730

Khromushkin, A. I., ed., M. N. Rabinovich 1949 PRESSURIZED SUITS AND OXYGEN-RESCUE EQUIPMENT FOR HIGH-ALTITUDE FLIGHTS. (SKAFANDRY I KISLORODNO-SPASATEL'NAYA APPARATURA DLYA VYSOTNYKH POLETOV) (State Publishing House of the Defense Industry, 1949) A. I. D. Library of Congress No. AID 455-I

ABSTRACT: This work deals with the theory and construction of pressurized suits and oxygen-rescue equipment. The author has summarized in one book various separate data on devices securing the safety of high-altitude flights. He asserts that this is the first attempt to gather such information scattered in Soviet and foreign literatures. Since the knowledge of some physiological and hygienic problems is important for designing pressurized suits and oxygen-rescue devices, a chapter on physiology is included. The book is concerned with flights over 12, 000 m when oxygen equipment for the emergency rescue of the crew is essential, and with flights over 14, 000 m when pressure cabins and strato suits are absolutely necessary. Full explanations of the construction and application of these devices are given, with illustrations, tables and diagrams. (CARI)

731

Kiehl, P.F. 1960 GUIDE TO AIRCREW PERSONAL AND AIRCRAFT INSTALLED EQUIPMENT. (Directorate of Systems Engineering, Wright Air Development Div. Wright-Patterson AFB, Ohio) WADD Technical Note 60-230 (Supersedes WADC TN 58-259) Sept. 1960. ASTIA AD 246 659.

ABSTRACT: A catalog format has been used in this technical note to describe and illustrate both personal equipment for aircrews and the equipment installed in aircraft that is of special interest to aircrews. The document includes information on special high altitude and long range flight clothing, personal and aircraft-installed oxygen equipment, survival kits, life rafts and preservers, parachutes, in-flight feeding systems, survival food packets, and aircraft-installed food service equipment. Brief descriptions of 128 items are included along with photographs illustrating the items.

This technical note is intended as a supplement to Air Force Supply catalogs and Air Force Manual 64-4, "Handbook For Survival Training and Personal Equipment Personnel."

732

King, B. G. et al 1948 SHOULDER HARNESS AND THE PILOT'S TASK IN OPERATING CONTROLS IN TRANSPORT TYPE AIRCRAFT. Civil Aeronautics Administration, Prepublication Release, 4 May 1948.

ABSTRACT: The Working Group of the CAA-CAB Subcommittee has recently reviewed reports received from members of the Air Transport Association in answer to a questionnaire on the use of shoulder harness by the pilot and co-pilot of transport type aircraft. A number of the replies raised the question as to whether the pilot and co-pilot could reach and operate the aircraft controls while wearing shoulder harness. Accordingly, the members of the group made a survey of five transport type aircraft to answer this question. The results of these studies constitute the subject matter of this report.

The results of the surveys of the various aircraft demonstrated that the present standard extension allowance of 18 inches will permit pilots to reach forward or to the side and allow sufficient freedom to grasp and operate all controls in the transport aircraft studied.

733

King, B. G. 1951 TIMES AVAILABLE FOR PROTECTIVE MEASURES IN EMERGENCIES AT HIGH ALTITUDE.
(Civil Aeronautics Administration, Washington, D.C.)

ABSTRACT: In explosive or extremely rapid decompression, some of the stresses may act upon man so rapidly as to preclude the possibility of applying remedial or protective measures, while others allow a brief or a relatively extended period for appropriate action. The rapid or "instantaneous" stresses include airblast and gas explosion. The delayed stresses include anoxia, aeroembolism, and cold.

734

King, B. G. 1951 AIRCRAFT EMERGENCY EVACUATION. A METHOD FOR EVALUATING DEVICES, PROCEDURES AND EXIT PROVISIONS. (US Department of Commerce, Civil Aeronautics Administration, Office of Aviation Safety) April 1951.

735

King, Barry G. 1959 PROTECTION IN AIRCRAFT ACCIDENTS
Medical Annals of the District of Columbia, October 1959

ABSTRACT: While both theoretically and in practive shoulder harnesses and reverse seating afford greater protection than do seat belts, the very real benefit of the belts in crash injury protection should not be underestimated. Further, the likelihood of the seat belt per se being responsible for a fatal or serious accident is so small as to be statistically negligible. Shoulder harnesses will provide even greater protection and should be unequivocally recommended for pilots of private, commercial and transport planes, and for passengers in private planes who fly repeatedly and are well informed on aviation matters. Shoulder harnesses are, however, quite impractical for the air transport passengers. Reverse seating, with lap belts, holds promise for increased safety for the future, provided practicable engineering design solutions are developed to insure adequate strength of the seat and its attachment at a reasonable weight and there is public acceptance and demand for the greater crash injury protection afforded by this arrangement.

736

King. R.L. 1945 REQUIREMENTS FOR PILOT EJECTION IN FIGHTER AIRPLANES
(Air Materiel Command, Army Air Forces) Report DC-356, Supplement No. 1
Serial No. TSEAL2-4534-7-2 ASTIA ATI 186 680

ABSTRACT: The purpose of this study was to develop and engineer a satisfactory pilot ejection type seat for incorporation in all production and service P-80 airplanes and in all future production and experimental P-84 aircraft. The basic design requirements for the ejection seat and the ejector gun are given in this memorandum and it is recommended that this information be furnished to designers and manufacturers of fighter airplanes.

737

Kuntz, W.H. 1948 THE DORNIER-335 PILOT EJECTION SEAT.
(AMC, Wright-Patterson AFB, Dayton, Ohio) Technical Report F-TR-1191-ND,
Aug. 1949. ASTIA ATI 27204

ABSTRACT: The Dornier-335 Ejection Seat was developed by the Germans, during the latter part of World War II, to provide a means of escape from high-speed aircraft. The seat is ejected from the airplane by a piston-type catapult,

utilizing compressed air stored in three steel bottles of two liters capacity each, pressure of 1707 pounds per square inch. The system produced an ejection velocity of approximately 57.4 feet per second at maximum accelerations of approximately 25 "G". The seat has a total vertical adjustment of 2-7/16 inches. The seat back is parallel to the ejection angle, which is 13° from vertical.

738

King, R.L. 1945 DEVELOPMENT OF PILOT EJECTION GUN AND ITS EXPLOSIVE CHARGE FOR USE WITH P-80 P-84 AND P-86 AIRPLANES (Engineering Division, Army Air Force) TSEAL2-4534-7-1, 8 October 1945, ASTIA ATI-172503

ABSTRACT: This is a report made by the author to Frankford Arsenal, Philadelphia, Pennsylvania, to assist in the design and development of a suitable pilot ejection gun and its explosive charge for use in P-80, P-84, and P-86. airplanes. A detailed Technical Report on the development work undertaken by Frankford Arsenal will be presented by Aviation Ordnance Section at a later date. As a result of the tests, it is recommended that this ejector gun be installed in a P-61 airplane for the purpose of conducting extensive flight tests to insure its satisfactory operation and to procure data on velocities, trajectories, rotation, etc. Also, upon completion of satisfactory operational tests of the ejection gun, it be installed in P-80 radio controlled airplane for high speed ejection flight tests. Upon completion of satisfactory high speed operational tests of the ejector gun, it should be installed in all service P-80, P-84, and P-86 airplanes.

739

Kirchner, O.E. 1958 CRASH FORCES AND SEATING
(Paper, Eleventh Annual International Air Safety Seminar, Atlantic City, New Jersey, November 11, 1958)

740

Kirchner, O.E. 1960 "NOTES" COVERING THE 13TH ANNUAL INTERNATIONAL AIR SAFETY SEMINAR OF THE FLIGHT SAFETY FOUNDATION.
(Boeing Airplane Company, Transport Division, Renton, Washington)

ABSTRACT: The objective in preparation of these "notes" is to provide a reader in one sitting with just enough information to cover the main thoughts expressed by the author or authors. Those with a more direct interest in a particular subject are referred to the original paper and where desired to the author direct. All papers presented at the Seminar are not included in these "notes" since some fall into the category of being "off-the-record".

741

Kittinger, J.W. 1959 A SUGGESTED PROGRAM DESIGNED TO REDUCE THE NUMBER OF FATALITIES OCCURRING DURING EJECTIONS AND BAILOUTS. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: Sufficient emphasis is placed on parachute and ejection training during the aviation cadet program; however, once the pilot or aircrew member is in an operational outfit this training is not pursued. Regulations require continual refresher training in the use of oxygen equipment, but there is no requirement placed on refresher training on the use of parachutes and escape systems. This lack of familiarity with the escape equipment might cause air crew members to delay that fatal second when the situation demands immediate action. Several solutions in getting a better aircrew member "psychology of escape" are discussed. (J. Aviation Med. 30(3):190, March 1959.)

742

Kitts, W.W., A. Nakai, S.M. Prather, & J.H. Best 1960 INTERIM REPORT ON PARACHUTE RECOVERY AND IMPACT SYSTEMS (Chance Vought Aircraft) 29 February 1960 ASTIA AD 263 499

ABSTRACT: This interim report contains information on the parachute recovery system for the Integrated Flight Capsule Program flight test vehicle. The various energy absorption systems investigated for the landing impact conditions are also discussed.

743

Kitzes, G. 1959 OCCUPATIONAL HEALTH PROBLEMS IN SPACE FLIGHT: IMPORTANT HEALTH PROBLEMS IN THE MAN-IN-SPACE STUDIES AT THE AERO MEDICAL LABORATORY Military Medicine 124 (10): 717-719, Oct. 1959

ABSTRACT: Problems related to man's survival in space are briefly reviewed and categorized. The primary objectives of space-medical research are to provide an environment, workspace, and sustenance for the space traveller that will allow him to carry out his mission with maximum efficiency and protect him from irreversible injurious body changes. Basic requirements -- physiologic (metabolic, environmental), psychologic (isolation, weightlessness, workspace, reduced sensory environment), and requirements pertaining to protection (from radiation, toxic chemicals and odors, noise and vibration, acceleration, natural infection, disorientation) are outlined.

744

Klemin, A. 1933 CORSETS FOR AVIATORS.
Scientific American, 149:80, Aug. 1933

ABSTRACT: Concerns acceleration and deceleration forces on pilots and protection devices to increase g tolerance.

745

Knacke, T. 1946 ABSTRACT FROM INFORMATION REPORT CONCERNING THE INVESTIGATIONS DEVELOPMENTS OF THE PARACHUTE DIVISION OF THE FORSCHUNG-SANSTALT GRAF ZEPPELIN, DATED 14 JULY 1945.
(War Dept., Air Forces) TSEAA-660-99, Appendix C, Feb. 1946.

746

Knacke, T. 1947 NOTES ON DECELERATION AT BAIL-OUT OF AIRCRAFT
(U.S. AAF-AMC) Memorandum Report TSETE-672-22, April 10, 1947

747

Knacke, T. W. 1952 HIGH-ALTITUDE PARACHUTE RECOVERY
In White, C. S., & O. O. Benson, Jr., eds., Physics and Medicine of the Upper Atmosphere, A Study of the Aeropause (Albuquerque, N. Mex.: Univ. of New Mexico Press, 1952) pp. 447-456

748

Knacke, T.W. and L.I. Dimmick 1962 DESIGN ANALYSIS OF FINAL RECOVERY PARACHUTES B-70 ENCAPSULATED SEAT AND THE USD-5 DRONE (Space Recovery Systems, Inc., El Segundo, Calif.) Contract AF 33(616)8371, Proj. 6065, ASD TDR 62-75, 1 May-31 Dec 61, ASTIA AD-277 424

ABSTRACT: A performance analysis was conducted on two parachute recovery systems developed for the B-70 encapsulated seat and the USD-5 surveillance

drone. Optimization of aerodynamic and textile design, controlled deployment and opening, and use of a cluster of two independently deployed parachutes for the USD-5 drone resulted in a highly predictable performance, in the highest known drag area per weight ratio for the USD-5 system, and a high velocity capability for the B-70 system. Equations were developed through data analysis for the opening process and the drag area increase versus time during parachute opening for extended skirt parachutes. These equations permitted a computer analysis of the total parachute acceleration process with computer results showing less than 10% deviation from actual test data. The developed computer method may well be suitable for performance analysis of recovery processes using ribbon, ring slot, and other solid material type parachutes. (Author)

749

Knerr, W.C. 1959 UNDERWATER ESCAPE PROGRAM: Description of High and Low-Level Test Drops Using F-9F and F86 Airplanes; and a 50-Foot Dummy Head Drop Test. (Naval Air Development Center, Johnsville, Pa.) Report No. 7, Proj. TED No. ADC AE-6307, NADC ED-5841, ASTIA AD 219 106

ABSTRACT: The results and analysis of aircraft water-crash tests simulating the 50-foot fall from an aircraft carrier deck are presented in this report. Important pilot survival parameters such as water-impact forces, accelerations, canopy implosion characteristics, and aircraft rate of sink are fully discussed These tests were conducted at Key West, Florida from April through July 1958 on completely instrumented F9F-series straight wing aircraft and F86 swept-wing aircraft. (Author)

750

Knerr, W. C. and S. S. Kress 1959 PRELIMINARY PROPOSED MILITARY SPECIFICATION CANOPY, AIRPLANE, DESIGN FOR UNDERWATER REMOVAL. (Naval Air Development Center, Johnsville, Pa.) Proj. TED no. ADC-AE-6307, Report no. NADC ED-5928; AD 231 395.

ABSTRACT: This specification contains the requirements for the design, performance and testing of hinged or sliding airplane canopies with capabilities for underwater removal or opening to permit underwater egress on VF, VA, and VT type aircraft.

751

Knowles, W. R. 1957 A REVIEW OF CRASHWORTHY DESIGN IN LIGHT AIRCRAFT (Aviation Crash Injury Research, A Division of Flight Safety Foundation, Inc., Phoenix, Arizona) Report AvCIR-53-0-87, June 1957

752

Knowles, W. R. 1959 THE IMPORTANCE OF DESIGNING FOR CRASH SAFETY IN ROTARY-WING AIRCRAFT (Aviation Crash Injury Research, A Division of Flight Safety Foundation, Inc., Phoenix, Arizona) Report AvCIR-60-0-103, May 1959

753

Konecci, E.B. 1957 PHYSICAL AND PHYSIOLOGICAL FACTORS IN MAJOR AIRCRAFT ACCIDENTS
(Directorate of Flight Safety Research, USAF, Norton AFB, California)
AFCFS-G-2, M-4-57, 13 February 1957.

754

Koehling, E.F. 1960 INTEGRATED FLIGHT CAPSULE ENVIRONMENTAL CONTROL SYSTEM STUDY (Chance Vought Aircraft, Inc., Dallas, Texas) 23 March 1960.

755

Knowles, W.R. 1958 "Crash Design from Crash Injury Research."
U.S. Army Aviation Digest 4:12-15

756

Konecci, E. B. 1958 HUMAN FACTORS AND SPACE CABINS
Astronautics 3(1):42, 43, 71, Jan. 1958

ABSTRACT: A look at the engineering and technological problems associated with keeping living components operating at peak efficiency in space, and how R & D work in this area is helping in the solution of such problems. (Literatuuroverzicht (Over Ruimtevaartgeneeskunke) (Space Medicine Bibliography) (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, den Haag, Netherlands) Rept. No. TDCK-16903; ASTIA AD-227 817; Feb. 1959)

757

Konecci, E.B. 1957 PHYSIOLOGICAL FACTORS IN USAF AIRCRAFT ACCIDENTS (Paper, 28th Annual Meeting of Aero Medical Association, Denver, Colo., May 6-8, 1957) See also J. Aviation Med. 28(6):553-558.

CONCLUSIONS: In conclusion, we can say that factors affecting the normal physiologic state of the pilot (or crew) are contributing causes rather than primary causes of major aircraft accidents. A few physiologic conditions like hypoxia and vertigo/disorientation were primary causes. Fatigue appeared as a contributing factor in a number of accidents but the incidence appears to be decreasing i.e., thirty-four cases in 1955 to thirteen in 1956. G forces and vibrations appeared as contributing factors in a large number of accidents; however, their significance could not be fully evaluated from the available data. The adversities of decompression, physical disturbances, hyperventilation, hypoglycemia, carbon monoxide poisoning, and air sickness do not seem to be primary problem areas.

758

Konecci, E. B. 1958 DECOMPRESSION EVENTS IN BIO-SATELLITES (Paper, ARS Semi-Annual Meeting of the American Rocket Society, Los Angeles, California, June 8-12, 1958)

ABSTRACT: Safety aspects in accidental decompression include: (a) structural techniques like Whipple's meteor bumper wall, multiple construction and thicker wall construction; (b) self sealing techniques; (c) detection of leaks; (d) warning the human occupants; (e) reserve high pressure gases to delay the decompression; (f) use of full pressure suits; (g) personnel training for emergency conditions; and (h) other devices like compartmentation, recompression chamber, pressurized bunks or seat capsule, pressure bag and repair kit for sealing leaks. (Literatuuroverzicht (Over Ruimtevaartgeneeskunke) (Space Medicine Bibliography) (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, den Haag, Netherlands) Rept. No. TDCK-16903; ASTIA AD-227 817; Feb. 1959)

759

Konecci, E. B. 1958 SPECIFIC FACTORS IN SPACE CABIN DESIGN - PROBLEMS OF RESPIRATION AND DECOMPOSITION WITH SEALED-CABINS. (Paper, Society of Automotive Engineers National Aeronautic Meeting, Los Angeles, Calif., Sept. 29 - Oct. 4, 1958)

ABSTRACT: For short duration space flights, attaining and maintaining an adequate atmosphere should be possible with conventional oxygen systems, and chemical carbon dioxide absorbers. However, for long duration flights lasting weeks, months or years, regenerative systems, (e.g. biological photosynthesis via algae,

photolysis of carbon dioxide with production of oxygen) will be required since payloads will be restricted in cubage and weight.
In vivo and in vitro photosynthesis experiments should be encouraged and supported to obtain a practical biological or photochemical closed ecological system. In addition, experiments involving photolysis of carbon dioxide with ultraviolet light and return of oxygen for re-use in the cabin should be exploited since there is an abundance of free UV light in space.
A hermetically sealed-cabin is a mandatory requirement for extended space flight operations. Leaks through structures and seals may prove to be more important than meteoroid penetrations. If, for some reason hermetic sealing is not possible on the first space cabins, then leaks rates will have to be precisely calculated so that adequate oxygen reserves are carried on board. The longer the exposure of the cabin in space the greater the probability of a penstrating hit by a meteoroid. In general, the expected meteoroid holes will be very small. However, to prevent excessive loss of oxygen, these leaks will have to be rapidly detected and sealed. (Literatuuroverzicht (Over Ruimtevaartgeneeskunke) (Space Medicine Bibliography) (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, den Haag, Netherlands) Rept. No. TDCK-16903; ASTIA AD-227 817; Feb. 1959)

760

Konecci, E. B. 1959 HAZARDS OF SEALED CABINS, Astronautics, 4 (2): 40-41: 48-51 Feb 1959

Summary: Sealed cabin systems in space flight are exposed to certain physical conditions which may affect the physiologic and psychologic well-being of their occupants. The more obvious hazards are high acceleration at the launching and during ascent; weightlessness accompanied by circulatory, nervous, and digestive disturbances during orbital flight; temperature and humidity changes within the cabin, which may exceed the limits of human tolerance, and on the outer surface, which may affect the surface coating of the capsule and further disrupt the thermal balance; radiation storms such as those encountered by the Explorer satellites; and collisions with meteoroids or leaks through structures and seals, which might result in decompression. To remain alive in space, man will require an artificial environment defined by his physiology, and he must rely upon the spaceship, especially the complex sealed-cabin system, to fulfill and maintain this requirement. Environmental control is necessary, particularly with regard to carbon dioxide, carbon monoxide from smoking, overheating of equipment and fires, ammonia from urine, methane and hydrogen from flatus, evaporation of sweat and glandular excretions of the skin, and indole, skatole, H_2S, phenol, and various amines from the feces. This may necessitate the conservation of materials by conversion and recycling.

761

Konecci, E.B. and A.J. Carah, and S. Deutsch 1960 HUMAN FACTORS IN MISSILES AND SPACE SYSTEMS DESIGN
(American Rocket Society ARS Anatomy of Manned Space Operations Conference, October 10-12, 1960)

ABSTRACT: Couglas Aircraft Company, Inc. looks upon human factors and life sciences activities as an integral and necessary part of the design processes of missile and space systems, and its hardware. Such activity has become accepted as useful and necessary by the designers, primarily as a result of positive benefits already demonstrated.

762

Konikoff, J. J. 1961 SPACE FLIGHT ECOLOGIES
(Space Sciences Laboratory, General Electric, Missile & Space Vehicle Dept.) Report R61SD200; ASTIA AD-268 509; Dec. 1961

CONCLUSIONS: Two systems have been described in this paper for the support of human life in sealed space vehicles. The first system, a partially closed ecology, has a number of important advantages: 1) It is composed of subsystems which have been found to be feasible by experimental methods. 2) As a result of this feasibility and the regeneration and recovery of man's metabolic waste materials, large weight savings can be effected over a finite flight time. 3) Since the subsystems comprise known reactions and to a great extent known yields from these reactions, the so-called lead time in assembling such a complete life support system should be relatively short. In fact, it is estimated that within perhaps one to two years a system of the type described could be assembled and tested. This latter point is of great importance when it is remembered that multi-manned cis-lunar flight experiments are currently being planned for the immediate future.
The second ecological system presented is a much more ambitious one and requires a considerable amount of research and development. Not only is research necessary with respect to the metabolism of algae, but appropriate equipment must be designed for such things as equilibrium maintenance, waste management and food processing. In addition, the very considerable problem concerning the utilization of light by the cell and the source of this light is of prime importance. The search should continue to find better strains of micro-organisms or to optimize those strains that are now being used. The system described appears to offer the greatest promise for the indefinite (planetary station) or extremely long flight time. (AUTHOR)

763

Koochembere, C.T 1952 HUMAN FACTORS RELATIVE TO THE PROBLEM OF ESCAPE-EJECTION ACCELERATIONS. (Paper, Conference on Problems of Emergency Escape in High Speed Flight, 29-30 Sept. 1952, at Wright-Patterson AFB, Ohio) ASTIA AD-14 347

ABSTRACT: This paper concerns itself with research work associated with ejection accelerations and how this data has been utilized in the development of equipment that will safely eject pilots from high performance aircraft. German and British experiments on human tolerance to acceleration are reviewed. On the basis of the data obtained in these experiments, the Martin Baker Aircraft Company developed a high-performance catapult, on which test subjects were exposed to 17-21 g over periods from 0.15 - 0.25 seconds. No injuries or undesirable side reactions were sustained. The firm developed a face curtain "for effectively maintaining the proper body and head position and relieving some fo the loading on the vertebrae during ejection strokes without injury or notable discomfort.

764

Korol'kov, O. N. 1961 CALCULATING THE LOAD FLOOR OF AN AIRCRAFT. Izvestiya Vysshikh Uchebnykh Zavedeniy Aviatsionnaya Tekhnika No. 3, pp. 78-88, 1961 (Translation Services Branch, Foreign Technology Division, Wright-Patterson AFB, Ohio) Translation No. FTD-TT-61-204/1+2; ASTIA AD-269 152; 7 Dec. 1961

CONCLUSIONS: (1) The elasticity of the fuselage does exert a considerable effect on the magnitude of bending moments of non-sandwiched longitudinal beams.
(2) In some instances, when on account of fuselage elasticity there is a sharp rise in the calculated moments of the beams, it is more convenient to change intc longitudinal sandwich beams.
(3) The approximate method of calculating floor cover with consideration of fuselage elasticity, suggested in the report, is very simple and warrants sufficient accuracy for practical calculations. (AUTHOR)

765

Korsak, K. 1960 TRAJECTORIES OF OBJECTS EJECTED FROM AIRCRAFT. Can. Aeron. Journal 6(1):3-9 Jan. 1960

ABSTRACT: A method of calculating the trajectories of objects, such as occupied seats or capsules ejected from an aircraft is presented.

766

Kramer, S.B. & R.A. Byers 1960 A MODULAR CONCEPT FOR A MULTI-MANNED SPACE STATION
In: Proceedings of the Manned Space Stations Symposium, (New York: Institute of Aeronautical Sciences, 1960) Pp. 36-73

ABSTRACT: Contains a section on the Micro-Ecology which is broken down into the following subsections: Biochemical (Respiratory, Nutritional, Waste); Psychological (Termal, Vibratory and Aurol, Gravitational); External Phenomena (Radiation, Meteors); and Hardware (Micro-Atmosphere System, Equipment Weights plus Power).

767

Kooy, J.M.J. 1952 SOME PROBLEMS OF INTERPLANETARY TRAVEL
Ing. 64:37-45, 1952

ABSTRACT: "Calculation of satellite vehicle and escape vehicle. Discussion of overall mass-ratio as a function of exhaust velocity and acceleration."
Brit. Interplan. Soc. J. 12:85, Mar. 1953

768

Kresser, S.L. & R.J. Sippel 1962 PUBLICATIONS OF THE JET PROPULSION LABORATORY, JULY 1961 THROUGH JUNE 1962
(Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, Calif.) JPL Bibliography 39-3 NASA Contract NAS7-100

ABSTRACT: This bibliography has been divided as follows: author, index, summary publications, astronautics information, numerical index, and subject index.

769

Kuklewicz, E. F. 1950 STATIC ULTIMATE LOAD OF FOUR MAN TROOP SEAT WITH REINFORCED CANVAS SEAT BOTTOM. (Fairchild Aircraft - Hagerstown, Md.) (LT110-722) Test Model C-119B, 25 Aug. 1950 ASTIA ATI 135 824.

770

Kuntz, W.H. 1946 PILOT EJECTION SEAT TESTS AT MUROC ARMY AIR FIELD. (Engng. Div., AMC, Wright-Patterson AFB, Dayton,Ohio) July 1946. ASTIA ATI 43122

ABSTRACT: Report is given of pilot ejection seat tests conducted from an F-61B fighter. Detailed description and general remarks are given for each test. Curves showing the trajectory of seat and dummy with respect to the test airplane after ejection are included. Still prints from the motion picture records of the tests are given. It is concluded that this pilot ejection seat is satisfactory for ejecting a 200-lb dummy and parachute equipment from an airplane in flight up to velocities of approximately 290 mph IAS at 12,000 ft altitude. Automatic devices are satisfactory for releasing the lap belt and the dummy's parachute when proper inspection is applied. Recommendations are given for future tests.

771

Kuntz, W.H. 1948 THE DORNIER 335 PILOT EJECTION SEAT. (LeBoeuf Co., Dayton, Ohio) Report 2-R-001, Feb. 1948. ASTIA ATI 54820

ABSTRACT: The Dornier 335 pilot ejection seat was evaluated to determine if the system or any features thereof might be of value to the USAF in developing ejection seats as a means of emergency escape from high speed aircraft. The seat was ejected by a piston type catapult utilizing compressed air as a source of energy, and the system produced an ejection velocity of approximately 57.4 fps at maximum accelerations of approximately 25 g. The system is described in detail, including performance data and a comparison of Dornier 335 and USAF ejection systems. The complete Dornier installation was studied to determine the relationship between the various components of the system, and the measurements of significant features were recorded. It was found that there are no advantages of this system over the present USAF ejection system utilizing a powder charge catapult.

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

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772

Lafferty, R.E., R. Graetzer 1957 A STRAIN GAUGE METHOD OF MEASURING WIND-BLAST ON FLIGHT HEADGEAR. WADD TR 57 204, ASTIA AD 118169

ABSTRACT: The headgear, such as helmets, oxygen masks, etc., worn by pilots must be able to withstand the windblast conditions encountered during emergency ejection from a moving aircraft. During the course of the tests herin described, strain gauges were used to measure the forces exerted by the windblast. When plotted, the data obtained gave qualitatively consistent graphs, and when correlated with high speed motion pictures of the test runs, indicated this method of instrumentation to be a feasible means for windblast force measurements.

773

Laine, C. O. 1961 EVALUATION OF ARMY PARACHUTE, PERSONNEL, TYPE A/P28S-3. (Air Force Flight Test Center, Edwards AFB, California) Addendum II to AFFTC-TR-61-37; ASTIA AD-261 954; Aug. 1961

ABSTRACT: This addendum presents the recommended procedures and techniques for using the "Army Free-Fall Parachute Assembly, A/P28S-3" in conjunction with C-130 C-119, C-123, C-54, C-47, SA-16, and U-1A (Army) aircraft. (AUTHOR)

774

Laine, C.O. 1962 TESTS OF H. KOCH AND SONS, INC., PARACHUTE HARDWARE. (Air Force Flight Test Center, Edwards AFB, Calif.) Technical Documentary Rept. no. 62-36, ASTIA AD- 292981, Nov. 1962

ABSTRACT: This report presents the results of testing experimental personnel parachute hardware designed by Koch and Sons, Inc., Corte Madera, California.

The test items were adjustable connector assemblies, Koch P/N015-10236-1 and canopy release assemblies, Koch P/N015-10217-9. The test items were installed on standard parachute pack and harness assemblies, P/N 51J7730.

The purpose of the tests was to determine the structural strength of the parachute hardware by subjecting it to dynamic loads of 7000 to 9000 pounds and to determine the suitability of the parachute hardware for use on personnel parachutes designed for emergency escape from Century type aircraft by conduct of live jump parachute tests.

The parachute hardware withstood the required dynamic load tests without any deformation. All test parachutists commented favorably on wearing comfort and ease of operation. The experimental parachute hardware is considered suitable for use on personnel parachutes

775

Lakeman, G. M. 1961 SAFETY AND EMERGENCY EQUIPMENT FOR AIRCRAFT CREWS - BIBLIOGRAPHY.
(Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, Den Haag, Nederland) Rapport TDCK Nr. 24600A. ASTIA AD 256 063.

ABSTRACT: This bibliography contains a list of reports, articles and other materials on safety- and emergency equipment for aircraft crews. Sources of materials were compiled from the files of the Netherlands Armed Services Technical Documentation and Information Center, the Central Luchtvarrt Documentatie Dienst and the Index Aeronautics from 1954-1961.

776

Lambert, E.H. 1945 COMPARISON OF THE PHYSIOLOGIC EFFECTS OF POSITIVE ACCELERATION ON SUBJECTS IN THE MAYO CENTRIFUGE AND IN AN A-24 AIRPLANE
(Army Air Forces Materiel Center) Contract No. w(33-038) ac-9166; August 1945; ASTIA ATI 13248

ABSTRACT: An RA-24A Douglas Dauntless dive bomber has been equipped for study of the physiologic effects of positive acceleration on the human subject in flight. The physiologic changes studied in the airplane were the visual symptoms, the changes in the ear pulse, the blood content of the ear and the pulse rate. Motion pictures of the subjects we e taken in many instances. G tolerance as measured by the occurrence of visual symptoms was on the average 0.7 g higher in the airplane than on the Mayo centrifuge. The level of acceleration at which loss of the ear pulse occurred was on the average 0.5 g higher in the airplane. The observations included in this study establish the essential aimilarity of the effects of positive acceleration on subjects in the airplane and on the centrifuge. They support the validity of applying the results of centrifuge studies to conditions of actual flight

777

Lambert, E.H. 1945 COMPARISON OF THE PHYSIOLOGIC EFFECTS OF POSITIVE ACCELERATION ON SUBJECTS IN THE MAYO CENTRIFUGE AND IN AN A-24 AIRPLANE (Submitted to Nat'l. Research Council, Sept. 1945, and as memo. rept. to Aero Medical Lab., Wright Field, Oct. 1945) CAM Report #467

ABSTRACT: This study was undertaken to determine whether or not there are differences between the subjective and objective physiologic changes which occur in human subjects as a result of exposures to positive acceleration on a centrifuge as compared with those which occur in an airplane. The pulse rates of the subjects both prior to and during exposure to acceleration were higher in the airplane than they were on the centrifuge. On the other hand, the actual cardiac acceleration resulting from exposure to a given magnitude of acceleration was less in the airplane than on the centrifuge, while the increase in pulse rate on exposure to accelerations which produced an equal degree of impairment of vision was almost the same in the two instances. The general pattern of the change in pulse rate during exposure to acceleration was the same in the airplane and centrifuge, although like other events the maximum cardiac acceleration was attained slightly earlier in the airplane.

778

Lambert, E. H. 1945 COMPARISON OF THE PROTECTIVE VALUE OF AN ANTIBLACKOUT SUIT ON SUBJECTS IN AN A-24 AIRPLANE AND ON THE MAYO CENTRIFUGE (Mayo Aero Med. Unit Memo Rept. to AAF Material Center. Contract No. W(33-038) ac-9166. Serial Rept.: Series B, No. 2)
See also: J. Aviation Med. 21(1):28-37, Feb. 1950.

779

Lambert, E.H. 1945 COMPARISON OF THE PROTECTIVE VALUE OF AN ANTIBLACKOUT SUIT ON SUBJECTS IN AN A-24 AIRPLANE AND ON THE MAYO CENTRIFUGE. CAM Report #487, October 1945

780

Lambert, E. H., & E. H. Wood 1952 SOME FACTORS WHICH INFLUENCE THE PROTECTION AFFORDED BY PNEUMATIC ANTI-G SUITS. J. Avia. Med. 23:218-228

781

Lamport, Hoff & Herrington 1944 REVIEW OF METHODS OF APPLYING AIR PRESSURE TO THE EXTREMITIES FOR PROTECTION AGAINST ACCELERATION WITH MEASUREMENTS OF THE EFFECTIVE PRESSURES ON THE SKIN
(National Research Council, Committee on Aviation Medicine, Washington, D.C.)
CAM Rept. No. 228; 24 November 1944

782

Lamport, H. & L.P. Herrington 1944 CENTRIFUGE TESTS OF THE PNEUMATIC LEVER ANTI-"G" SUIT
(National Research Council, Committee on Aviation Medicine, Washington, D.C.)
CAM Rept. No. 368; 14 June 1944

ABSTRACT: Nine male subjects tested the PLS inflated to 1.14 to 1.85 psi on the Wright Field Centrifuge. Overall protection against all visual symptoms was 1.38 "g". Roughly equal protection was obtained against all visual symptoms The PLS suit offers promise of cooler anti-"g" device than those suits where pressurized bladders cover large areas of the body.

783

Lamport, H., & L. P. Herrington 1944 PRESSURE EXERTED ON THE LOWER EXTREMITY BY THE LATEST MODELS BERGER SINGLE PRESSURE ANTI-"G" SUIT AND PNEUMATIC LEVER ANTI-"G" SUIT. (Yale) CAM No. 294; 27 March 1944

ABSTRACT: (a) The pressures imparted to the tissues of the leg by latest models pneumatic Berger single pressure suit and Yale pneumatic lever suit were measured during inflation with acceleration.
(b) Berger SPS gives maximum pressure on calf, the PLS gives gradient pressure decreasing from ankle to the thigh.
(c) The PLS gives much more uniformity of pressure at any given level than the Berger SPS.
(d) Berger SPS is painful over the thighs without acceleration when inflated higher than 7 psi. The PLS is not painful.
(e) It is thought that uniformity of pressurization and provision of gradient pressure might give added "g" protection to PLS.
(f) Further development of PLS and its trial in centrifuge and plane seems indicated

784

Lamport, H., W.C. Clark & L.P. Harrington 1945 THE COMFORT AND ACCELERATION PROTECTION ON THE CENTRIFUGE OF THE L-12 PNEUMATIC LEVER ANTI-BLACKOUT SUIT
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 483; 1 May 1945

ABSTRACT: Comparison between Pneumatic lever suit and the G-4 suit. Subjects preferred lever suit assuming each gave equal protection.

785

Lamport, H. & L.P. Harrington 1945 TEST OF THE GENERAL ELECTRIC ACCELERATION ACTIVATED AIR PRESSURE REGULATOR (P-321-14) AND VALVE (P-321-13)
1 May 1945

786

Langner, F. C. 1960 CONDUCT STUDY, DESIGN, DEVELOP AND FURNISH PROTOTYPES OF ENERGY ABSORPTION SYSTEMS FOR AIRCRAFT SEATS (Aerotec Industries, Inc., Aerotherm Div., Bantam, Conn.) Contract NOas 57-367-c; ASTIA AD-272 672; 30 March 1960

ABSTRACT: This investigation proved a tube and die energy absorption system can be mounted on a catapult tube and be secured to the ejection seat by its trunnion bolts.
The energy absorber unit was statically and dynamically tested to prove its reliability and load qualities. Final design consists of a 3-1/8" dia. x .049" 4130N steel draw tube secured to the catapult tube by a threaded adapter. A trunnion mounted die is fastened to the ejection seat with two brunnion bolts. The die and its guide sleeve have a maximum O.D. of 3.250" while the inner drawing surface is 2.975" diameter. Provisions are made for 4" of E/A motion with a loading of 7600 lbs. The completed unit weighs 3.31 pounds.
The second phase of this report showed that a tube and die vertical energy absorption system can be adapted to a crew member seat. The energy absorption unit was tied in with the vertical adjustment of an Aerotherm Model 442 Helicopter seat to provide 2" of energy absorber motion when the seat was fully down and 4" maximum movement when the seat is 2" above the lowest point. During static seat test the energy absorption units operated satisfactory. The energy absorption prototype units secured to the three 442 seats use a 7/8" x .035" 4130N steel draw tube with a die I. D. of .851" diameter. These units will go into operation when a 4810 lb. down load is applied to the 442 seat. The E/A units weigh .89 pounds each while the total conversion adds 5.8 pounds to the original seat.

The tube and die energy absorber system possess the following characteristics desirable for an efficient system.
(1) Constant loading during the complete energy absorption cycle.
(2) Reliability of operation
(3) Irreversibility can be incorporated with few additional parts.
(4) Adaptability can readily be accomplished on ejection and crew seats
(5) Low weight energy absorption system.
(6) Simplicity of design for low manufacturing costs.
(AUTHOR)

787

Lansberg, M.P. 1955 ON THE ORIGIN OF THE UNPLEASANT SENSATIONS ELICITED BY MOVEMENTS DURING AFTER-SENSATIONS.
Aeromed Acta (Soesterberg), 4:67-72

788

Lanz, R. C. 1948 KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-82 AIRPLANE (Air Materiel Command, Wright-Patterson AFB, Ohio) Rept. MCREXAS-45341-3-4, 11 March 1948; ATI No. 22026

ABSTRACT: Tests were made to obtain data relative to the forces experienced by a pilot-dummy when ejected upward from high-performance aircraft by means of a catapult. Tests were made with a P-28 airplane. The measuring instrumentation consisted of a multi-channel recording oscillograph in conjunction with resistance-type acceleration, air pressure, and position transmitters. It was concluded that rearward accelerations become more critical at airspeeds above 430 knots and that armor plate should be attached to the ejection seat rather than the fuselage to reduce this acceleration. (ASTIA)

789

Lappin, A.N. 1949 DESIGN OF ROTATABLE SEAT FOR ACCELERATION ALLEVIATION (Cornell Aeronautical Laboratory, Inc., Buffalo, New York) December 1949; Report BC-531-S-16; ASTIA ATI 125 505

ABSTRACT: The rotatable seat, described in this report, is an acceleration sensitive device which automatically causes the pilot's or passenger's body to be oriented into a position which greatly increases his tolerance to high acceleration.

790

Latham, F. 1953 ANALYSIS OF EJECTION SEAT ESCAPES.
(Inst. Aviation Med., R.A.F., Farnborough) FPRC Rept. 851

791

Latham, F. 1955 PHYSIOLOGICAL REQUIREMENTS OF EJECTION SEATS.
(Inst. of Aviation Med., R.A.F., Farnborough) FPRC Memo 63, Sept. 1955

792

Latham, F. 1957 LINEAR DECELERATION STUDIES AND HUMAN TOLERANCE.
(Flying Personnel Research Committee, Gt. Brit.) FPRC Rept. No. 1012; June 1957. ASTIA AD 141 044.

ABSTRACT: The limits of physiological tolerance to linear deceleration lasting 0.2 to 0.4 secs. have been assessed for subjects wearing four types of Service torso-restraining harnesses without limb restraint. A combined harness alone, which is proposed for use in Service aircraft, should give protection up to 17 g, but above this figure serious injury is likely. If additional leg-restraint is employed, it is considered that the safe limit may be raised to at least 20 g. Above this figure arm, leg and head restraint, and a jerk in harness should give protection up to 25 g. Attention is drawn to the possible mechanism of injury to the larynx, face and chest. Peak intra-abdominal pressures of 450 mm. Hg, at 12 g have been recorded in a test subject. When the test subjects were relaxed prior to impact a protective extensor response in the lower limbs tending to brace the subject against the rudder pedals was not detected less than 100 milliseconds after impact. (Author)

793

Latham, F. 1957 A STUDY IN BODY BALLISTICS. SEAT EJECTION.
Proc. Roy. Soc. B. 197: 121-139, Aug. 1957
See also: (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 1016, Jan. 1957

ABSTRACT: To define the upper limits of tolerance for short-duration accelerations acting through the vertical axis of the body, subjective reactions from tests in vertical ejection rigs were assessed. Accelerometers on the head and waist recorded up to 30 g lasting 0.01 to 1.0 sec. Frequency and damping characteristics of the man-seat system were determined by vibrating the system over

the frequency range of 1 to 20 c./sec., and by use of sledge-hammer and seat-drop experiments. Tolerance was found to be conditioned by the force-time function of the ejection gun, the alignment of the body and seat, and the dynamic characteristics of the seat pack. For minimum overshoot of acceleration in the body the optimum duration of force was 0.23 sec. Low-frequency response of the man was the important variable, Previously defined limits of thrust should be adhered to as anatomical limits. Maximum overshoot in the body would result with a rate of acceleration change increased to 400 g/sec.

794

Latham, F. 1958 LINEAR DECELERATION STUDIES & HUMAN TOLERANCE
Clin. Sci. 17(1):121, Feb. 1958.

ABSTRACT: The physiological effects of decelerations up to 16 g, with a maximal rate of change of 300 g/second, were studied in human subjects on a rocket-propelled trolley apparatus. Four types of restraining harness were compared, including a conventional Royal Force "Z" harness comprised of shoulder and lap straps, a four-point harness incorporating leg (crutch), lap, and shoulder straps, and two three-point variations of the latter harness. Decelerations up to 12 g were found to produce no undue discomfort or bruising with any harness tested, provided that the head was flexed to an angle of 45° prior to impact. Above 12 g, bruising in the region of the lap belt and shoulder straps occurred, particularly in the absence of crutch straps. Location of the feet in aircraft rudder pedals resulted in a noticeable reduction in lap belt load, although no reflex leg muscle action could be distinguished until 100 milliseconds after the start of deceleration. Peak intra-abdominal pressures of 200-450 mm. Hg were recorded during deceleration. Electrocardiograms were normal immediately following impact, and pulse rates returned to normal resting rates (from 100-140 beats/minute during runs) within several minutes. It is concluded that the leg, lap, and shoulder harness gives protection up to 17 g but that serious injury is likely above this level. It is suggested that the safe limit of deceleration might be increased to 20 g with additional leg restraint, and to 25 g with a jerkin harness and arm, leg, and head restraints.

795

Laughlin, C. P. and W. S. Augerson 1961 PHYSIOLOGICAL RESPONSES OF THE ASTRONAUT IN THE MR-4 FLIGHT. (Results of the Second U. S. Manned Suborbital Space Flight, NASA Manned Spacecraft Ctr) Pp. 15-21, 21 July 1961.

796

Laurell, L. 1959 MEDICAL ASPECTS OF ESCAPE WITH EJECTION SEATS IN THE SWEDISH AIR FORCE. Medd Flyg Navalmed Namnd 8(2):1-6

797

Lautier, R.A. 1942 PILOT'S SEAT UNIT PROOF LOAD TESTS OF NO. 214-MODEL XAT-15. (Boeing Airplane Co., Wichita Div., Kans.) Report No. x120-6324, ASTIA ATI 104 196, Jan 1942

ABSTRACT: It is concluded from the tests made and from a study of the deflection curves which are a part of this report that, since the deflection points of various parts of the chair when plotted are all approximately straight lines, no part of the unit exceeded the elastic limit of the material used and is, therefore, sufficiently strong as now supplied.

798

Lautier, Roger A. 1942 PROOF LOAD TEST - PILOT'S SEAT - MODEL XAT-13 & 14 Warren McArthur Corporation, Bantam, Conn.; Fairchild Engine and Airplane Corporation, Aircraft Div., Hagerstown, Md.) Engineering Report No. 7709 ASTIA ATI 110 521

ABSTRACT: The purpose of the test described in this report was to apply static loads simulating the forces of acceleration on the #203 Pilot's Seat Unit to determine it's behavior while under Proof Loads. In each test 20% of the ultimate load was directly applied to the unit to remove any slack in the joints. Additional loads were applied in 20% increments by means of weights on a platform suspended from a whiffle tree or equivalent in order that after each increment was added the platform might be raised leaving only the initial 20% load. In this manner any set would be noted and plotted to warn of incipient failure. Measurements were taken by means of sliding wooden deflection guages clamped to the seat unit and test rig. All deflections were noted and plotted during the tests. In addition, photographs were taken at the 20% and proof loads, which negatives were later superimposed and the resulting positive prints show the behavior of all parts under the loads applied. The results of the tests showed that the seat unit withstood the applied loads without failing or retaining any permanent set.

799

Lautier, R.A. 1942 PROOF LOAD TEST - CO-PILOT'S SEAT - MODEL XAT-13 and 14 (Fairchild Engine and Airplane Corp., Aircraft Div., Hagerstown, Md.) Eng. Report No. 7710, ATI 109-433

ABSTRACT: The purpose of this report is to describe the results of tests in which static loads simulating the forces of acceleration were applied to the #204 Co-Pilot's Seat Unit to determine its behavior up to Proof Loads. Referring to the curves incorporated in this report which show the deflection of various parts while under the different loads, it will be noted that the deflections form approximately straight lines or form only the elastic portion of the materials used. Points below 20% of the ultimate loads should be neglected because their co-ordinates do not reflect true values due to the slack in the joints. It may be concluded therefore, that the seat unit is sufficiently strong as now supplied.

800

Lautier, Roger A. 1942 PROOF LOAD TEST - RADIO OPERATOR SEAT - MODEL XAT-13 and 14
Warren McArthur Corporation, Bantam, Conn. (Fairchild Engine and Airplane Corporation, Aircraft Div., Hagerstown, Md.) Engineering Report No. 7711 ASTIA ATI 110 522

ABSTRACT: The purpose of the test described in this report was to apply static loads simulating the forces of acceleration on the #205 Radio Operator's Seat Unit to determine its behavior up to Proof Loads. In each test 20 percent of the ultimate load was directly applied to the seat unit to remove any slack in the joints. Additional loads were applied in approximately 20 percent increments by placing weights on a platform suspended from a whiffle tree or equivalent in order that after each increment was added the load might be raised leaving only the initial load. In this manner any set would be noted or probable failure looked for. Measurements were taken by means of sliding wooden deflection gauges clamped to the seat unit and to the test rig. All deflections were noted and plotted to warn of incipient failures. In addition, photographs were taken at the 20 percent and proof loads, which negatives were later superimposed and the resulting positive print shows the behavior of all parts under the loads applied. The results of the tests showed that the seat unit supported the loads applied without collapsing or any parts thereof retaining a permanent set.

801

Lautier, Roger A. 1942 PROOF LOAD TEST - NAVIGATOR'S SEAT - MODEL XAT-13 & 14 (Warren McArthur Corporation, Bantam, Conn.; Fairchild Engine and Airplane Corporation, Aircraft Div., Hagerstown, Md.) Engineering Report No. 7712 ASTIA ATI 109 434

ABSTRACT: The purpose of the test described in this report was to apply static loads simulating the forces of acceleration on the #206 Navigator's Seat Unit to determine its behavior up to proof loads. In each test 20 percent of the

ultimate load was directly applied to the seat unit to remove any slack in the joints. Additional loads were applied in approximately 20 percent increments by placing weights on a platform suspended from a whiffle tree or equivalent in order that after each increment was added the load might be raised leaving only the initial load. In this manner any set would be noted or probably failure looked for. Measurements were taken by means of sliding wooden deflection gauges clamped to the seat unit and to the test rig. All deflections were noted and plotted to warn of incipient failures. In addition, photographs were taken at the 20 percent and proof loads, which negatives were later superimposed and the resulting positive print shows the behavior of all parts under the loads applied. The results of the tests showed that the seat unit supported the loads applied without collapsing or any parts thereof retaining a permanent set.

802

Lawrence, M.L., J.W. Macmillan and associates 1946 ANNOTATED BIBLIOGRAPHY ON HUMAN FACTORS IN ENGINEERING DESIGN.(Aviation Branch, Research Division, Bureau of Medicine and Surgery, Washington, D.C.) Project X-651, Feb. 1946, Astia ATI 82599

ABSTRACT: An attempt has been made to present such information as could be found concerning human factors in the operation of military equipment. Among topics considered are the following:

Anthropometric Data: Physical measurements, Dynamometric measurements.
Physiology: Bodily movements, Work performanc.
Psychology: Measurements of performance, Training.
Instruments: Facing, Illumination, Methods of indication, Association, Auditory factors.
Controls: Shape and coding, Movement, Placement, Sequence of operation.
Work Place: Positioning, Visual Fields, Safety.
Group operations.

803

Lawton, Alfred H. 1952 HUMAN FACTORS IN THE OPERATIONS AND DESIGN OF AIRCRAFT Journal of Aviation Medicine 23: 254-258 & 306

ABSTRACT: Human factors in aviation embrace three broad divisions: (1) aviation medicine, which familiarizes pilots with their equipment, safety measures, and preventive medical aspects; (2) human engineering, which analyses limitations

of human response to the aircraft and its equipment; and (3) human resources which relate to selection, classification, aptitude measurement, training, and human relations, taking into the account the diversified nature of human beings. Psychophysiological aspects of noise, vibration, use of pressurized cabins, use of ejection seats and all kinds of protective equipment, and the impact of speed are discussed. Animal experiments have a great value in furthering research but ultimately each device, method, and principle has to be tested by "human guinea pigs."

804

Lay, W. E. and Fischer, L. C. 1940 RIDING COMFORT AND CUSHIONS. SAE J. 47:482-96. Dec. 1940.

805

Lee, P.A. 1946 INJURIES TO AIRCREW FROM THE CHEST-TYPE PARACHUTE. (Flying Personell Research Committee, Air Ministry) F.P.R.C. Report #658a, May 1946

806

Lehmkohl, J.C. 1947 SPINAL ACCELERATION MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-61 AIRPLANE IN FLIGHT (Army Air Forces, Materiel Command, Engineering Division) Serial No. TSEAC12A-45341-2-5, 1 July 1947; ASTIA ATI 10 794

ABSTRACT: It is concluded that the existence of a vibrating system; consisting of the ejection seat, the cushioning media, and the dummy; which induces the high peak accelerations is further substantiated by the results of these tests. The peak values of spinal acceleration, as recorded, exceed the present known physiological tole ances of a human subject. The weight of the ejection charge has a very small effect on the peak value of spinal acceleration. The primary factor effecting the magnitude of the spinal acceleration peak is the angle of ejection. Within 0.15 seconds after the catapult separation the spinal acceleration of the dummy stabilizes at approximately -2g for the duration of the record It is recommended that ground tests be conducted to obtain additional data concerning the effect of ejection angle. Corrective action be taken towards the modification of the means of cushioning in order to eliminate or reduce the excessive peak accelerations. (Author)

807

Lent, C.P. 1962 MOBILE SPACE SUIT
(U.S. Patent 3, 034, 131, May 15, 1962.)

ABSTRACT: A high-altitude inflatable aviation suit is described and illustrated which is made of flexible material to withstand internal pressures and to flex freely. The neck section includes an attached air-tight helmet.

808

Lenz, R.C. 1946 KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-61 AIRPLANE IN FLIGHT. (Air Materiel Command, Wright-Patterson AFB, Dayton, Ohio) ASTIA ATI 42654, July 1946

ABSTRACT: Data are presented relative to the forces which act on a pilot-dummy when subjected to ejection by a catapult mechanism from an F-61 fighter airplane in flight. It was ascertained that the average velocity of ejection obtained in these tests closely approximates the velocity for which the catapult was designed. The vertical acceleration, as recorded for the peak values, exceeds the present known physiological tolerance of a human being.

809

Lenz, Ralph 1948 KINETIC MEASUREMENTS OBTAINED DURING PILOT-DUMMY EJECTIONS FROM A P-80B AIRPLANE
(Engineering Division, Air Materiel Command, Wright-Patterson AFB, Ohio)
Serial No. MXREXA8-45341-3-8 August 1948 ASTIA ATI 40805

ABSTRACT: A study is made of the kinetic measurements obtained during pilot-dummy ejection from an F-80B fighter. It was found that the M-1 (service) catapult, containing the M-28 (service) cartridge, attained a practical optimum in ejection acceleration pattern while slightly exceeding the minimum required standard ejection velocity. The neck of the catapult does not meet the general structural requirements under ground test ejection conditions. Following catapult separation, the inside tube assembly of the catapult attained sufficient kinetic energy in its upward swing to impart a strong forward turning moment to the seat upon contact with the seat trunnion. Recommendations are given for further testing of this equipment.

810

Lenz, R. C. 1948 KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-82 AIRCRAFT. (Air Material Command, Wright-Patterson AFB, Ohio) Rept. No. MCREXA-8-45341-3-4, March 1948.

ABSTRACT: Tests were made to obtain data relative to the forces experienced by a pilot-dummy when ejected upward from high-performance aircraft by means of a catapult. Tests were made with a P-33 airplane. The measuring instrumentation consisted of a multiple-channeled recording oscillograph in conjunction with resistance type acceleration, air pressure, and position transmitters. It was concluded that rearward acceleration becomes critical at airspeeds above 430 knots and that armor plate should be attached to the ejection seat rather than the fuselage to reduce this acceleration.

811

Leverett, S. D., Jr., R. U. Whitney, and G. D. Zuidema 1961 PROTECTIVE DEVICES AGAINST ACCELERATION. (In Gauer, O. H. and G. D. Zuidema, Gravitational Stress in Aerospace Medicine) (Boston: Little, Brown, and Co., 1961). Pp. 211-220

812

Levy, P. M., D. J. Sekinger & R. S. Stone 1961 A DISCUSSION OF THE NATURE AND SOURCE OF INJURY EXPERIENCED BY AVIATORS EJECTING FROM F9F-8T COUGAR UTILIZING MK-45 SEAT.
Paper, Symposium on Biomechanics of Body Restraint and Head Protection, Naval Air Material Center, Philadelphia, Pa. 14-15 June 1961.

ABSTRACT: An analysis of nine aviators ejecting in the MK-45 seat revealed that the more serious injuries were related to the ejection per se and were back injuries. Analysis of the MK-45 seat revealed inadequancies relating to improper positioning of the aviators and application of increased ejection forces to the ejecting aviator.

813

Lew, J. 1949 REVIEW OF PROBLEMS OF EMERGENCY ESCAPE BY PARACHUTE JUMP AND EJECTION SEAT
(Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y.)
Report No. BC-531-5-12, Dec. 1949. ASTIA ATI 125 336.

ABSTRACT: To obtain an understanding of the status of the problems of escape from an airplane at high speeds and altitudes, a search was made of

pertinent literature. The existing literature covered only the normal parachute jump and the catapult seat ejection, methods of egress which are satisfactory at maximum speeds of 350 and 550 mph, respectively, and at a maximum altitude of 50,000 feet.

Information is presented on:

the conditions imposed upon the human by the two methods during egress and the descent to earth, and

the reactions of the human body to these conditions.

814

Lewis, B. M. 1955 EFFECT OF INFLATION OF FULL PRESSURE HALF SUIT ON RESPIRATION (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 314; TED ADC AE 1405; 31 Dec. 1955

ABSTRACT: The full pressure half suit has been shown to produce marked pulmonary congestion. This study has attempted to investigate the effects of this congestion on the lungs. In two individuals, from 500 to 700 cc of air is "trapped" in the lungs by inflation of the suit. In three studies this trapping has been strikingly demonstrated by an increase in nitrogen expired during the inhalation of 100% O_2 when the suit was deflated. Diffusing capacity of the lungs is slightly decreased by inflation of the suit. However, because of air trapping this decrease is an apparent, rather than a real, phenomenon.

815

Lewis, B. M., R. E. Forster & E. L. Beckman 1957 THE EFFECT OF INFLATION OF A PRESSURE SUIT UPON PULMONARY DIFFUSING CAPACITY IN MAN. (Naval Air Development Center, Johnsville, Pa.) Rept. no. NADC-MA-5705, May 1957. ASTIA AD 134 510.
See also J. Applied Physiology 12:57-64, 1958.

ABSTRACT: Inflation around the lower half of the body of a tightly fitting pneumatic suit to a pressure of 75 mm Hg was previously shown (AD-62-492) to produce an acute increase in pulmonary arterial and wedge pressures of about 25 mm Hg in normal subjects. The effects of such an increase in pressure upon the pulmonary capillary bed were investigated by measuring the lung diffusing capacity (D_L) for CO at different alveolar O_2 tensions from below 100 mm Hg to above 600 mm Hg in 4 healthy subjects by the 10-sec breath-holding technique of Krogh (J. Clin. Invest. 33:1135-1145, 1954). Measurements with the inflated suit were compared with control measurements taken immediately before and/or after, with the suit deflated. No significant change in mean D_L was produced by inflation of the suit in 11 series of experiments. The true diffusing capacity of the pulmonary membrane (D_M) and the volume of the blood in the pulmonary capillaries (V_C) were also calculated from the value of D_L at different alveolar O_2 tensions. Following suit inflation, D_M fell in 2 subjects and rose in 2 others, while V_C fell in one subject, rose in 2, and was unchanged in 1 subject.

These changes are probably not significant. An underestimate of D_L during suit inflation may have been produced by gas trapping in the lung.

816

Lewis, B. M., R. E. Forster & E. L. Beckman 1958 EFFECT OF INFLATION OF A PRESSURE SUIT ON PULMONARY DIFFUSING CAPACITY IN MAN. J. Appl. Physiol. 12:57-64.

ABSTRACT: Inflation around the lower half of the body of a tightly fitting pneumatic suit to a pressure of 75 mm Hg was previously shown (AD-62-492) to produce an acute increase in pulmonary arterial and wedge pressures of about 25 mm Hg in normal subjects. The effects of such an increase in pressure upon the pulmonary capillary bed were investigated by measuring the lung diffusing capacity (D_L) for CO at different alveolar O_2 tensions from below 100 mm Hg to above 600 mm Hg in 4 healthy subjects by the 10-sec breath-holding technique of Krogh (J. Clin. Invest. 33:1135-1145, 1954). Measurements with the inflated suit were compared with control measurements taken immediately before and/or after, with the suit deflated. No significant change in mean D_L was produced by inflation of the suit in 11 series of experiments. The true diffusing capacity of the pulmonary membrane (D_M) and the volume of the blood in the pulmonary capillaries (V_C) were also calculated from the value of D_L at different alveolar O_2 tensions. Following suit inflation, D_M fell in 2 subjects and rose in 2 others, while V_C fell in one subject, rose in 2, and was unchanged in 1 subject. These changes are probably not significant. An underestimate of D_L during suit inflation may have been produced by gas trapping in the lung.

817

Lewis, D.H. 1955 THE G-PROTECTION PROVIDED BY THE FULL PRESSURE HALF SUIT (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5511, 23 Sept. 1955 ASTIA AD 79 881

ABSTRACT: An evaluation was made of the g protection provided by the full-pressure half suit, and a comparison was made with the protection provided by straining, by the Z-2 suit, and by a combination of the Z-2 suit and a straining. The mean protection which was obtained by 4 experienced subjects in 415 centrifuge runs was 2.4 g with the full-pressure half suit, 1.1 g with straining, 1.2 g with the Z-2, and 2.2 g with the Z-2 plus straining. Maximum suit pressures of 7 and 9 psi were obtained for the full-pressure and Z-2 suits, respectively. No cardiac arrhythmias or circulatory embarrassment was observed at 7 psi with the full-pressure half suit. For the Z-2 suit, straining, and the combination of the two, the g level at which peripheral light loss occurred was selected as the limiting g level. For the full-pressure half suit, abdominal pain due to suit pressurization limited the g level; voluntary straining was not possible, apparently because of respiratory difficulty. For the full-pressure half suit, the pressure required for protection against peripheral light loss was 2 psi/g above the g level at which light loss occurs without the suit; for the Z-2 suit, the value is 3 psi/g. Acceptability of the full-pressure half suit is limited

by excessive cumbersomeness, difficulty in donning, the presence of abdominal pain at maximum suit pressures, and lack of improvement over the combination of the Z-2 suit plus straining.

The maximum protection obtained by our subjects with the full pressure half suit was about the same as that obtained by the combination of the Z-2 suit plus straining.

818

Lewis, Frederick, J. Jr. 1958 MILITARY HELMET DESIGN, (Naval Medical Field Research Laboratory, Camp Lejeune, North Carolina) June 1958 ASTIA AD-209-762

Abstract: A brief history of the design, development, production, and use of helmets is provided, emphasizing the period since the start of World War I. The design of helmet components is discussed, together with the effectiveness and medical, psychological, logistic, and tactical aspects of helmets. Particular emphasis is placed upon the infantry helmet. Recommendations are made for fundamental development and evaluation studies, and a design approach is outlined. A representative bibliography concerning helmets and descriptions of recent foreign helmet developments are included.

819

Lewis, R. E. F. 1959 EMERGENCY ESCAPE FROM TANDEM-CREWED AIRCRAFT (Defence Research Medical Labs. Canada) Reprint from Canadian Aeronautical Journal 5: 187-194, June 1959.

ABSTRACT: The results suggest that escape sequences for a tandem crew can take an excessive period of time when considered in relation to low level incidents demanding escape. In the light of this evidence it is recommended that in tandem-crewed aircraft the ejection seats be so linked together that the pilot, upon deciding that the crew must escape immediately, operates the firing control of his seat which will automatically eject the observed and in turn, himself. Such an arrangement could reduce total escape time for both occupants to approximately 2.5 seconds. However, in order that the observer be properly positioned for ejection, an automatic restraint for the observer would be a mandatory component of a linked system. Furthermore, the observer should be provided with an override which would enable him to eject alone in case where there is ample time for the escape, or should the pilot be incapacitated, e.g. by anoxia. (Author)

820

Lewis, S. T. and J. P. Stapp 1958 HUMAN TOLERANCE TO AIRCRAFT SEAT BELT RESTRAINT
J. of Aviation Medicine 29(3):187-196, March 1958.

ABSTRACT: Human volunteer subjects were decelerated while restrained by a lap belt three inches in width while seated forward-facing in three experimental devices:

1. An aircraft seat hanging by 20-foot cables forming a swing-pendulum, which could be raised and dropped through a measured vertical component and arrested by a steel cable;
2. A sled, on a 120-foot track, propelled by an ejection seat M1-A1 catapult and decelerated by water inertia brakes; and
3. A catapult accelerating a seat by means of rubber shock cords in an 18-foot distance and decelerating it with mechanical friction brakes in thirty inches or less.

Rate of onset, magnitude and duration of force are tabulated for 30 human experiments. Air transport chrash protection is discussed as well as tolerance limits to the application of crash-type mechanical forces of the magnitude investigated by these experiments.

821

Lhotka, D. C. 1962 A PROGRESS REPORT OF THE JOINT NATIONAL EDUCATIONAL SEAT BELT PROGRAM. (In M. K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration Conference, Sept. 14-16, 1961) Pp. 241-242.

822

Libber, L.M., L.J. Santa Maria, and V. Vaccaro 1958 DEHYDRATION EFFECTS ON MODERATELY HEAT-STRESSED SUBJECTS WEARING A FULL PRESSURE SUIT IN AMBIENT CONDITIONS REQUIRING A HIGH VENTILATING AIR FLOW Jour. Aviation Med., 29(3):241, March 1958

ABSTRACT: A study was made of the dehydration effects produced in resting subjects wearing an impermeable full-pressure altitude suit by ventilation at a comfortable level with 90° F. air flowing at a rate of 900 liters/minute. Determinations were made of rectal and skin temperature, pulse rate, total weight loss, evaporative weight loss, weight deficit, and hematologic and urinary values. Comparison with control subjects wearing unventilated summer flying suits at an ambient temperature of 70° F. revealed no severe thermal stress with the full-pressure suit.

823

Libbey, B.W. 1958 EVALUATION MEASUREMENTS OF ENERGY ABSORBING BUMPERS ON TEST VEHICLES.
(Master's Thesis for MS in Me, University of Minnesota, 1958)

824

Liebel, D. A. 1960 THE EJECTION SEAT IS NOT YET OBSOLETE
Society of Experimental Test Pilots Quarterly Rev. 5(2):5-10, Winter 1960.

ABSTRACT: This article describes in detail the Aircrew Escape System known as the "B" seat in terms of the structural and operational characteristics. Also, the extensive series of developmental tests are summarized. (Tufts)

825

Lincoln Laboratory 1956 BIBLIOGRAPHY OF SCIENTIFIC AND ENGINEERING PAPERS 1954-1956
Lincoln Laboratory, Massachusetts Institute of Technology Contract No. AF 19(122)-458 ASTIA AD 24 972

ABSTRACT: This bibliography is composed of journal articles, meeting papers, and theses concerning science and engineering.

826

Lincoln Laboratory 1960 ABSTRACTS, SCIENTIFIC AND ENGINEERING PAPERS, JUNE 1960
Lincoln Laboratory, Massachusetts Institute of Technology Contract No. AF 19(604)-5200

ABSTRACT: This publication lists, by Lincoln Laboratory author, abstracts of articles published in the technical journals and papers presented at meetings of the scientific societies.

Included also are abstracts of work performed under Lincoln sponsorship or by consultants to the Laboratory, and, in Section A, of theses submitted for advanced degrees.

The period covered by this report is July 1, 1956 - April 15, 1960. An earlier edition, published in 1956 and now out of print, includes abstracts from the period July 1, 1954 - June 30, 1956.

827

Lincoln Laboratory 1961 UNCLASSIFIED PUBLICATIONS OF LINCOLN LABORATORY Lincoln Laboratory, Massachusetts Institute of Technology Contract No. AF 19(604)-7400 ASTIA AD 264 714

ABSTRACT: This report lists all technical reports, G-reports, journal articles, meeting speeches, technical memorandums, Lincoln Manuals, special reports, and translations published by Lincoln Laboratories.

828

Lindegard, Bengt 1961 STUDIES ON THE EFFECT OF PROPAGANDA FOR THE USE OF SAFETY BELTS IN CARS. International Road Safety and Traffic Review 9:48-49

829

Lindsey, J.F., V. Mazza et al. 1959 EVALUATION OF THE HUMAN FACTORS. ASPECTS OF THE B-58 WEAPON SYSTEM. CATEGORY II DEVELOPMENT TEST AND EVALUATION (Air Proving Ground Center, Eglin AFB, Fla.) Rept. no. APGC-TN-59-73, 25 Feb 1960, ASTIA AD-315 231

ABSTRACT: This study was conducted in conjunction with the Category II Test of the B-58 Weapon System. Test participants who supplied data for analysis include 297 airmen and 23 aircrew, all members of the B-58 Test Force, Carswell AFB, Texas. The significant findings were as follows: (1) areas requiring additional attention include tests to ascertain the superiority of the encapsulated seat ejection system over the open seat ejection system, certain modifications to personal equipment and the present ejection system, usage of personal equipment, and certain ground maintenance problems; (2) sufficient differences were noted between the job descriptions and the actual duties to justify a new AFSC for flight control personnel and additional shredouts for bomb-navigation personnel; (3) the successful accomplishment of the procedures which must be performed during the simulated combat mission considered in the study is regarded to be within the capability of specially selected aircrews; and (4) because of the nonavailability of simulators and two-pilot-position aircraft, inadequate means are presently available for assessing aircrew performance. (U) (Author)

830

Lippert, S. DESIGNING FOR COMFORT IN AIRCRAFT SEATS.
(Douglas Aircraft Co., Inc., Santa Monica Plant, Calif.)
ASTIA ATI-62618,

ABSTRACT: The dimensional and dynamic aspects of seat design are presented in a design sequence based on fitting groups on which statistically reliable measurements are available. The graphs and tables incorporate data from many seat and related studies and form a working body of information for the seat designer and for the seat purchaser.

831

Lippert, S. 1948 A BIBLIOGRAPHY OF SEATING
(Douglas Aircraft Co., Inc., Santa Monica, Calif.) Rept. No. SM 13425, 14 Dec. 1948

832

Lippert, S. 1948 "PASSENGER COMFORT": A BIBLIOGRAPHY OF COMPANY LITERATURE. (Douglas Aircraft Co., Santa Monica Division, Santa Monica, California) Report no. SM-20163. 26 Aug 1946, revised 2 Nov. 1948

833

Lippert, S. 1949 DESIGNING FOR COMFORT IN AIRCRAFT SEATS.
(Douglas Aircraft Company, Inc., Long Beach, Calif.)
Report No. SM-14741, 7/20/49, revised 10/10/52 and 5/15/53

ABSTRACT: The dimensional and dynamic aspects of seat design are presented in a design sequence based on fitting groups on which statistically reliable measurements are available. The graphs and tables incorporate data from many seat and related studies and form a working body of information for the seat designer and for the seat purchaser. (AUTHOR)

834

Lippert, S. 1953 DESIGNING FOR COMFORT IN AIRCRAFT SEATS. (Douglas Aircraft, Santa Monica Div.) Rept. No. SM-14741.

ABSTRACT: The dimensional and dynamic aspects of seat design are presented in a design sequence based on fitting groups on which statistically reliable measurements are available. The graphs and tables incorporate data from many seat and related studies and from a working body of information for the seat designer and for the seat purchaser.

835

Lippert, S., J. A. Graves & B. A. Rasmussen 1955 A PHILOSOPHY OF AIRCRAFT SEAT DESIGN (Santa Monica Div., Douglas Aircraft Co.) (Paper, Association Francaise des Ingenieurs et Techniciens de l'Aeronautique International Aeronautical Congress, Paris, June 1955).

836

Lippert, Stanley 1956 CELLULAR PLASTICS IN AIR TRANSPORTATION (Douglas Aircraft Company, Santa Monica, California)

ABSTRACT: This paper attempts to define the requirements of both passengers and crew with respect to a wide variety of design problems. Most of the material characteristics of seats discussed are those which insure a proper response on the part of the passengers during various flight conditions and are considered primary requirements. There are other secondary properties of the materials which cannot be neglected. Consistent and close control of the foam density is a necessity. It is also mandatory that a cushion have a reasonable service life without a permanent set or change in properties. This means good life even in case of spillage of liquids and frequent removal of covers for cleaning. Whereas the polyurethanes are superior to Latex Foam in tear resistance, the Process Laboratories have found that the more dense polyurethane foams have a tendency to hydrolize and become soggy.

837

Lippert, Stanley 1959 A QUARTER CENTURY OF AIRCRAFT SEATING. (Paper, Avn Conference, Los Angeles, Calif., 9-12 March 1959, of The American Society of Mechanical Engineers)

838

Lippisch, A.M., R. Noble 1948 TRAJECTORIES OF UPWARD SEAT EJECTION (Naval Air Material Center, Aeronautical Medical Equipment Lab., Philadelphia, Pa.) TED NAM 256005, Report No. 6, Nov. 1948. ASTIA ATI 57 511

ABSTRACT: A method for determining the trajectory of a man and seat ejected upward from a moving aircraft when the initial conditions of flight and ejection are known has been derived. The mathematical derivation is highly complex, but the solution of the differential equations of motion yields a set of equations from which the position of the ejected body with respect to ground or to a point in space can be easily determined when the seven parameters used to define the boundary conditions are given. These seven parameters which comprise the initial conditions necessary for accurate calculation are airplane speed, direction and angle of inclination of flight, flight altitude, ejection velocity, angle of the seat guide rails with respect to the vertical, weight of the ejected mass, and air resistance of the mass. A particular form of the method presented can be used to determine the initial conditions of flight and ejection which are necessary for specified clearance of aircraft for particular dimensions. A preliminary investigation of the effect of the variation of four of the seven parameters is presented. The method for calculating the space and time trajectories of the ejected mass is given, and a comparison of available flight test trajectory data with theoretical calculations is shown. This analysis of trajectories and of the effects of the variable on the path of the ejected body is able to serve as a check and assurance of the validity and completeness of the aero-medical and engineering studies.

839

Lissner, H. R., et al. n.d. AIRCRAFT SEAT DESIGN FOR PASSENGER CRASH SURVIVAL. (Wayne State University, Detroit, Michigan)

840

Livingstone, R. E., & B. F. Weems 1959 TEST AND EVALUATION OF THE NAVY HELICOPTER RESCUE SEAT. (U. S. Coast Guard Testing & Development Division, Washington, D. C.) Project J28-3/1-17; ASTIA AD-228 702; 23 July 1959

SUMMARY: In November, 1957, Commandant (OAV) requested a Testing and Development Project to evaluate, for Coast Guard use, the grapnel type helicopter rescue seat as developed by U. S. Navy Helicopter Squadron 21, Lakehurst, N. J. The project was assigned to Coast Guard Air Station, Miami, Florida. The Navy seat was received in 1 July 1958. Testing was conducted from July to September, 1958, and the test report was received in November, 1958. The Grapnel type seat was considered to fulfill the requirements of the original project directive. It was recommended that it be adopted for Coast Guard use in lieu of the hoisting sling.

841

Lockheed Aircraft Corp., Van Nuys, Calif. 1955 X-7A SUPERSONIC RAMJET TEST VEHICLE PARACHUTE RECOVERY SYSTEM, SECTION TWO, RECOVERY SYSTEMS. (Lockheed Aircraft Corp. Missile Systems Div., Van Nuys, Calif.) Rept. for March 1947 - Dec. 1954, Contract No. AF33(600)-26471, WADC TR 55-162, Sec. 2; ASTIA AD-95 744; June 1955

842

Lockheed Aircraft Corp., Marietta, Ga. 1957 FEASIBILITY STUDY. EXPENDABLE TYPE PLATFORMS FOR LOW COST AERIAL DELIVERY BY PARACHUTE. (Lockheed Aircraft Corp., Marietta, Ga.) Rept. for 5 July 1956 - 2 Aug. 1957; Contract No. AF 33(616)-3792; WADC TR 57-403; ASTIA AD-130 989; Aug. 1957

ABSTRACT: Aerial delivery operations were studied to determine what factors influence the cost of delivery of vehicles, weapons, and other heavy equipment by parachute. Those factors which could affect a saving over the present system were further studied to determine an optimum system. Load combinations, platform sizes, materials, methods of construction, shock-absorption methods, and antitoppling devices were analyzed. Consideration was given to aerial delivery system (ADS operating requirements, feasibility of non-load bearing platforms, development of optimum loads for expendable ADS, comparative mission cost analysis, shock absorption at optimum cost, design solutions for platform structures, and making the material cost optimum, and final platform design.

843

Lombard, C. F., R. C. Travis, J. O. Moore & S. W. Ames 1951 HUMAN FACTORS IN MAJOR ACCIDENTS OF JET FIGHTER AIRCRAFT -- PERIOD 1 JAN 50 - 1 JUL 51. (Directorate of Flight Safety Research, Norton AFB, California) 20 August 1951.

844

Lombard, C. F., R. V. Schmidt and P. H. von Essen 1961 PASSENGER SAFETY AND COMFORT CRITERIA STUDY IN DYNAMIC ENVIRONMENTS (Proposal Brief 67, Northrop Corp., Norair Div.,Hawthorne, Calif.) September 1961.

was considered to have better overall characteristics than the grapnel type. Fouling tendency was considered to be minimized. Minor modifications were recommended.
Following modifications which consisted of reducing the overall wheel diameter to 24 inches overall and adding a hand strap for ease of survivors, the wheel and grapnel seats were retested at CGAS, Elizabeth City, N. C. That station reported that the wheel type seat offers more advantages and safety features than the grapnel type.
The one requirement which is not fulfilled in the final wheel configuration is that, because of its padding, this device will not float at a predetermined depth in the water to facilitate mounting. No objection to this was noted during final testing at CGAS, Elizabeth City, N. C. (AUTHOR)

845

Lloyd, S.J. 1941 NAVIGATOR'S SEAT UNIT PROOF LOAD TESTS OF NO. 215 MODEL (X-120) XAT-15. (Boeing Airplane Co., Wichita, Kans.) Report No. X120-6323, ASTIA ATI- 104194, November 1941

ABSTRACT: Tests were conducted applying static loads simulating acceleration forces on the #215 Navigator's Seat to determine the behavior of the seat unit up to proof loads. After completion of the tests, it was concluded that under the proof loads applied the elastic limit was not reached. It was also found that all deflections were simple elastic deformations and the seat was sufficiently strong in its present design and assembly.

846

Loach, J. C. 1958 A NEW METHOD OF ASSESSING THE RIDING OF VEHICLES AND SOME RESULTS OBTAINED. (Paper read at Inst. Mechanical Engs., London, 23 Jan. 1958) J. Inst. Locomotive Engineers 48(2):183-208

847

Lockheed Aircraft Corp., Van Nuys, Calif. 1955 X-7A SUPERSONIC RAMJET TEST VEHICLE PARACHUTE RECOVERY SYSTEM. SECTION ONE. PRETEST AND TEST PROGRAM. (Lockheed Aircraft Corp. Missile Systems Div., Van Nuys, Calif.) Contract No. AF33(600)-26471; WADC TR 55-126, Sec. I; ASTIA AD-95 743; June 1955

848

Lomonaco, T., A. Scano and F. Rossanigo 1960 BEHAVIOR OF SOME PERCEPTIVE-MOTOR FUNCTIONS DURING THE PASSAGE FROM ABOUT 2 TO ZERO G AND THE EFFECT OF TRAINING. EXPERIMENTS MADE WITH THE SUBGRAVITY TOWER. In Riv. Med. Aero. 23:439-456, Oct. - Dec. 1960 (Italy)

849

Lorch, D. L. 1958 UNDERWATER ESCAPE PROGRAM: Tests of F8U-1 Pilots' Survival Equipment for Possible Use in Nadevcen Automatic Ditch System. (Naval Air Development Center, Johnsville, Pa.) Rept. no. NADC-ED-5828; ASTIA AD 231 390.

ABSTRACT: The F8U bailout oxygen system with the modified Firewel Regular (1732-3) and the MK-3C life preserver were tested to determine if this equipment might be utilized in an automatic water-crash escape system now under consideration. The tests indicate that this equipment is satisfactory for underwater escape from a depth of 1000 feet

850

Lorch, D. L. 1959 UNDERWATER ESCAPE PROGRAM: Underwater Seat Ejection Tests, NAMC Type II Catapult. (Naval Air Development Center, Johnsville, Pa.) Report No. 6, Proj. TED no. ADC AE-6307, NADC ED-5908; ASTIA AD 219 105.

ABSTRACT: The results of 15 dummy underwater ejections and 3 human ejections are compiled and evaluated. These tests were conducted to determine the feasibiiity of using the inflight ejection system with the NAMC Type II catapult to remove a pilot safely from a sinking aircraft. Test results indicate that underwater ejection with this catapult is not safe. Ejection is also not mechanically reliable unless the following modifications are made: (1) the catapult tube is sealed; and (2) the firing head has been modified for underwater use. Underwater ejection is recommended only if it is impossible for the pilot to escape in any other way.

851

Lorch, D. L. 1962 ROCKET-JET TYPE RELEASE FITTING, DYNAMIC EVALUATION TO ASSIGN CAUSES FOR FAILURE, DRAG LOAD ON PILOT TOWED THROUGH WATER BY PARACHUTE TO EVALUATE ROCKET-JET RELEASE FITTINGS. (Naval Air Material Ctr., Philadelphia 12, Pa.) NAMC-ACEL-474; ASTIA AD-274 459; 31 March 1962

ABSTRACT: This report is concerned with a subjective evaluation of the Rocket-Jet canopy release fittings used on naval parachutes and a fitting modified by

the Air Crew Equipment Laboratory.
An anthropomorphic dummy and two live subjects were towed through the water at various speeds in the 3000' tow tank, Langley AFB, Virginia. Drag loads were measured and the subjects attempted to release either the standard or modified fittings. Curves were prepared correlating actual wind velocities, pilot velocity through water, parachute loads, and release capabilities. (AUTHOR)

852

Lovelace, II, W. Randolph, E.J. Raldes, & V.J. Wulff 1945 THE EJECTION SEAT FOR EMERGENCY ESCAPE FROM HIGH-SPEED AIRCRAFT.
(Air Technical Service Command, Engineering Division, Army Air Forces Serial No. TSEAL-3-696-74C Aug. 31, 1945. ASTIA ATI 7245

ABSTRACT: This report presents data obtained from the German, British and Swedish Air Forces on the research and development of the pilot ejection seat and evaluates this information for application to the Army Air Forces pilot ejection seat program. It was found from tests that emergency escape from fighter aircraft, such as the P-38, P-51, P-47 and P-80, while traveling at high speeds is a diffucult and dangerous operation. Emergency escape from high-speed bombers such as the A-26 is equally difficult. The ejection seat, as used operationally by the German Air Force, is the most successful method known to date for emergency parachute escape from high-speed aircraft. The following design characteristics of the ejection seat assembly are believed desirable up to speeds of 550 miles per hour for AAF aircraft: (a) Maximum duration of acceleration: 0.1 second. (b) Maximum allowable average acceleration: 20 g with peaking to 25 g for 0.01 second or less, when ejecting the pilot above the aircraft. (c) Minimum allowable ejection velocity into wind stream: 57 ft./sec. in aircraft having a single vertical stabilizer of average height. (d) Minimum piston length: 30 inches, based on the above ejection velocity. In designing an ejection seat the following is required: (a) All parts of the body, especially the head, arms, and legs, must be supported. (b) A shoulder harness must be used, to prevent forward bending of the pilot with consequent fracture of the lower thoracic and lumbar vertebrae. (c) Arm rests must be used to reduce the load on the lower vertebral column.

853

Lovelace, W. R., E. J. Baldes, & V. J. Wulff 1945 NOTES ON MECHANICS OF SEAT EJECTION; NOMENCLATURE AND CONVERSION FACTORS. Appendix 1 to Lovelace, W. R. E. J. Baldes, & V. J. Wulff, The Ejection Seat for Emergency Escape from High Speed Aircraft, ATI No. 7245

854

Lovell, G. 1954 DESIGN AND DEVELOPMENT OF THE R. A. E. DUMMY OF THE STANDARD AIRMAN. (Ministry of Supply, London) TN 176, May 1954

855

Lowry, R. H. 1953 TEST TRIALS OF G-4A ANTI-BLACKOUT SUITS IN THE HUMAN ACCELERATOR. (Defense Research Medical Labs, Toronto, Canada) Report No. 157, p. 1-6, April 1953.

ABSTRACT: Blackout tolerances of 50 pilots wearing the suit were compared with those of the same personnal without suits, in the Human Centrifuge. Use of the suit gave an increased tolerance of 1.99.

856

Lubinski, T.P. 1962 TRACK TESTS OF CANOPY ESCAPE CAPSULE (Coleman Engineering Co., Inc., Torrance, Calif.) Project 1362 ASD TDR 62 404, Aug. 1962 ASTIA AD 287 281

ABSTRACT: The results of all of the track tests for the Air Force Canopy Escape Capsule are presented. The purposes of these tests were to evaluate the ejection and recovery of the capsule and to obtain aerodynamic, structural, component functioning, and physiological information. Descriptions of the capsule model, test equipment, and test procedure are included in the report. Feasibility of the canopy-type capsule method of escape was not fully demonstrated because the track tests were terminated prior to completing the design range of test velocities and because the test results indicated a need for an evaluation of the stability and impact problems of the capsule for these velocities. The tests showed that unguided separation of the capsule was successful, that proper functioning of the recovery system was demonstrated for the 150-kt run, and that 10- level ejection capability of the escape capsule was indicated. (Author)

857

Luchsinger, C.W. 1949 ADDITIONAL KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM AN F-82 AIRPLANE. (Engineering Division, AMC, Wright-Patterson AFB, Ohio) March 1949. ASTIA ATI 63931.

ABSTRACT: Five ejection seat tests, simulating pilot escape from high performance aircraft, were conducted with an F-82 twin engined fighter.

Kinetic measurement intelligence was successfully recording during four of these tests by means of a recording oscillograph in conjunction with acceleration and strain gages. The pilot ejected the test seat, which was loaded with a 185 lb. anthropomorphous dummy, from the right cockpit by closing a switch on the control stick in the left cockpit. The normal maximum acceleration produced by the M-1 (Service) catapult was in the range of 15 g to 17 g units. Average ejection velocity was slightly less than the recommended 60/ft sec. The drag coefficient of the seat and dummy is 1.56 at low Mach numbers, and has a percentage increase equal to that of a sphere with increase in Mach numbers.

858

Luchsinger, C.W. 1950 KINETIC MEASUREMENTS DURING PILOT EJECTION SEAT GROUND TESTS - AND APPENDIXES I AND IX
(Air Materiel Command, Engineering Division, Wright-Patterson AFB, Ohio) Aug. 1950. ASTIA ATI 83 127

ABSTRACT: Kinetic qualities were measured during pilot ejection seat ground tests conducted with various centers of gravity of the ejected components and with various lengths of ejection rails. Sensing and recording of the kinetic quantities was accomplished by the use of resistance-bridge accelerometers, pressure transmitters and multichannel oscillograph, together with bridge balancing controls and appropriate connecting circuits. The normal maximum acceleration produced by the M-1 catapult was in the range of from 12 to 16 G units and the CG location had no consistent effect on the maximum peak value. As the CG was moved forward, the maximum ejection velocity tended to decrease in magnitude and a further decrease in magnitude was encountered when 28-in. ejection rails were used in lieu of the 32 7/8 in. ejection rails.

859

Luft, U.C. 1953 PHYSIOLOGICAL ASPECTS OF PROLONGED FLIGHT AT HIGH ALTITUDES AND SURVIVAL IN EMERGENCIES Aeronautical Engineering Review 12:56-60

ABSTRACT: Problems posed by temperature and humidity, cabin pressure, sudden decompression, and escape from aircraft.

860

Lund, D.W. HIGH ACCELERATION DURING PARACHUTE OPENING.
AAF Memo Report TSEAA-695-72B

861

Lundin, I.E. 1946 STATIC LOAD TESTS OF WMCA NO. 347 - PILOT SEAT ARMORED.
(Warren McArthur Corporation, Bantam, Connecticut) Report No. 347
19 July 1946. ASTIA ATI 102228.

ABSTRACT: Tests were conducted for the purpose of applying static loads simulating acceleration forces on the Warren McArthur No. 347 Armored Pilot Seat to determine its behavior up to ultimate design loads. As a result of the tests, it was concluded that the seat unit supported the ultimate design loads without failure.

862

Lunsford, E.M. 1956 INVESTIGATION OF FORCE REQUIRED TO ACTIVATE THE WEBBING LOOP AND RIPCORD PIN TYPE PARACHUTE PACK CLOSURE.
(Wright Air Develop. Center, Wright-Patterson AFB, Ohio) WADC Technical note no. 56-505, ASTIA AD-110 590, November 1956

ABSTRACT: The current maximum force requirements for actuation of a ripcord system on personnel parachutes as set forth in Specification MIL-P6645, titled 'Parachutes General, Personnel, Specification For,' were established for a ripcord pin, grommet, and cone locking system. Pack assemblies utilized on the latest type parachutes are held closed by webbing loops which are anchored on the pilot chute flaps and pass completely through the pack by way of grommets in the side and end flaps and base panel of the pack and are locked in place by the ripcord pins. It was desirable to determine the maximum force requirements for actuation of a ripcord using the new closing system to provide more up to date data for Specification MIL-P-6645. A series of tests to determine ripcord pull force were accomplished and are recorded in this technical note. (EL abstract)

863

Lutz, C.C. and J.V. Kennedy 1953 PROPOSED EMERGENCY ALTITUDE SUIT. (Wright Air Development Center, Wright-Patterson AFB, Dayton, Ohio) Technical Note WCRD 53-29, ASTIA ATI 203134, 15 January 1953

ABSTRACT: This report describes a method of pressurizing the human body, which is new, simple and practical, and when used with the K-1 Pressure Breathing Helmet, Provides adequate emergency protection to 55,000 feet for a period of 6 minutes.

864

Lutz, C. C. 1959 DEVELOPMENT OF AN EMERGENCY PRESSURE SUIT (COVERALLS, HIGH-ALTITUDE, TYPE CSU-4/P). WADC TN 59-148; ASTIA AD 226 056

ABSTRACT: The design of coveralls, high-altitude, Type CSU-4/P attempts to correct operational deficiencies in presently available garments as to comfort, mobility, heat ease of donning, fitting, and integration with other flight clothes. The requirements of the pressure suit were established, and seven prototype models were designed, each improving on the previous model. The outer layer of the most recent suit is orange in color as an aid to rescue operations. This suit will provide physiological protection for a large segment of the flying population for the times and altitudes required of such a garment (70,000 ft. for 5 minutes). Improved comfort and mobility are achieved in the unpressurized condition, and tolerable comfort and adequate mobility are maintained while pressurized. Present testing of the capabilities of the new garment and continued plans of the program are described.

865

Lutz, R. R. 1951 PASSENGER SEAT - STRUCTURAL TEST, MODEL 340 (Consolidated Vultee Aircraft Corp., San Diego, Calif.) Rept. 6601, 13 Sept. 1951

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

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866

McCollom, I. N. and A. Chapanis 1956 A HUMAN ENGINEERING BIBLIOGRAPHY (San Diego State Coll., Calif.) Contract Nonr-126801 Tech. rept. no. 15 Nov. 1956 ASTIA AD 122 248

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867

McCollom, I. N. & A. Chapanis 1956 HUMAN ENGINEERING BILIOGRAPHY (PSYCHOLOGICAL ASPECTS - EQUIPMENT DESIGN) (San Diego State College Foundation) Library of Congress PB 132333

868

McCollom, I. N. 1956 FINAL REPT.
(San Diego State Coll., Calif.)
Contract Nonr-126801 1 Dec. 1956 ASTIA AD 118 905

ABSTRACT: Work involved in compiling a human-engineering guide for equipment design is outlined. Bibliographies, abstracts, translations, experimental studies, and special reports were prepared in the following areas: (1) comparison and interaction among sensory input channels (AD-95 131); (2) disorientation; (3) effect on human performance of acceleration, motion, and vibration; (4) effect on human performance of ventilation, temperature, and humidity; (5) man-machine integration (AD-106 677); (6) motion sickness (AD-95 139)and therapeutic drugs; (7) simulators and proficiency measuring devices; (8) speech communication; (9) systems considerations; and (10) work and fatigue (AD-95 133, AD-95 137). A special human-engineering bibliography of 5600 entries was assembled and published. (ASTIA)

869

McCarley, J.B. II 1947 BACKWARD SEATS Flying Safety Journal (HQ Air Transport Command) 2:22-3

870

McCready, W. E. 1958 INVESTIGATION INTO THE DESIRABILITY OR OTHERWISE OF PROVISION OF AIR VENTILATED SUITS TO AIRCREW OF SHACKLETON Mk 1 AIRCRAFT. (Inst. of Aviation Med., R.A.F., Farnborough) FPRC Memo 99, Nov. 1958.

871

McCutchan, J. W. & J. D. Isherwood 1959 PREDICTION OF THERMAL TOLERANCE WHEN USING AN MA-2 VENTILATING GARMENT WITH A MODIFIED MK-IV ANTI-EXPOSURE SUIT, (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADC-TR-59-326 June 1959, ASTIA

872

McDonald, A. E. & W. K. Stewart 1946 NOTE ON SEAT EJECTION FROM HE162 AIRCRAFT.
(RAF, Institute for Aviation Medicine, Farnborough) F.P.R.C. 657, March 1946. ASTIA ATI 31120

ABSTRACT: Tests were made of an experimental seat ejection from a He 162 interceptor carried out under normal temperature conditions, while airplane remained on the ground. Tests were made with the fuselage, with turbine unit removed, setting in a flying attitude and offset slightly to the right. A dead weight of 210 lb was fixed to the pan of the seat. Firing was actuated remotely by means of a long cord. The ejection was photographed and accelerations were recorded on an inductance accelerometer fixed rigidly to back of seat. The firing cartridge used was of German fabrication. Analysis of the film showed that the ejection velocity was 34 ft/sec (± 10%) and that the maximum vertical height was from 14 to 15 ft. It was concluded that the ejection from the He 162 is feasible and, with the adequate cockpit dimensions present, should give pilots of average weight some chance of bailing out. Where ancillary factors are present such as centrifugal accelerations in spins, or high speed, it is doubtful if this installation is effective.

873

MacDonald, H.D. 1961 DEVELOPMENT OF CATAPULT, AIRCRAFT EJECTION SEAT, XM10
(Wright Air Development Division, Wright-Patterson AFB, Ohio)
WADC TR 60 452, March 1961. ASTIA AD 270 108

ABSTRACT: Frankford Arsenal was requested to adapt the ballistic geometry of the rocket assisted pilot ejection catapult, RAPEC No. 1, to USAF aircraft requirements, specifically, as a replacement for M4 catapults presently installed in the F104 aircraft.

The existing RAPEC No. 1 catapult has been successfully scaled down to meet the USAF requirements.

The XM10 catapult supplies the necessary thrust and, consequently, ejection height to permit low-level ejections from high performance aircraft. This device is now ready for qualification and analysis tests. (Author)

874

MacDonald, H.D. & N.J. Waecker 1961 DEVELOPMENT OF CATAPULT AIRCRAFT EJECTION SEAT, T20. (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) WADD TR 59-306, FA Report R-1557, ASTIA AD 299 138

ABSTRACT: Rrankford Arsenal was requested to develop a rocket-assisted catapult that would provide sufficient impulse to accomplish safe low-altitude ejection. Two problems were considered during the program; first, attaining sufficient impulse with the rocket-catapult combination; and second, eliminating the bending of the catapult tubes during ejection. The first problem was solved by using a rocket motor attached to the bottom of the catapult. In this case, the rocket provides the sustained acceleration necessary to achieve the required final velocity. The problems associated with catapult tube bending in conventional catapults were eliminated by making the power stroke of the catapult section equal to the guided stroke of the seat in the rails. Flight stability and proper trajectory are obtained during ejection by angling the nozzle of the rocket so that the vector of the rocket thrust passes through the effective center of gravity of the seat-man mass and by igniting the rocket at the instant the rocket catapult is released from the aircraft structure. The T20 catapult is now ready for qualification and analysis testing.

875

MacDonald, J. A. 1960 HUMAN ENGINEERING PAYOFF
(Paper SAE National Aeronautic Meeting, New York, N. Y., April 5-8, 1960)
(Society of Automotive Engineers, Inc., New York, N. Y.)
Rep. 173B, April 1960.

ABSTRACT: Some of the gains in aeronautics that can be attributed to Human Engineering efforts in the past few years are discussed informally. The areas dealt with specifically are escape systems and components, restraint, sealants, vision, and crew station design and arrangements. Some expectations for future developments are mentioned. (Tufts)

876

McDonald, L. I. & E. L. Backman 1958 UNDERWATER TRIALS ON MARTIN-BAKER MARK 2D EJECTION SEAT 2.
(Admiralty Hydro-Ballistic Research Establishment, Glen Fruin, Dunbartonshire) Feb. 1958. ARL/R.4/G/HY/1/2.

877

McFadden, E. B. & J. J. Swearingen 1958 FORCES THAT MAY BE EXERTED BY MAN IN THE OPERATION OF AIRCRAFT DOOR HANDLES.
Human Factors 1(1):16-22.

ABSTRACT: Six handle configurations were tested by 8 male subjects on a test arrangement simulating an aircraft door. The torques exerted by the subjects were measured in angular increments of 45^{o}. Over 1200 static and dynamic measurements were made. A limited check study on 10 females, totaling 120 measurements, was also made. The shape, length, direction of movement, arc of motion, effects of one-handed operation, maximum torques and differences between sexes are discussed.

878

McFadden, E. B., J. J. Swearingen & C. D. Wheelwright. 1959 THE MAGNITUDE AND DIRECTION OF FORCES THAT MAN CAN EXERT IN OPERATING AIRCRAFT EMERGENCY EXITS.
Human Factors 1(4):16-27

ABSTRACT: The maximum forces that men and women were capable of applying to emergency exit release handles under various conditions were determined. Experiments were conducted on both port and starboard sides of a cabin mockup simulating the interior of the Convair 240. Approximately 339 determinations of the maximum force that 17 female subjects were capable of applying to emergency exit handles were obtained. This study was extended to include measurement of the resultant force and its direction with 112 tests conducted by eight female subjects, of which three participated in the above series. In addition 162 tests were conducted by nine male subjects, and a few tests on six children. The effects of handle configuration, location, position of the subject, and the duration of the muscular contraction are discussed.

879

McFarland, R. 1946 HUMAN FACTORS IN AIR TRANSPORT DESIGN
(New York: McGraw-Hill, 1946)

ABSTRACT: The aims of the author are three: to present factual information upon all these aspects of air transport design to be used by those who operate planes or travel by air; to furnish whatever interpretative background is necessary in order to show how a given physical variable creates a human problem; and to offer recommendations or possible solutions concerning human factors in designing for air transport. A summary with recommendations is provided at the end of each chapter. A bibliography accompanies each unit. (CARI)

880

McFarland, R. A. 1953 HUMAN FACTORS IN AIR TRANSPORTATION. (New York: McGraw-Hill Book Company, Inc., 1953)

881

McFarland, R. A. & A. L. Moseley 1954 HUMAN FACTORS IN HIGHWAY TRANSPORT SAFETY. (Harvard School of Public Health)

882

McFarland, R. A. & H. W. Stoudt 1955 PHYSICAL VARIABLES INFLUENCING DRIVER COMFORT. In Harvard School of Public Health, Efficiency and Safety, March 1, 1955.

883

McFarland, R.A, Damon, A., and Stoudt, H.W. Jr., 1958 ANTHROPOMETRY IN THE DESIGN OF THE DRIVER'S WORKSPACE. Am. Jrnl. of Phys. Anthro. N.S. 1:1-23, March 1958

ABSTRACT: Differences in human body size may have serious implications for the comfort, efficiency, and safety of vehicle drivers. Our aim has been to out line methods whereby data on human body size may be systematically incorporated into vehicular design. In this report are therefore presented the 5th, 50th and 95th percentiles of 30 pertinent body dimensions of 360 commercial bus and truck drivers. Specific values are recommended for a sample of cab dimension closely linked to human dimensions.

884

McFarland, R. A. 1958 HEALTH AND SAFETY IN TRANSPORTATION. (First annual lectureship on preventive medicine of the Amer. Col. of Preventive Med., Cleveland, Ohio, 13 Nov. 1957) Public Health Reports 73(8):663-680, Aug. 1958

ABSTRACT: Accidents now rank above disease as the chief cause of death and disability to many segments of our population, and now constitute a major threat to the wellbeing and health of our people.

885

McFarland, R. A. & H. W. Stoudt 1960 HUMAN BODY SIZE AND PASSENGER VEHICLE DESIGN
(Society of Automotive Engineers, Inc., New York, N. Y.) Rep. AP 142A, 1960.

ABSTRACT: This study deals with the derivation of seat and workspace dimensions of passenger cars from anthropological data descriptive of the general driving public. The 5th, 50th, and 95th percentiles of static body measurements of passenger-car drivers are interpolated from selected anthropometric studies on various segments of the United States population. The manner of utilizing such data in car design is discussed in general and specifically in regard to dimensions for driver's seat and workspace. Additional aspects of seat design, such as seat comfort, are mentioned. (Tufts)

886

McGuire, T. F. 1960 PHYSIOLOGY AND OPERATIONAL COMPARISON OF MC-1 AND MC-3 (MC-4) PARTIAL PRESSURE SUITS. (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADC TR 57-536(I); ASTIA AD-256 873; Oct. 1960

ABSTRACT: A theory on the physiological limitations of partial pressure suits, with supporting evidence, is discussed. Loss of "effective" blood volume, workload placed on the heart, available oxygen, a number of reflexes that can work separately or together to the individual's disadvantage, and other contributory mechanisms are stressed. The comparative operational characteristics of the MC-1 and MC-3 (MC-4) partial pressure suits are presented. (AUTHOR)

887

McIntyre, A. K. 1944 PRELIMINARY REPORT ON "KOP" ANTI-G SUITS.
RAAF-FPRC-FR No. 92; June 1944

ABSTRACT: KOP is Kelly one-piece pneumatic anti-"g" suit. The KOP I and KOP II have 5 gradient pressures, the KOP III has 3 gradient pressures. It is concluded from tests on one subject that 5 pressures are not superior to 3 and that the KOP is still too bulky for practical use. Photographs.

888

McIntyre, A. K. 1944 PRESENT POSITION OF ANTI-G SUITS.
(RAF Institute of Aviation Medicine, Farnborough) FPRC-FR No. 93.

889

MacIver, John 1959 SAFETY AND HUMAN BEHAVIOR: I. HUMAN FACTORS IN ACCIDENTS. II. ACCIDENT-PRONENESS. III. SAFETY AS A WAY OF LIFE. (Paper, 29th Annual Safety Convention, Greater New York Safety Council, 14-16 April 1959)

890

McKay, B. 1947 STATIC TEST - RADAR OPERATOR EJECTION SEAT AND PILOT EJECTION SEAT OPERATIONAL TEST-QUICK DISCONNECTS RADAR OPERATOR AND PILOTS EJECTION SEATS MODEL XP-89 (Northrop Aircraft Inc., Hawthorne, Calif.) USAF Project MX-808 Contr. No. W33-038-ac-14541, Oct. 1947, ATI 54795

ABSTRACT: Static tests were run on the Pilot's and Radar Operator's Ejection Seats that are utilized on the XF-89 fighter airplane. The tests were made to determine whether or not the seats would support the required static loads as established by Air Forces Specification, number 25282. The results of the tests were satisfactory. In addition, tests were conducted on the electrical, oxygen and gravity suit quick disconnects, to ascertain the load required to release the quick disconnect fittings, and to determine whether or not the assembly would be satisfactory for use in the airplane. The following are the actual up loads required to move the R.O. seat and disconnect the units: to move seat with electrical oxygen and gravity suit unit, resp; connected: 85, 107, and 75 pounds, resp. The quick disconnect assembly will be satisfactory for use in the airplane

891

McLaughlin, R.L. 1959 AUTOMATIC INFLATION OF PERSONAL FLOTATION GEAR PRIOR TO WATER ENTRY. (Paper, Meeting of Aero Medical Association Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: There is evidence to suspect wind blast alone is sufficient to render a man unconscious during ejection seat egress from an aircraft traveling at speeds near Mach one. Add to this non-fatal injuries resulting from flailing arms and legs or impact with flying debris and you have a crewman who needs some automatic assistance to survive, especially in water, even though the ejection itself is considered successful. By the same token there is reason to believe the crewman who effects an over the water excape from an aircraft, completely unharmed, also needs help to survive. Cold water can numb minds and fingers quickly. It is not necessary to go down three ti es to drown, but rather it is possible to drown or enter into a strangling tracheal spasm on one gulp of water. Parachute canopys and shroud lines can entangle and restrict the most powerful swimmer. The help needed is automatic inflation of personal flotation gear. Because it is possible to drown or strangle so easily, personal flotation gear should be inflated in the air before water entry to hold submersion time to the minimum. (J. Aviation Med. 30(3):194, March 1959)

892

McNaughtan, I. I., D. J. Day & E. L. Beckman 1959 ESCAPE FROM DITCHED AIRCRAFT. II. INVESTIGATIONS INTO THE PROBLEM OF CANOPY OPENING IN ESCAPE FROM DITCHED AIRCRAFT.
(Flying Personnel Research Committee, Air Ministry) F.P.R.C. Report No. 1091, Sept. 1959.

893

McNaughtan, I. I., D. J. Day & E. L. Beckman 1959 INVESTIGATIONS INTO THE PROBLEM OF CANOPY OPENING IN ESCAPE FROM DITCHED AIRCRAFT.
(Inst. of Aviation Med., R.A.F., Farnborough) Tech. Note No. Mech. Eng. 299; F.P.R.C. 1091 ii.

SUMMARY: When an aircraft has ditched and submerges with the canopy closed, the canopy may be forcibly held shut by the water pressure load. Preliminary trials to evaluate the factors which prevent jettisoning of the canopy of a submerged aircraft have been made. The time required for a subject to jettison the canopy manually after the aircraft had submerged to 30 feet varied from 30 to 240 seconds depending on aircraft attitude.

The forces closing the canopy have been analysed and defined as a result of these trials and a theoretical analysis of the jettison forces has been validated. These analyses show that with modern operational aircraft ditched with the canopy closed there is little chance of jettisoning the canopy either manually or by power jacks after the aircraft has sunk a few feet.

The need for re-evaluation of the problem of underwater canopy jettison in naval aircraft has been emphasised. (Author)

894

McNaughtan, I.I. and J.S.P. Rawling 1960 UNDERWATER ESCAPE FROM SCIMITAR AIRCRAFT (Royal Aircraft Establishment Gt. Brit.) TN no. Mech Eng. 316, March 1960. ASTIA AD-319 048L

ABSTRACT: A description is given of a comprehensive series of underwater tests made on a Scimitar cockpit speciment. The tests included investigations into cockpit leakage rates, canopy jettison system limitations, canopy implosion risk, ejection seat performance and underwater functioning of escape equipment. The results of the tests are discussed in conjanction with a theoretical study of the sink rate of Scimitar aircraft and the best procedure for escape from ditched Scimitar aircraft is derived. (U) (Author)

895

McNutt, D. C. 1958 UNDERWATER ESCAPE. Flight Deck (Autumn 1958): 44-46.

ABSTRACT: Trials have recently been conducted at the Admiralty Hydroballistic Research Establishment Glen Fruin to investigate some of the problems of escape from ditched aircraft. The center section of a Sea Hawk fuselage was used for the experiment, and Martin Baker ejection seats complete with normal parachutes and dinghies were tested.

896

McSurely, A. 1952 GOOD SEATING ENGINEERING SAVES LIVES
Aviation Week, 24 Nov. 1952.

ABSTRACT: The importance of seat design and construction is exemplified by the analysis of an airplane crash involving a Convair 240 (in Flushing Bay near La Guardia Airport, New York, on January 14, 1952). The plane ditched in 15 ft. of water at a speed of about 135 mph., and a normal rate of descent of about 500 ft per minute. Peak decelerations in the range of 10 to 15 g were absorbed by hull and wings. Failure of some seat anchorages indicated that standard load specifications of 6 g forward, 6.6 g downward, and 1.5 g sideways were exceeded. Still, no major injuries were incurred by the passengers due to the resilient structure of seat backs and the firm anchorage of the seats. The following improvements are recommended: (1) seats which will stand 15 g loads; (2) seat backs of ductile metal that will cushion body or head shock; (3) firm anchoring of passengers to their seats with snugly tightened 3000-lb. load seat belts.

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

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897

Maaske, C. A. 1945 A REPORT ON THE INTRODUCTION OF ANTI-"G" EQUIPMENT TO FEAF AND A SURVEY OF AERO-MEDICAL PROBLEMS IN SWPA INCLUDING CONTINENTAL AUSTRALIA (Wright Field) Memo Report TSEAL-696-51h; 24 Feb. 1945

ABSTRACT: The visit of Capt. Maaske and Dr. Baldes of the Mayo Clinic to the Southwest Pacific area and Australia is reported. Tropical climatic conditions interfere with the use of either the G-2 or G-4 coverall anti-"g" suits; the G-3 functions very satisfactorily, preventing blackout and fatigue. However present flying tactics do not indicate a need for anti-"g" equipment. (It is recognized that this situation may change at any time).

The centrifuge at Sydney is described. No physiological recordings have been made on it to date. A brief description is also given of the six-pressure gradient Australian suit.

898

Maaske, C.A., A.L. Roach, E.E. Martin, & G.L. Maison 1944 EVALUATION OF ANTI-G SUITS. (Wright Field) TSEAL-3-696-51-F, Rept. No 6, 16 Nov. 1944.

ABSTRACT: (a) Tests have been made on the Wright Field centrifuge of the efficacy of the G-3 (cutaway) and G-4 (coverall) anti-"g" suits. Eleven subjects tested the G-3, 10 subjects the G-4. Protection was determined relaxed with maximum "g" lasting 10 seconds.

(b) Protection offered was as follows:

Graying	1.0 "g"	1.0 "g"
Peripheral light loss	1.05 "g"	1.14 "g"
Blackout	1.26 "g"	0.9 "g"

(c) The G-3 is pressurized at 0.86 psi per "g" in maneuvers exceeding 2 "g". The G-4 pressurized at 0.88 psi/ "g". The slightly greater protection against adjustable lacings, which are not incorporated in the G-4.

(d) The G-3 has been reported to offer 2 "g" protection in planes, quite adequate for the aircraft now being flown.

899

Maaske, C.A., G.A. Hallenbeck, & E.E. Martin 1944 EVALUATION OF ANTI-"G" SUITS. (Wright Field) Rept. No. 4; Eng-49-696-51D; CAM No 348; 10 June 1944

ABSTRACT: The efficacy of a single pressure pneumatic suit (G-2) was compared with that of a gradient pressure suit (g-1) with a view to lightening and simplifying anti-"g" protection. The G-1 suit plus oil filter and valve weighs 15.5 lbs, the G-2 assembly weighs 8.5 lbs.

In the G-2 the oil filter has been removed and the abdominal bladder simplified. It is pressurized at 1 psi/"g" for values of "g" over 2. There are one abdominal, 2 calf, and 2 thigh bladders. Air is metered to the suit by a 2 unit single pressure "g" activated valve. Pressure source is the positive pressure side of the B-12 vacuum instrument pump rotating at 3,000 rpm and working on 5 inches Hg intake.

Twenty experienced subjects who tested the G-2 by 10 second exposures on the centrifuge obtained an average protection of 1.2 "g" against visual dimming and peripheral light loss and of 1.9 "g" against blackout. This compares favorably with the performance of the G-1 suit.

900

Maison, G. L. 1943 REPORT TO THE AIR SURGEON ON STATUS OF ANTI-"G" DEVICES AS OF 1 NOVEMBER 1943 (Wright Field)

ABSTRACT: Comparison of operation and construction of hydraulic suits (FFS), gradient pressure pneumatic suits (GPS), and Clark-Wood arterial occusion suit (AOS). Pressurizing devices for GPS and AOS at present time consist of:

(a) Positive side of vacuum instrument pump. Performance of this pump falls off badly at altitude, must be used with oil filter.
(b) Cornelius Co., electrical pump operating on 24 volts DC and using 35 amps. Current model has been shown to be unreliable in service tests at Eglin Field.
(c) Tanks of compressed gases. These give excellent performance at all altitudes and temperatures but are least satisfactory source of pressure because of limited period of usefulness, unsatisfactory valves, and added complications of installation and servicing.
(d) Combination pump and tank units. Still in developmental stage and designed for use with AOS.

Average protection offered to relaxed subjects on centrifuge is reported as follows:

901

Maison, G. L., & C. A. Maaske 1943 EVALUATION OF ANTI-G SUITS
(Wright Field) CAM No. 201; 29 Sept. 1943

902

Maison, G.L. and E.E. Martin 1943 HUMAN PICK-UP.
(War Dept., Air Forces) ENG-49-696-53, 8 October 1943

903

Maison, G.L. 1944 EVALUATION OF ANTI-G SUITS
(Wright Field) Rept. No. 3, ENG-49-696-51C, 18 Apr. 1944. CAM no. 309

ABSTRACT: A total of 22 Berger Bros. pneumatic gradient pressure suits and 22 hydraulic Franks flying suits were flight tested by 26 pilots of the 9th Air Force in P-47 and P-51 aircraft. Complete visual protection was obtained with both suits.

Eighty percent of the pilots thought anti- "g" protection desirable in P-51 aircraft but only about 40 percent thought it necessary in P-47's, probably because the latter planes are less maneuverable. Protection was especially desired for combat flying.

Of the 17 pilots who tested both types of suit, 11 preferred the GPS, one the FFS, and 5 had no preference. The GPS was preferred because it is lighter, less cumbersome, can be worn over ordinary clothing, fitting is less critical, and it does not need to be serviced with water prior to take off.

FFS	0.7 "g"		
GPS	1.3 "g"	to	1.5 "g"
AOS	2.0 "g"	to	2.5 "g"

Both FFS and GPS have proved acceptable to pilots for operational use. AOS should theoretically prove more valuable, but 20 out of 25 experienced combat pilots who flight tested both GPS and AOS preferred the GPS as the AOS proved too uncomfortable. Further operational testing of both GPS and AOS is suggested.

904

Maison, G. L., & C. A. Maaske 1944 EVALUATION OF ANTI-G SUITS
(Wright Field) Rept. No. 1; Eng-49-696-51A.

905

Maison, G.L., and C.A. Maaske. 1944 EVALUATION OF ANTI-G SUITS. (Wright Field) Eng-49-696-51E-1, Report No. 5, 11 August (To report the status of anti-"g" devices for fighter planes in the various theaters)

ABSTRACT: Two models of the anti-"g" suit have been shown to be necessary, a cut-out suit (G-3) consisting only of the cloth covered bladders to be worn with regular officer's clothing in cold climates, and the G-4, a very light weight coverall for wear in tropical localities where a minimum of clothing is desirable. G-suits are now optional in the 9th Air Force for P-47's and P-51's; they are mandatory in the 8th AAF for P-51"s

The G-3 is a cut out G-2 (single pressure) suit. Comparative weights:

G-2 suit.....6 lbs.
G-2 plane installation...4 lbs
G-3 suit.....2¼ lbs
(Plane installation interchangeable with G-2)

The G-4 coverall is made of rayon marquisette; probably is too porous to protect against sunburn. (NB this has been replaced by solid weave nylon at a later date.) Total number of "g" suits delivered to date is 3500. 6600 are on order

906

Maison, G.L., C.A. Maaske, G.A.Hellenbeck & E.E. Martin 1945 ACCELERATION AND G SUIT. Air Surgeon's Bull. 1:3-7, Jan. 1945.

907

Maciolek, J.A. 1955 CIRCULATORY REFLEX ACTIVITY AS A G-PROTECTIVE DEVICE (Aero Medical Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio) Report No. WCRD-55-1. Jan 1955. ASTIA AD 75 056.

ABSTRACT: The response on the human centrifuge of 7 seated subjects to positive accelerations of normal rapid onset (1 g/sec) was compared with their tolerance in runs having 0.07 to 0.1 g/sec rate of onset. The approximate blackout threshold of the group was 3.7 g for the standard runs. The runs of slow onset attained 6.2 g before equivalent symptoms occurred. The 2.5 g difference in symptom level is a measure of the response of the various hemostatic mechanisms tending to sustain blood pressure in man exposed to a gravitational stress which is acting from head to foot. The technique seems to be a simple and practical method of evaluating the activity of the protective reflexes in different persons and in the same person under varying conditions.

908

Mahaffey, P.T. 1945 PROOF TEST OF SEAT INSTALLATIONS. (Douglas Aircraft Company, Inc., Santa Monica, Calif.) ASTIA ATI-105 836, 4 July 1945

ABSTRACT: The pilot's and relief pilot's seats were subjected to the limit down loads, and the bombardier's seat to the limit down load and the belt load. The requirements of specifications AAF 25278 and AN-S-1a were carried out as far as was practicable. The test indicated that the pilot's seat was under-strength, and as a result the material of the seat frame was changed from mild steel tube to alloy steel tube. The other seats were satisfactory as tested.

909

Mahoney, D. I., & J. A. Wood 1949 COMPARISON BETWEEN A FULL LENGTH AND AN ABBREVIATED TYPE OF PARTIAL PRESSURE SUIT. (Air Materiel Command, Wright-Patterson AFB, Ohio) Memo Rept. MCREXD-696-104M; ASTIA AD-63 109; 3 Feb.1949

910

Malcolm, R., W.White 1947 REPORT ON THE "LOBELLE" SEAT EJECTION UNIT - PART 1 (Ministry of Supply, England) June 1947, ATI 100 940

ABSTRACT: The need for Pilot Ejection systems has arisen due to the number of occasions when operational pilots have failed to escape successfully from damaged aircraft at high speeds by ordinary methods. The two major reasons for such failures were considered to be: (a) impossibility of climbing out of the cockpit at high speeds, and (b) danger of pilot being struck by some part of the aircraft after climbing out at lower speeds. The system adopted to overcome these difficulties was as follows: To eject the pilot and the seat together upwards from the aircraft with sufficient initial velocity to clear all parts of the aircraft at speeds up to 600 m.p.h. E.A.S., and for the pilot to remain attached to the seat, which forms a support for his limbs, until such time as he is completely clear of the aircraft and his resultant speed has dropped low enough for him to leave the support of his seat. Other points of this system are: (a) The case with which it could be installed in the type of aircraft in the design stage at the time. (b) The possibility of retrospective installation in aircraft such as the Meteor and Vampire. (c) The minimum variation to standard cockpits and controls that is entailed.

911

Mallan, L. 1956 SECRETS OF SPACE FLIGHT.
(Greenwich, Conn.: Fawcett Publications, Inc., 1956)
Fawcett book No. 298

ABSTRACT: A photographic account is presented of rocketry and space flight. Subjects covered include studies in space medicine; escape capsules and rocket sleds; development of the space suit; launch into the stratosphere; training of space pilots, and research rocket takeoff.

912

Mangelsdorf, J.E. 1959 LOGISTIC SUPPORT TO MAN'S ECOLOGY IN SPACE.
Mechanical Engineering. 81:79, July 1959

ABSTRACT: This paper discusses the ecological elements with which the system must provide the satellite crew. Provision for potable water and nutriment and means of ingestion; gases for breathing; disposal of body wastes; protection from thermal, noise, radiation, psychological and G-stresses are treated in some detail. It is shown that the solution of the problem of man's ecology in space requires talent from a number of technical areas. The author briefly examines the Lockheed ecological model, first as a means of illustrating man's metabolic exchange, and second, as a tool for solving some of the problems of designing for long-endurance, manned satellites.

913

Manzell, , tr. J. B. Bateman 1945 DO 335 CATAPULT SEAT: THREE-COMPONENT MEASUREMENTS. (Dornier-Werke G. m. b. H., Friedrichshafen) Wind Tunnel Research Rept. Pages A-17189 to A-17205
Translated as Appendix 6a to Lovelace, W. R., E. J. Baldes, & V. J. Wulff, The Ejection Seat for Emergency Escape from High-Speed Aircraft, ATI No. 7245

SUMMARY: Three-component measurements were carried out on the catapult seat, both with a dummy and with living subjects. The catapult seat was required to have a backward turning, or positive moment immediately it emerges from the cockpit. Since the back of the Do 335 catapult seat both in position in the airplane and at the moment of its ejection is tilted backward at an angle of 13 degrees, this position (Y=13 degrees) was designated as "normal." It can be seen from the measurements that the catapult seat in the "normal" position was very top heavy. By bringing extra surface to the head guard an attempt was made to reverse the direction of the turning moment, but it had to be recognized that relatively large surfaces were needed in order to fulfill this requirement. The desired result was obtained with extra surface No. V, 0.116 n.^{2} (1.25 ft.^{2}); the outline of this surface conformed to the internal cross section of the roof of the cabin. A series of measurements of the effect of wind velocity was made using this arrangement.

914

Marciniak, F.P., R.A. Houghton 1958 AN EVALUATION OF A GROUND-LEVEL ESCAPE SYSTEM. SAE National Aeronautic Meeting no. 91A, Sept. 29-Oct. 4,1958.

ABSTRACT: This paper gives a description of the evaluation and testing of the Martin Baker ejection seat for ground-level escape. The ejection seat is credited with being the greatest life-saver since the parachute, but up until two years ago, a pilot could count on a 100% probability of getting himself killed if he ejected below 1000 ft altitude.
Grumman elected to take on a major protion of the evaluation of a Martin-Baker ejection seat. The resulting installation in the Grumman F9F-8T jet trainer is a modification of the existing British system, which has already saved many lives. Although this seat gets some of its ground-level capability from a high trajectory, its main advantage lies in its unique arrangement for rapid, positive deployment of the parachute and positive separation of the pilot from the seat.

915

Marcks, C.A. 1952 HOW DOES EQUIPMENT AND CLOTHING AFFECT THE PROBLEM OF EMERGENCY SYSTEMS DESIGN. (Paper, Symposium on the Problems of Emergency Escape in High Speed Flight September 29-30, 1952, Wright Field, Ohio) AD14344

ABSTRACT: The general trend of personal equipment and protective clothing design for aircraft operations has been a gradual evolution during and since World War II with new components being developed when their need became evident. The accumulative volume and assortment of this equipment has had an adverse effect on pilots and aircrewmen. The bulk and weight of the equipment causes fatigue. Furthermore, the varied attachments slow down movement and could easily be a crucial liability during an emergency. In order to eliminate this heavy burdensome equipment, the author suggests a flight capsule for the pilot.
A flight capsule would also protect a pilot from windblast, cold, and pressure during an emergency escape.

916

Marinelli, J. L. 1960 PROJECT NR AVN 2860, "EVALUATION OF THE IMPROVED PASSENGER SEAT ARRANGEMENTS FOR HU-1A AND HU-1B HELICOPTERS". (U. S. Continental Army Command, Fort Monroe, Virginia) ASTIA AD-245 516; 3 Nov. 1960

CONCLUSIONS: (a) The seven-passenger seat kit as tested is unsuitable for Army use. (b) Based solely on available space and weight-carrying capability of the helicopter, the best seating arrangement for the maximum number of troops is with the three medical attendant seats facing aft, which will accommodate eight

passengers and permit satisfactory entrance and exit. (c) Center-of-gravity limitation and the required ballast for more than six passengers preclude consideration of a seven- or eight-passenger configuration for the HU-1A. (d) A seven-passenger configuration utilizing two medical attendant seats aft of the pilot, facing either aft or outward, and a 4-5 passenger variable-width troop seat across the after cabin bulkhead is considered the optimum seating arrangement for HU-1B Helicopters.
RECOMMENDATIONS: A seven-passenger seat configuration which permits two medical attendant seats to be faced aft or outward and which employs a standard 4-5 passenger variable-width troop seat be utilized in the HU-1B Helicopter. (AUTHOR)

917

Markushewski, L. and W. C. Knerr 1958 UNDERWATER ESCAPE PROGRAM: Description of F86D-11 Airplane Low Level Test Drops and Comparison with F9F-4 Test Drops Key West, December 1957 January 1958. (Naval Air Development Center, Johnsville, Pa.) Proj. TED no. ADC-AE-6307, Rept. no. NADC-ED-5811; Interim rept. no. 2; ASTIA AD 231 389.

ABSTRACT: Results from three F86D-11 airplane test drops are compared with those of the F9F-4. The F86D-11 sank faster than the F9F-4. The implosion of the canopy bubble on the F86D-11 occurred at 5.3 psi less differential pressure than did that of the F9F-4 canopy. Both aircraft were found to sink tail-first to varying degrees of pitch when the cockpit remained dry during submersion. Fuselage structural damage in the cockpit area after the aircraft had been sunk to a depth of about 21 fathoms did not appear sufficient to deter egress. The deformation of stringers and bulkheads was not sufficient to cause injury to the pilot by crushing. The time from release to implosion of the canopy was 45.5 sec. The canopy imploded about 1.7 sec after the aircraft disappeared below the surface of the water. This left the pilot little time to open his canopy after a crash and avert possible fatal injuries from flying pieces of canopy propelled by the implosion force.

918

Marsh, D. P. 1961 CAPSULAR COCKPIT - WEIGHT AND BALANCE ANALYSIS OF MODEL A4D-5 (Douglas Aircraft Co., Inc., El Segundo, Calif.) ES 40258; ASTIA AD-264 292; Jan. 26, 1961

ABSTRACT: This report contains a weight and balance analysis prepared for use in conjunction with the February 1961 proposal to incorporate a capsular cockpit on Model A4D-5 aircraft. Highlights of the analysis include: (1) Detailed "in and out" weights and balances, (2) a weight and balance comparison of the cockpit area before and after modification, (3) cockpit weights and balances for various configurations, (4) airplane weight empty, normal gross weight, and nose heavy condition after modification, and (5) the pitching moment of inertia of the cockpit. A weight and balance breakdown is also included to reflect a change of cockpit P.S.I. from 3.3 to 7.5. (AUTHOR)

919

Martin-Baker Aircraft Co. THE MARTIN-BAKER AUTOMATIC EJECTOR SEAT-MARK 3 (Martin-Baker Aircraft Co., Ltd., England) ASTIA ATI-88684

ABSTRACT: The design of the Martin-Baker automatic ejector seat is described which enables pilots and aircrew personnel to escape from high-speed aircraft at all altitudes. It is effective at any speed and under any G accelerations that may occur whatever the altitude of the aircraft. By the simple movement of a hand lever, the airman has his parachute available for normal rip-cord operation either without ejection with the seat or at any time after ejection has taken place. The seat is ejected from the aircraft by means of a cartridge operated gun and slides during ejection on four rollers in a guide rail. The ejection gun is fired by the withdrawal of a flexible screen, which covers and protects the occupant's face against the effects of the air stream. On ejection, the seat leaves the aircraft at 60 fps.

920

Martin-Baker Aircraft, Ltd. 1946 DETAILS OF DEVELOPMENT WORK ON THE MARTIN PATENT EXPLOSIVE EJECTION SEAT. (Martin-Baker, Higher Denham, Middlesex, England)

921

Martin-Baker Aircraft Company 1956 SOME INCIDENTS WITH MARTIN-BAKER EJECTION SEATS, 1951-1956. (Martin-Baker Aircraft Co., Ltd. Higher Denham (Bucks), Nr. Uxbridge, Middx.)

922

Martin, E. E. 1947 EVALUATION OF THE ANTI-G SUIT. Rept. No. 7, USAF Memo Rept. No. TSEAA-689-2B., Nov. 1947

923

Martin, E.E., J.P. Henry, J.L. Gamble & R.S. Shaw 1948 EVALUATION OF THE ANTI-G SUIT. (USAF Air Material Command, Wright-Patterson AFB, Ohio) MCREXD-689-2C, Report No. 8. 24 July 1948.

ABSTRACT: Three subjects were each exposed to one or more series of runs on the human centrifuge. Each series consisted of direct arterial pressure measurements at 1 g, 2.5 g, 3.5 g, and 5 g without and with each of the anti-g suits. This report presents direct radial artery pressure results obtained while comparing three anti-G suits on the human centrifuge. The G-5 suit proved to be more efficient than the G-4A which gives more than twice the protection afforded by the G-3A suit. The added protection given by the three suits when using the m-1 maneuver is as follows: ½ g for the G-3A, 2.3 g for the G-4A and 0.1 g for the G-5. This protection is over and above the normal arterial pressure method for evaluating G-suit protection can be used to confirm the results obtained by the visual method of G-suit evaluation. Experiments should be conducted to measure cerebral perfusion pressure head and blood flow rates during positive acceleration to determine how they vary in proportion to cerebral arterial pressure.

924

Martin, E. E., G. Schroer, & J. P. Henry 1949 STATIC ASSESSMENTS OF THE RELATIVE EFFICIENCY OF ANTI-G SUITS. Fed. Proc. 8:107.

ABSTRACT: Attempts to estimate the effectiveness of anti-G suits while at rest by measuring the changes they induce in blood pressure have shown increments proportionate to the relative efficiency of these devices during acceleration. The results suggest that test of G-suit efficiency could be devised which do not require the use of a human centrifuge. With this end in view, 3 further measurements were made: venous pressure, vital capacity and teeter board weight shift. Venous pressure was measured at the ante-cubital fossa when the legs only of the G-3A, G-4A, and G-5 suits were inflated. A teeter board was employed to measure the weight shift induced by the inflation. The changes in vital capacity were measured under the same conditions. Eight series of 3 tests each were carried out on 6 subjects. The following table shows the changes induced by suit inflation:

	G-3A	G-4A	G-5
Venous pressure increase ($cm.H_2O$) . . .	0.3 ± 0.2	1.9± 0.6	4.3± 0.5

Vital capacity decrease (cc.).	250 ±60	325 ±70	400 ±60
Teeter Board weight shift (pounds)	0.3± 0.1	0.4± 0.2	0.5± 0.3

These differences are qualitatively confirmed by the results of tests of these suits on the human centrifuge. In the G-3A suit mean protection as estimated from blood pressure changes was 1.0G, G-4A suit 2.2G, and the G-t suit 2.3G.

925

Martin, E. E. 1949 SERVICE TEST REPORT ON USAF TYPE G-4A PILOT PNEUMATIC SUIT, ANTI-G.
(Air Material Command, Wright-Patterson AFB, Ohio) Memo. Rept. No. MCRED-689-2E, 20 May 1949.

ABSTRACT: The G-4A anti g suit was compared with the G3A suit, first without pressure and then using pressure from the M-4 pressure-regulating valve. The suit consists of a coverall incorporting 5 intercommunicating bladders which exert pressure over the thigh, calf and abdominal regions. Tests were conducted at 10,000 ft or higher utilizing the type maneuvers necessary to obtain combat-like accelerations. The superiority of the G-4A suit was indicated in the tests.

926

Martin, E. E., R. U. Whitney & E. B. Smith 1951 DEVELOPMENT AND FABRICATION OF THE USAF TYPE M-8, NO-LEAK ANTI-G VALVE (ARO EQUIPMENT PART NUMBER C10050)
(Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC Memo Rept. No. WCRDB-689-4Q, 21 Nov. 1951.

927

Martin, E.E., and R.U. Whitney 1952 A DESCRIPTION OF THE U.S. AIR FORCE TYPE M-7 NO-LEAK, NEGATIVE-G VALVE. (Wright Air Development Center, Wright-Patterson AFB, Ohio) Technical note no. WCRD 52-11; ASTIA AD-2134; Sept. 1952

ABSTRACT: A description is given of the type M-7 negative-g valve, a unit which automatically responds to negative acceleration so as to provide controlled predetermined pressures within the T-1 altitude helmet. During negative maneuvers

exceeding 1 g the valve closes the breathing port and thereafter regulates the counterpressure in the helmet to 25 mm Hg per g. As the negative g decreases below 1 unit, the valve exhausts the counter-pressure gas and permits the pilot to resume normal breathing. This unit, which satisfactorily provides counter-pressure to the head-neck region during negative acceleration up to 5 g, operates in conjunction with the present aircraft oxygen system. Centrifuge tests showed that the device operates satisfactorily in the range 1 to 6 negative g. In flight tests performance was satisfoctory within the 3-g negative limits imposed by an F-84.

928

Martin, J. 1949 REPORT ON RESEARCH AND DEVELOPMENT CARRIED OUT BY MARTIN-BAKER AIRCRAFT CO. LTD. IN CONNECTION WITH EJECTION SEATS FOR HIGH SPEED AIRCRAFT. (Martin-Baker Aircraft Co., England) June 1949. ASTIA ATI 89438

ABSTRACT: A description is given of British research and development carried out in connection with ejection seats and the escape of personnel from high-speed aircraft. The early history of the ejection seat project is presented as well as information on work done on the Defiant and Meteor III fighters, and the 16 and 65 development and construction of the Mark I seat and the fully automatic seat is discussed. Consideration training rig for the RAF. A schedule of dummy and live ejections from the Meteor III is included. Photographs and drawings illustrate some of the equipment and graphs show acceleration data.

929

Martin, J. 1956 EJECTION FROM HIGH SPEED AIRCRAFT. J. Royal Aero. Soc. 60(550):659-668, Oct. 1956.

ABSTRACT: Early studies to determine physiological acceleration limits on a ground ejection rig and to test operational designs of the Martin-Baker aircraft ejection seat in flight are described. The chief design features of the seat, including an automatic ejection device, main time release, ejection gun, leg restraining device, and duplex drogue system are described, and the peculiar conditions and methods of ejection at high altitude, high speed, and low altitude are discussed.

930

Martin, J. 1956 EJECTION SEAT AND PARACHUTE ASSEMBLY FOR A SINGLE PERSON U. S. Patent 2,762,588, 11 Sept. 1956

ABSTRACT: An ejection seat is described and illustrated, provided with two drogue parachutes. It is claimed that this assembly results in a gradual opening of the parachutes in the proper order.

931

Martin, J. 1957 EJECTION REPORTS. (Martin-Baker Aircraft Co., Denham, England)

932

Marvin, F. F. 1955 RECOVERY SYSTEMS FOR DRONES AND MISSILES (Air Force Institute of Technology, Wright-Patterson AFB, Ohio) Rept. No. GAE-23; 30 Aug. 1955

933

Marzella, J., J.R. Hess 1946 GROUND AND FLIGHT TESTS OF MARTIN-BAKER AIRCRAFT COMPANY PILOT'S EJECTION SEAT FROM MODEL JD-1 AIRPLANE (Naval Air Material Center, Aeronautical Structures Lab., Philadelphia, Pa.)

ABSTRACT: Ground and flight tests were made of the Martin-Baker pilot's ejection seat to determine its practicability and limitations as an emergency escape device, to obtain data on the accelerations acting on dummies during flight ejections, and to perform a human ejection at low airspeed. Five flight ejection tests were made at speeds from 200 to 350 mph in 50 mph increments and altitudes from 3000 to 6000 ft, and a live ejection test was made at a speed of 250 mph and an altitude of 5000 ft. It was concluded that the emergency escape device is satisfactory for service aircraft, that the highest accelerations imposed on the dummy and seat in the airstream was caused by the action of the drogue parachute and that the acceleration-time characteristics and operation of the seat catapult are satisfactory for line ejection tests

934

Mases, P., R. Falet & C. Jacquemin 1959 MODIFICATIONS RESPIRATOIRES ET CIRCULATOIRES ENGENDREES PAR CERTAINES POSITIONS DE TRAVAIL DU PERSONNEL NAVIGANT AU COURS DU VOL (Respiratory and Circulatory Changes Caused by Certain Work Positions of Flying Personnel in Flight)
Medecine Aeronautique (Paris) 14(1): 1-3.

935

Mason, J.K. 1958 PATHOLOGICAL FINDINGS FOLLOWING UNSUCCESSFUL EJECTION FROM HIGH SPEED AIRCRAFT.
J. Forensic Med., (Johannesburg, S. Africa), 5(4):173-184, Oct.-Dec. 1958.

ABSTRACT: Operational and performance features of the standard British ejection seat are outlined. Post-mortem examinations of victims of unsuccessful escapes during flight are analyzed. The findings suggest human or instrumental failure in the preparatory stage or during actual ejection. Potential pathologic findings are correlated with various ejection stages. Illustrations are included showing how the post-mortem examination may disclose the circumstances surrounding the unsuccessful escape. On the basis of the degree of pulmonary fat embolism and of local reaction to injury, general observations are made with regard to timing of injuries. The role of post-mortem examinations in preventive medicine is stressed with particular regard to the uncommon causes of death encountered in unsuccessful ejections.
(J. Aviation Med. 30(5):378, May 1959)

936

Mason, John W. 1957 A RESTRAINING CHAIR FOR THE EXPERIMENTAL STUDY OF PRIMATES.
WRAIR-68-57 Project: 6-60-10-017 Subtask No. 4
ASTIA Doc. No. AD 151 646.

937

Masters, P.G., W. Lehman, P.W. Wood & D.M. Bland 1960 INTEGRATED FLIGHT CAPSULE IMPACT AND FLOTATION BAG INFLATION SYSTEM.
(Chance Vought Aircraft, Dallas, Texas) Naval Weapons Contract Noas 59-6150-c, Interim Report No. AER-EOR-12836, 1 March 1960.

ABSTRACT: This report describes the studies made and system selected for inflation of the impact bags and flotation bags used on the integrated flight

capsule. The use of a hot gas generator inflation system was considered early in the study. However, contact with Vendors indicated that the hot gas generator system hardware is feasible, but bag materials are not available which will withstand the generated gas temperature. Three different types of cold gas inflation systems were investigated. The single air bottle, single pressure regulator system requires extremely large lines to achieve desired results. A system using a single air bottle with a pressure regulator at each bag allows use of smaller lines but the required inflation time of 3 seconds is not feasible using the proposed 900 cu. in. air bottle. Both of these systems can be designed; however, calculations are presented only to the point that the assumptions made for system design are insufficient to meet established criteria. The system recommended for this application is individual air bottles with no pressure regulators. The most apparent advantage of this system is insurance against loss of the entire recovery system in the event of failure of one bag.

938

Material Laboratory 1949 REPORT OF TYPE APPROVAL EVALUATION OF PROTECTIVE HATS. (Material Lab., Naval Shipyard, Brooklyn, N.Y.) Report 4526-14, ASTIA AD- 205449, 9 December 1949

ABSTRACT: Samples of eleven protective hats of various design and structure were submitted for tests for electrical protection, ordinary abuse, and peak force endurance. The hats were also tested for insulation resistance, flammability, water absorption, and sterilization. The results of the tests performed on the hats are given in this report.

939

Mathewson, J.H., & D.M. Severy 1953 RAPID DECELERATION TESTS OF CHEST LEVEL SAFETY BELT. (ITTE-UCLA, Los Angeles, Calif.) Rept. No. 27 Reprint Bulletin No. 73 - Highway Research Board, Washington, D.C.

940

Matlock, H., E.A. Ripperger, et al. 1957 HIGH VELOCITY IMPACT CUSHIONING, PART II, ENERGY-ABSORBING MATERIALS AND SYSTEMS. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129 qm-817, 26 Aug. 1957. ASTIA AD 220 738

ABSTRACT: The cost of air drop can be substantially reduced to the proper combination of aerial retarder and ground cushioning, which depends upon the relative cost of the retarder and cushioning. Laboratory studies of the impact energy absorption of various materials and systems including paper honeycomb foamed plastics, and metal cylinders indicate that minimum cost is achieved with smaller parachutes than those currently in use.

941

Matlock, H., E.A. Ripperger, J.W. Turnbow, & J.N. Thompson 1957 HIGH VELOCITY IMPACT CUSHIONING, PART I. DROP-TEST FACILITIES AND INSTRUMENTATION. (Structural Mechanics Research Lab., University of Texas, Austin, Texas) Aug. 1957. ASTIA AD 220 737

ABSTRACT: Three drop-test installations were developed for research on impact cushioning. These range from a small indoor facility, 28 feet high, to 275-foot tower which provides for both vertical and inclined guided drops of masses weighing up to 5000 pounds. Instrumentation measures time, force, and displacement during impact for determining energy-absorbing properties of materials and systems. (Author)

942

Matlock, H., & J.N. Thompson 1957 HIGH-VELOCITY IMPACT CUSHIONING PART III. PRELIMINARY TEST ON A NONPRESSURIZED AIR BAG. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129-qm-817, 15 Oct. 1957. ASTIA AD 220 822

943

Matthews, B.H.C. 1941 SERVICE TRIALS OF FRANKS HYDRAULIC SUIT. (National Research Council, Canada) Report #C-2835, July 2, 1941

ABSTRACT: This memorandum from the R.A.F. Physiological Laboratory, R.A.E. Farnborough, recommends that the Franks Anti-G suit be submitted to service trials.

944

Matthews, B.H.C. 1945 HUMAN LIMITS IN FLIGHT
Smithsonian Institute, Washington, D.C. Publication 3785

ABSTRACT: A modern aircraft will climb in a few minutes to heights at which the air is so thin that will no longer support life. It can turn and maneuver so fast that the pilot may easily be rendered unconscious from the mechanical forces which it imposes on his body, and in an aircraft which is moving rapidly in three planes of space the pilot can be subjected to stresses beyond the limits which the human body can stand. Besides the stresses from wind pressure, cold, vibration, and noise, the pilots body must also be protected from other less obvious stresses. The two greatest stresses which an aircraft puts upon the pilot and those reviewed in this publication are those stresses due to acceleration and those due to high flying in the rarefied air of the upper atmosphere.

945

May, J. 1959 OUTFITTERS FOR OUTER SPACE.
Space Age 1(3):20-26, May 1959

946

Mayfield, G. B. & M. C. Crook 1948 TESTS TO DETERMINE STRENGTH OS SAFETY HARNESSES FOR AIRCRAFT PILOTS.
(The David W. Taylor Model Basin) Rept. No. 633, Oct. 1948.

947

Maynard, J. D. 1961 AERODYNAMIC CHARACTERISTICS OF PARACHUTES AT MACH NUMBERS FROM 1.6 TO 3.
(N.A.S.A., Washington, D. C.) NASA TN D-752, May 1961.

ABSTRACT: A wind-tunnel investigation has been conducted to determine the parameters affecting the aerodynamic performance of drogue parachutes in the Mach number range from 1.6 to 3. Flow studies of both rigid- and flexible-parachute models were made by means of high-speed schlieren motion pictures, and drag coefficients of the flexible models were measured at simulated altitudes from about 50,000 to 120,000 feet. (Author)

948

Mayo, A.M. 1951 BASIC ENVIRONMENTAL PROBLEMS RELATING TO MAN IN THE "AEROPAUSE" AS SEEN BY A AERONAUTICAL ENGINEER
(Douglas Aircraft Co., Inc., El Segundo, Calif.) Nov. 6, 1951 ASTIA AD 87 435

ABSTRACT: While many new factors and principles must be considered in design for flight in the AEROPAUSE, emphasis on the cardinal principles of working toward the optimum pilot-airplane combination, will probably pay the greatest total dividend in operational efficiency. This principle can best be approached by making use of the best available aeromedical and engineering data, in order to arrive at workable compromises in each. Some of the new problems will radically affect some of the equipment associated with the airplane.

New problems include those of fit and arrangement of the aircraft cabin, time-distance factor, temperature of the aircraft, pressure environment in the cabin, acceleration, noise and vibration and the escape problem.

949

Mayo, A.M. 1952 BASIC ENVIRONMENTAL PROBLEMS RELATING MAN AND THE AEROPAUSE AS VISUALIZED BY THE AERONAUTICAL ENGINEER
In: White, C.S. & O.O. Benson, Jr., eds., Physics and Medicine of the Upper Atmosphere, A Study of the Aeropause (Albuquerque, New Mexico: University of New Mexico Press, 1952) Pp. 6-22

ABSTRACT: Flight in the aeropause will impose great physiological and psychological demands on pilot and crew. The rapid advances in aircraft construction call for a corresponding step-up in education and training. The human factor should, on the other hand, be considered in the design of equipment and instrumentation. The latter should be reduced to the absolute essentials. Further clarification of the visual effects of reduced light dispersion is required. The reduction of the time-distance factor in high-speed flight will put more reliance on automatic control mechanisms, confining the human element to slow-rate monitoring operations. Temperature regulation systems will have to be adapted to the increasing speeds (a chart indicating various cooling systems practicable at the various speed ranges is presented). Problems concerning pressurization, physiological effects of acceleration, of noise, and vibration are discussed. Brief sections are dedicated to radiation and meteor hazards. General principles of escape mechanisms are analyzed. In conclusion it is recognized that a compromising formula is to be worked out to balance all factors involved and keep the resulting costs at a minimum.

950

Mayo, A.M. 1952 ESCAPE DEVICES REQUIRED FOR FUTURE AIRCRAFT. (Douglas Aircraft Company, Inc., El Segundo, Calif.) 29 Sept. 1952.

SUMMARY: It should be emphasized that no single escape method can adequately cover the needs of all aircraft. It is also important to make certain that arbitrary opinions do not supplant objective analyses and allow the corporation of devices giving less safety per unit effort than would be possible by the application of the proper escape met od. It is also essential to be extremely wary of systems adding large chunks of dead weight or of those which tend to materially increase aircraft dimensions. Wrong decisions in this respect can reduce total safety by excessively decreasing performance or numbers of additional protective aircraft.

951

Mayo, A. M. 1952 ESCAPE DEVICES REQUIRED FOR FUTURE AIRCRAFT (Paper Conference on Problems of Emergency Escape in High Speed Flight. 29-30 Sept. 1952, at Wright-Patterson Air Force Base, Ohio) Sept. 1952 ASTIA AD 14 353

952

Mayo, A.M. 1955 SELECTION OF THE ESCAPE SYSTEM (Chief Equipment and Interiors, Engr. Section, Douglas Aircraft Co., Inc., El Segundo, Calif.) Rept. 1366, Oct. 7, 1955

ABSTRACT: This paper was presented to the Aeromedical-Engineering Association Institute of Aeronautical Sciences. In order to prevent excessive performance or economic penalty, the selection of the escape system should be based on an objective study of the over-all requirements of the man-aircraft into which it is to be incorporated. Full utilization should be made of all available aeromedical, engineering, and statistical data available. The designed should be extremely wary of any system adding substantial increments of complexity, dead weight, or size increments to the over-all aircraft system.

953

Mayo, A.M. 1957 SOME SURVIVAL ASPECTS OF SPACE TRAVEL
Journal of Aviation Medicine 28(5): 498-503

ABSTRACT: In a space craft as in aircraft the over-all objectives must command first attention. Survival problems resulting from space environment will be so severe however, that a larger percentage of total space craft design time is likely to be spent in their solution than in airborne craft. The design of crew compartments will be dictated by the requirements of human operators not significantly different in basic physical and mental capabilities from those of the pilots of present aircraft. Automatic controls will be needed as greatly for actuation of safety equipment and environmental control of the crew quarters as in control of the craft and its propulsion and power systems. A major problem will be that of suitably linking the human operator to his "automatic" systems. Hermetically sealed crew quarters to provide a livable earth environment in space will be a prime survival requirement. The reconversion of liquid and food waste products to useful nutrients that are psychologically satisfactory might be approached by the use of secondary living organisms in the same manner as in nature. Temperature control will undoubtedly require specialized attention. The possibly dangerous stresses to be encountered during space flight include weightlessness and acceleration. The problems of surviving the effects of a wide variety of solar and cosmic radiation are other dangers. Careful consideration must be given to a proper balance of the fundamental moral, morale and economic factors to provide escape equipment justifiably on the basis of the total purpose of the craft involved.

954

Mayo, A. M. 1958 BASIC CONSIDERATION OF SPACE CABIN DESIGN
(Paper, Society Automotive Engineers National Aeronautic Meeting, Los Angeles, California, Sept. 29 - Oct. 4, 1958)

ABSTRACT: Some important environment requirements have been considered and are discussed by category as follows: Radiation, temperatures, acceleration, noise and vibration, meteoroids and space debris, internal atmosphere, food and water supply. (Literatuuroverzicht (Over Ruimtevaartgeneeskunke) (Space Medicine Bibliography) (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, den Haag, Netherlands) Rept. No. TDCK-16903; ASTIA AD-227 817; Feb. 1959)

955

Mayo, A. M. 1958 SURVIVAL IN SPACE, THE VEHICLE-COMBINED REQUIREMENTS.
(Douglas Aircraft Co., Inc., El Segundo, Calif.) DACO Technical Paper No 646, 10-12 Nov. 1958

956

Mayo, A.M. 1959 SOME SURVIVAL ASPECTS OF SPACE TRAVEL
Electronic Ind. Pp. 60-63, Feb. 1959

ABSTRACT: Discussion of the need for highly reliable and accurate high-speed automatic control systems. Various environmental problems, such as exposure to cosmic radiation meteorites and temperature, and high acceleration rates are discussed.

957

Mazer, M. 1945 THE G SUIT IN COMBAT
Air Surg. Bull., 2:236-238

ABSTRACT: Presents data on the occurence of grayout and blackout and the highest G force ever experienced as recorded by the Kollsman accelerometer in 35 pilots who wore the G suits on all missions. Ten of the pilots had had grayout but not blackout, 3 had been exposed to 6 G or more. Of the 21 who had never grayed out, 17 had experienced 5 G or more and 14, 6 G or more. Of the 31 who had never blacked out, 20 had experienced a force of 6 G or more. Six pilots had experienced 7 to 7.9 G and 5.8 to 9 G without blacking out.

It is concluded that the G suit is an important factor in increasing the combat efficiency of the P-51 pilot-aircraft combination.

958

Mazza, V. 1947 PNEUMATIC CATAPULTS FOR SIMULATED SEAT EJECTION TESTS.
(Engineering Division, Air Materiel Command) Sept. 1947.
ASTIA ATI 49510

ABSTRACT: Preliminary tests were conducted of two types of pneumatic catapults which were developed for use on the ejection seat test tower to determine the most tolerable acceleration-time diagrams on human subjects. In one catapult type, acceleration is controlled by metering compressed air through a series of orifices in the cylinder which are uncovered successively by movement of the piston. The other pneumatic catapult is accelerated by air metered by a mechanically actuated air valve which is positioned through a cam arrangement by the upward displacement of the ejection seat. The two methods were shown to be feasible, with the former method recommended for work with human subjects from the standpoint of safety and simplicity.

959

Mazza, V., R. W. Briggs, C. E. Caroll, & R. V. Wheeler 1950
HIGH ALTITUDE BAILOUTS. Memo Rept. No. MCREXD-695-66M

960

Mazza, V. 1951 HIGH ALTITUDE BAILOUTS.
J. Aviation Med. 22(5):403-407. Oct. 1951.

961

Mazzei, J.H. 1961 A COMPARISON STUDY. CONFINED VS. UNCONFINED TEST DATA. A CHECK STUDY. INSTRUMENTATION RESPONSE AT HIGH FREQUENCIES. (Feltman Research Labs., Picatinny Arsenal, Dover, N.J.) September 1961
Technical Rept. No. FRL-TR-45 ASTIA AD 263 564L

ABSTRACT: Confined and unconfined dynamic drop tests were conducted on like specimens of cushioning material of known density, size, and under comparable environmental conditions. The data collected from these tests were employed to plot, on the same graph, a static load-vs-peak acceleration curve, one for confined and one for unconfined data. A comparison of these curves shows conclusively that there is considerable difference in the dynamic behavior of the cushion in the confined, or as-packaged, condition. Beyond the optimum loading range, the peak accelerations transmitted by the unconfined cushion, continue to rise sharply, while peak accelerations for the confined cushion show a secondary decrease beyond the optimum loading range, the peak accelerations transmitted by the unconfined cushion, continue to rise sharply while peak accelerations for the confined cushion show a secondary decrease beyond the optimum loading range, before starting a secondary increase beyond bottoming-out. (Author)

962

Mead, L.C., 1948 APPLICATION OF HUMAN ENGINEERING TO FLIGHT PROBLEMS
J. Aviat. Med., 19:45-51

963

Mead, Leonard C. 1952 HANDBOOK OF HUMAN ENGINEERING DATA -- SECOND EDITION (REVISED)
(Institute for Applied Experimental Psychology, Tufts College) (Under Contract for the Special Devices Center, USN) ASTIA AD 43.650

ABSTRACT: Up to the present, we have been able to keep up with technological progress by education and training. But we have now reached the point where the machine has dwarfed the man, for the characteristics of the individual -- the human machine -- have not changed in the memory of man and will change for countless generations to come, while the man-made engine is capable of ever increasing power, scope, and speed of operation. Our machines must be manned by the average human being, their operator must be governed by his capabilities under the influence of mantal stress, fatigue, and sudden change: consequently the average man's capabilities must be analyzed, measured and made available to the designer and engineer to make good our progress from now on. This book represents only the beginning of what is hoped to be a continuing and ever expanding compilation of data which will provide the planner and designer with the probably characteristics of the average individuals who will man the machines of the future.

964

Meakin, L. W. 1945 REPORT ON BLADDERS, VINYLITE COATED NYLON—ANTI-BLACKOUT SUIT—ENDURANCE TESTS OF.
(Naval Air Experimental Station, Philadelphia) 9 Feb. 1945.

ABSTRACT: Anti-"g" suit bladders (nylon) were exposed to up to 24 hours at 100 degrees F. and 100% relative humidity and up to 24 hours at 120 degrees F. dry, following which leakage was tested. Bladders met BuAer specifications and were actually improved as far as leakage was concerned by weathering.

965

Meier-Muller 1940 MEDICAL PSYCHOLOGICAL INFORMATION REGARDING FLYING ACCIDENTS
Flugwehr. u. Technik. 2: 1940

ABSTRACT: A high percentage of the growing number of flying accidents since the beginning of flights at high altitudes are due to the psychic and physical collapse of the crew. Where the cause of flying accidents is not discovered the confidence of the personnel in the reliability of the material is shaken and an atmosphere of disquiet is created. Medical officers and technicians must be taken with the new construction of aircraft and apparatus, breathing apparatus

to be used at high altitudes, sitting position, safety belt, clothing, etc. The psychic make-up of the crew is of paramount importance for the success of their career. Only a small number of the men with particular psychic and physical powers of resistance will be able to endure the heavy demands upon them by the present war as regards flying at high altitudes and cold. A great number of accidents could be avoided by choosing flying personnel on psychological grounds through psychological supervision of the force and suitable treatment of neurotic occurrences.

966

Meister, David and R.B. Wilson 1960 THE ROLE OF MAN IN THE MAINTENANCE OF EARTH SATELLITES
(Paper, American Rocket Society Semi-Annual Meeting and Astronautical Exposition Ambassador Hotel, Los Angeles, California, May 9-12, 1960.

ABSTRACT: Man will have a role to play in the maintenance of these satellites: 1. First to decide if maintenance is worthwhile for a particular satellite mission. 2. Second, if maintenance is considered necessary, one must next decide which of several means of performing maintenance is the most economical.

His decision must be based on these factors: (a) Mission requirements; (b) Availability and reliability of rocket booster thrust; (c) Equipment failure rate under space conditions; (d) Equipment complexity.

There are several ways in which satellites can be maintained by men in the space environment: (a) By flying a maintenance crew from earth to the malfunctioning vehicles and return; (b) By stationing maintenance personnel in each vehicle; (c) By stationing a maintenance crew within an orbiting space station from which the crew "flies" to the malfunctioning satellite and then returns to the space station.

967

Merrill, G., ed., C. W. Besserer, K. A. Ehricke, & B. B. Small 1959 DICTIONARY OF GUIDED MISSILES AND SPACE FLIGHT. (Princeton: Van Nostrand, 1959)

968

Mewes, Ernst UNTERSUCHUNG VON MOEGLICHKEITEN DES NOTAUSSTIEGS DER FLUGZEUGINSASSEN BEIM ABSTURZ, INSBESONDERE BEI HOHER GESCHWINDIGKEIT
(Investigations on Emergency Escape from Diving Aircraft)
ASTIA ATI 74752

969

Meyer, R. A. 1958 WIND TUNNEL INVESTIGATION OF CONVENTIONAL TYPES OF PARACHUTE CANOPIES IN SUPERSONIC FLOW. (U.S. Air Force) WADC Tech. Rept. 58-532, December 1958.

970

Michel, E.M. 1955 WINDBLAST TESTS OF THE MB-2 HELMET
(Wright Air Development Ctr., Wright-Patterson AFB, Ohio)
WADC TN 55-287, Nov. 1955. ASTIA AD 95 755

ABSTRACT: During 1954, three phases of windblast tests were conducted on the MB-2 semi-rigid helmet. The first two series of tests were made in conjunction with the B-47 downward ejection program sponsored by the Aircraft Laboratory. The first phase was carried on at Wright-Patterson Air Force Base by using an anthropomorphic dummy ejected downward from the observer's position. The second phase, using live subjects, was made at Eglin Air Force Base, Florida. The third test was carried out at the windblast facility of the Marquardt Aircraft Company, Van Nuys, California, using an anthropomorphic dummy seated in an ejection seat installed in front of a blast nozzle. Results of the test have proved the MB-2 semi-rigid helmet has windblast retention capabilities and might possibly be a satisfactory replacement for the standard P-3 helmet. (CARI)

971

Michel, E. M. 1957 SURVIVAL SPACE REQUIREMENT FOR INDIVIDUAL AIRCRAFT ESCAPE CAPSULES
(Aero Medical Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio)
WADC Tech. note no. 56-526 Feb. 1957 ASTIA AD 110 649

ABSTRACT: In aircraft with an escape capsule, clothing will be part of the survival gear. Studies were made to determine space requirements and the minimum of clothing and survival equipment for survival under extreme conditions. Items were selected, measured, and weighed; and a pack was designed to carry the gear. A minimum of 3700 cubic inches was required to stow the survival items, which weighed 70 pounds.

972

Michelson, I. and B. Tourin 1962 CONSUMERS UNION'S DYNAMIC TESTS OF SEAT BELTS. (In M. K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration, Sept. 14-16, 1961) Pp. 243-248.

973

Mickelson, W. F. 1960 EMERGENCY ESCAPE CAPSULE SYSTEM (Paper, 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960)

974

Mickelson, W. F., B. J. Mills, J. B. Graves, R. S. Huey, & P. F. Kiehl 1961 EMERGENCY ESCAPE CAPSULE STUDIES: PHASE II: FLOTATION AND SURVIVAL TESTS IN WARM-WATER ENVIRONMENT, PHASE III: FLOTATION, SURVIVAL, AND HABITATION TESTS IN COLD-WATER ENVIRONMENT; PHASE IV: SURVIVAL AND HABITATION TESTS IN COLD-LAND ENVIRONMENT. (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) WADC TR 59-247, Part II; ASTIA AD-272 784; Dec. 1961

ABSTRACT: Flotation, survival, and habitation studies were conducted on full-scale crew escape capsules. The objectives were to determine the use of the escape capsule in a warm-water environment, cold-water environment, and cold-land environment. The individual facets of the program included: the design of capsule clothing, donning of clothing in confined space, stowage of emergency survival items, air exchange requirements, flotation, inhabitation, and communication studies.
As long as the capsule occupant can conduct physical exercise when discomfort is detected, keep the seat cushions from becoming saturated with salt water, and use the survival equipment normally and reasonably, he can survive for 72 hours after landing in cold or warm water. Findings also indicated that a human subject can use the capsule as a basic survival item for 72 hours in a cold-land environment.

975

Milhoan, F.M, J.J. Vorachek and J. D'Allura 1961 INVESTIGATION OF ESCAPE CAPSULE SYSTEMS FOR MULTI-PLACE AIRCRAFT. PART II. PRELIMINARY DESIGN AND WIND TUNNEL TESTING OF AN INDIVIDUAL ESCAPE CAPSULE. WADC TR 57-329, pt. 2; ASTIA AD 273 626.

ABSTRACT: Design and dynamic model and wind tunnel model testing is reported for an individual escape capsule as part of a program for the investigation

of escape capsule systems for a hypothetical multi-place aircraft. The capsule provides safe escape over an aircraft performance envelope through an altitude range from sea level to 55,000 ft and a Mach number of 4.0 from 55,000 to 100,000 ft with a flight duration of 30 hr. The preliminary design is described. Results from stress and weight analyses are included. A preliminary performance and stability analysis of 3 capsule stabilization systems, including fins, boom-balloon configurations, and trailing drag bodies, was made, and a system comprised of a variable sized inflatable drag body was selected and further analyzed. Data used for the analysis was obtained from quarter-scale model free-flight tests and transonic and supersonic wind tunnel tests from Mach 0.5 to 3.0. Graphical results from the wind tunnel tests are included. (Author)

976

Millar, A. 1956 EJECTION SEATS
Aircraft (Toronto) 18(4):16-18, 21; (5):33-34, 37, 84-85, April-May 1956

ABSTRACT: The development of ejection seats and the initial experiments dealing with ejection procedure are discussed. Flight experiments are reported and illustrated of dummy ejections using the automatic Martin-Baker seat. Consideration is given to the design of ejection seats, especially the Weber ejection seat, and to problems associated with downward supersonic ejection and capsule ejection. Mention is made of human ejection drills executed at low speeds. It is stressed that successful ejection always depends on the airman's psychological reactions.

977

Miller, A. E. and E. H. Replogle 1959 DEVELOPMENT OF AN EMERGENCY PRESSURIZATION SYSTEM FOR AN ESCAPE CAPSULE (Wright Air Development Division, Wright Patterson AFB, Ohio) WADC-TR-58-397, May 1959, ASTIA AD-216307

ABSTRACT: An Emergency Pressurization system for an Escape Capsule was developed It is included its own "bottled" high pressure air supply and a sequential system of controls whereby, after being armed either manually or by separation from the aircraft, the system automatically (as a result of the sensing of the drop of cockpit pressure) releases its air at the rate required for fast repressurization. It then cuts short the fast repressurization as soon as the capsule pressure has again returned to a safe level, and directs the air through an absolute pressure regulator which maintains this level, compensating for capsule leakage.

978

Miller, B. P. 1952 A BRIEF HISTORY OF AERIAL EMERGENCY ESCAPE (Paper Conference on Problems of Emergency Escape in High Speed Flight, 29-30 Sept. 1952, at Wright-Patterson Air Force Base, Ohio) (Aircraft Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio) ASTIA AD 14 352

979

Miller, C.O., and J.A. Barton 1957 ANALYSIS OF EJECTIONS FROM JET FIGHTER AIRCRAFT (Chance Vought Aircraft, Inc., Dallas, Texas) Report NO. 11184, 7 October 1957.

980

Miller, C.O. 1957 EVALUATION OF TRANSVERSE ACCELERATION (REAR TO FRONT) UTILIZING CONVENTIONAL AND SPECIAL RESTRAINT GEAR. (Chance Vought Air-craft, Inc., Dallas, Tex.) Rept. No. 10816, Feb. 1957

981

Miller, J. H. 1953 STANDARDIZATION OF THE AIR FORCE-NAVY PILOT'S PNEUMATIC SUIT, TYPE ANTI-G.(Wright Air Development Center.)Techn rept. no. 53-80 AD 30 380

Summary: The better features of the U. S. Air Force type G-4B and the U. S. Navy type Z-2 anti-g suits were combined and modified in an effort to produce a suit superior to both of the suits and acceptable to pilots of both services. The new suits differed from the Z-2 and the G-4A in that it incorporated larger abdominal bladders, internal lacing adjustments extending from crotch to knee and from the waist to the knee, basic cloth of 50% nylon-50% cotton combination, narrower tapes under the slide fasteners, and buttoned pockets located only on the lower legs and left arm. This suit was designated the model S-362-1, abdominal filling. Another suit, identical to the U. S. Air Force suit with the exception that the filling tube in this model extended beyond the mid-thigh area to the middle of the calf bladder, was designated model S-362-1, leg filling. Tests indicated no significant advantage for either inflation system. Centrifugal and flight tests on experimental Air Force Navy anti-g suit indicated acceptability of this suit for use in the fighter aircraft of both services.

982

Miller, R., Bondurant & Hiatt 1959 DURATION OF TOLERANCE TO POSITIVE G IN 11 SUBJECTS. (in minutes). (without g-suit) (with g-suit). In Gauer, O.H. & G.D. Zuidema, Gravitational Stress in Aerospace Medicine (Boston: Little, Brown, and Co., 1961) p. 262

983

Mills, G.J. 1957 DEVELOPMENT AND FABRICATION OF SUPERSONIC WIND BLAST AND DECELERATION HELMET FOR HUMANS AND CHIMPANZEES. (Holloman Air Development Center, Holloman AFB, New Mexico) Progress Report No. 2, Contract No. AF 29(600)-1104, 18 April 1957.

984

Milton, Alexander, H. T. E. Hertzberg 1957 A COMFORT EVALUATION OF A FORM-FITTING HIGH ALTITUDE HELMET (Aero Medical Laboratory, Wright Air Development Center) WADC Tech. Rept 56-404 ASTIA No. AD 110 548

985

Minkler, L.F. 1959 PASSENGER SEAT CRASH RESEARCH TESTS MODEL COMMERCIAL JET. (Convair, San Diego, Calif.) Rept. No. SL-59-423, 2 Dec. 1959.

986

Minkler, L.F. 1960 LOUNGE COMPARTMENT AREA, BULKHEAD AND SEAT BACK HEAD IMPACT DEVELOPMENT TESTS, MODEL 22. (Convair, San Diego) Rept. No. SL-59-364, Jan. 1960.

987

Mohrlock, H.F. 1957 THE DEVELOPMENT OF THE RESCU. (ROCKET EJECTION SEAT CATAPULT, UPWARD) MARK I. A.R.S. Preprint 414-57, 4-6 April 1957.

ABSTRACT: Fast-paced development of today's military aircraft permits the breaking of speed and altitude records with striking regularity. This continual increase in the flight performance envelope has aggravated the task of design engineers in providing an escape system for each new configuration. The problems associated with escape from these high performance aircraft may be categorized as:

a. Low Level Ejection
b. Fin Clearance
c. Tumbling (Seat Instability)
d. Windblast

988

Mohrlock, H. F., Jr. 1957 AIRCRAFT PERFORMANCE SYSTEMS RELATED TO ESCAPE SYSTEMS.
J. Aviation Medicine 28:59-64, Feb. 1957.

ABSTRACT: Many variables influence crew escape from military aircraft. The first item considered is aircraft speed capability. Altitude, here, is an important variable. Improved escape systems are necessary to keep peak deceleration within human tolerance at speeds beyond 600 knots. Several ways are proposed in which this may be accomplished. First, reduce the drag of the seat relative to its ejectable weight. A second measure would be to add seat thrust in the direction of flight. A third improvement might be that of an escape capsule. Aircraft altitude capabilities are a second important consideration.

The goal of the design engineer should be a system that will provide a means of safe escape at any speed and altitude which an aircraft is capable of attaining without airframe failure. It is imperative that such a system be designed for the entire flight performance capabilities of the aircraft. A successful escape system consists of more than the ejection seat or capsule. It is an integration of the man with his clothing, oxygen and pressure supply, body restraints, survival gear, and stabilizing and descent parachutes to provide protection against sudden decompression, deceleration, acceleration, wind blast, thermal changes, and a hostile environment which might exist upon landing.

989

Moller, F. D. 1959 HIGH-ALTITUDE, PARTIAL PRESSURE SUITS DESIGNED WITH DOUBLE CAPSTANS, VENTILATION LAYERS, AND PARTIAL PRESSURE AND FULL PRESSURE SOCKS. WADC TR 59-246; ASTIA AD 216 308.

ABSTRACT: The resizing is described of the Type MC-4 suit (partial pressure, high-altitude, with g-bladder protection) to meet fitting requirements when selection is made by "Stature-Weight" selection charts. The resized suit is known as Type MC-4A. The design and construction of three prototypes of partial pressure suits having various features requiring evaluation in the effort to overcome certain problem areas are discussed. The development of pneumatic socks (both partial pressure and full pressure) for pressurizing the feet is also discussed. (Author)

990

Montagard, F. 1953 SYSTEMATIC X-RAY EXAMINATION OF THE SPINAL COLUMN BEFORE ENTERING EJECTION SEAT TRAINING (Examen radiologique systématique de la colonne vertébrale(avant stage d'entraînement au siège éjectable). Médecine aéronautique, (Paris) 8 (3): 243-248. 1953 In French.

Summary: X-ray examination of the spinal column of fighter pilots to be trained in the use of ejection seats has the triple purpose to detect diseases of the bone, traumatic lesions or their sequelae, and anomalies of the spinal column and body structure in genera. This article is primarily concerned with the latter aspect, expecially with the timely detection of disorders of the equilibrium or of a slipped disk. The standing position was standard for the spinal X-ray examination, but a few pictures were also taken in the ventral position. In the majority of the cases the spinal column showed no abnormalities. Among the pathological conditions detected, the most interesting were: a case of flattening of two vertebrae, agenesia of the disk of the second and third cervical vertebrae, and bilateral spondylolysis of the posterior arc of the fourth and fifth lumbar vertebrae. Spinal malformations are not always indicative of elimination from ejection-seat training; however, anomalies of the lower lumbar column have to be watched carefully.

991

Montagard, F., & R. Picamoles 1956 1.500 RADIOGRAPHIES SYSTEMATIQUES DE LA COLONNE LOMBAIRE POUR APTITUDE AU SIEGE EJECTABLE (1500 SYSTEMATIC RADIOGRAPHS OF THE LUMBAR SPINAL COLUMN TO TEST EJECTION SEAT CAPACITY) Médecine aéronautique (Paris) 11(1):59-69

ABSTRACT: Radiological examinations were conducted in 1552 French airmen to detect the presence of spinal anomalies which might increase the probability of injury during ejection. Minor malformations of the spine, including sacralization and spina bifida, were observed in 30% of the men, but were not considered dangerous. Malformations for which ejection-seat training was considered inadvisable were observed in almost 4% of the men and included spondylolisthesis (2.32%), intervertebral hernias, and vertebral osteochondrosis.

992

Montagard F., R. Papet 1959 LUMBAR DIFFICULTIES FROM THE EJECTION SEAT AND THE TRAINING RAMP. (REFLECTIONS APROPOS OF SYSTEMATIC RADIOGRAPHY OF THE VERTEBRAL COLUMN) Med. Aero (Par) 14:377-83

993

Moody, D. J., & R. H. Shannon 1958 THE ROLE OF ESCAPE SYSTEM GROUND SAFETY PINS IN JET AIRCRAFT ACCIDENTS, 1 JANUARY 1955--30 JUNE 1957 (Directorate of Flight Safety Research, Norton AFB, Calif.) Publication: M-8-58; ASTIA AD-205 121; 18 June 1958

ABSTRACT: A study of the jet aircraft accidents that occurred during the period 1 January 1955 through 30 June 1957 indicated that 87 crew-members failed to remove ejection system ground safety pins prior to takeoff. This failure resulted in delays in initiating the ejection sequence and inability to use the ejection seat during inflight emergencies. In slightly over half of the cases ejection was subsequently effected. The opportunity for successful escape at low altitudes was sharply reduced when ground safety pins had not been removed. Considering the case in which such pins had not been removed, when the emergency occurred below 5,000 feet, two-thirds were fatally injured. In contrast even though ground safety pins were installed, when the emergency occurred above 5,000 feet, three-fourths of the persons survived. (ASTIA)

994

Moody, Donald J. 1960 SUMMARY OF PERSONAL SURVIVAL EQUIPMENT IN AIRCRAFT ACCIDENTS. (Norton AFB, California)

995

Moore, C. B. 1952 PLASTIC BALLOONS: A PLATFORM FOR EXPERIMENTS IN THE UPPER ATMOSPHERE. In White, C. S., & O. O. Benson, Jr., eds., Physics and Medicine of the Upper Atmosphere, A Study of the Aeropause (Albuquerque, N. Mex.: Univ. of New Mexico Press, 1952) pp. 395-404

996

Moore, E.P. 1942 ANTI-BLACKOUT EQUIPMENT -TEST OF - REPORT ON. (Navy Dept., Naval Air Station, Anacostia, D.C.) 12 February 1942

997

Moore, F., Jr. 1959 SUPERSONIC EJECTION TESTS AT SMART. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: To investigate further and attempt to define more accurately the human tolerance limits to open ejection seat escape, a program of supersonic tests was conducted at the SMART facility during the fall of 1956 and spring of 1957. Chimpanzee subjects were ejected and successfully recovered at speeds from approximately M0.9 to M1.4. The problems of equipment and instrumentation design are discussed; a brief resume of test results and conclusions as well as test philosophy will be summarized. An 8 minute 16 mm. color sound film is available for presentation which traces a typical test run from start to finish, including a description of specialized test equipment. (J. Aviation Med. 30(3):195, March 1959)

998

Moore, F. L. 1952 NEW DITCHING SURVIVAL PLAN URGED Aviation Week 56:84-87, May 12, 1952

999

Moore, J. O. 1951 ANALYSIS OF EJECTION SEAT OPERATION IN JET FIGHTER ACCIDENTS (Medical Safety Division, Directorate of Flight Safety Research, Norton AFB, Calif.) Publication #M-37; August 10, 1951.

1,000

Moore, J. O. 1957 STATEMENT MADE 8 AUGUST 1957 IN A HEARING BEFORE THE SPECIAL SUBCOMMITTEE ON INTERSTATE AND FOREIGN COMMERCE. Seat Belt Hearings in the U.S. House of Representatives. (Automotive Crash Injury Research, Cornell University Medical College, New York, New York)

1,001

Moore, John 1961 THE HAZARDS OF PROTECTION OF NEW MATERIALS OR STRUCTURES (Paper, Symposium On Impact Acceleration Stress, Brooks Air Force Base, San Antonio, Texas, November 27-29, 1961)

1,002

Moore, W.L. & C.W. Morgan 1956 CUSHIONING FOR AIR DROP. PART IV. THEORETICAL ANALYSIS OF A LANDING SNUBBER FOR USE WITH PARACHUTES (Structural Mechanics Research Lab., U. of Texas, Austin.) Contract DA 19-129-qm-150; 21 Nov. 1956 ASTIA AD-122 375

ABSTRACT: This report describes the characteristics of a landing snubber and a theoretical analysis of its operation. The theoretical analysis is based on fundamental principles of mechanics and certain reasonable assumptions. The analysis yields two simultaneous differential equations which were solved by an analog computer to give the snubber stroke, the motion of the parachute, and the motion of the load in terms of convenient parameters. The results of ten analysis presented in tabular form indicate satisfactory operation of the device if the design is based on the proper combination of parameters. (Author)

1,003

Moore, W.L., Jr. & B. Rowen 1963 DYNA-SOAR (X-20) AND AEROSPACE PLANE
Paper: Lectures in Aerospace Medicine, School of Aviation Medicine, Brooks AFB, Texas, 4-8 February 1963

1,004

Morant, G.M. 1947 DIMENSIONAL REQUIREMENTS FOR SEATS IN R.A.F. AIRCRAFT.
(Flying Personnel Research Committee, Gt. Brit.) Report no. 682
ASTIA AD-122 025, February 1947

ABSTRACT: Sections of this report deal with: (a) physiological considerations regarding seating in general and aircraft seating in particular; (b) safety considerations relevant to seats in aircraft; (c) experimental trials regarding seating requirements; (d) body measurements relevant to seating for groups of men using R.A.F. aircraft; (e) requirements for particular features of seats; (f) suggested requirements for all kinds of seats in R.A.F. aircraft except ejection seats. (FPRC summary)

1,005

Morant, G. M. & H. P. Ruffell Smith 1957 CRITICAL DIMENSIONS OF A STANDARD HELICOPTER COCKPIT.
(Inst. Aviation Med., R.A.F., Farnborough) FPRC Rept. No. 1002; March 1957.

1,006

Morehouse, G. G. 1949 MODEL TESTS OF SEAT EJECTION FROM A FREE-SPINNING MODEL OF THE F-82B AIRPLANE.
(Air Materiel Command, Wright-Patterson AFB, Ohio) AF TR No. 5777, May 1949
ASTIA ATI 55249.

ABSTRACT: An investigation was made to determine the possibility of the spin being a critical flight condition for pilot ejection from the F-82B aircraft. The tests were performed in the USAF 12-Foot Vertical Wind Tunnel, Wright-Patterson AFB using a 1/25 scale, free spinning model of the aircraft and the pilot-ejection seat combination. The criteria for dynamic similarity necessary for a free spinning model are given in the report. The tests indicated that the pilot can safely escape from the spinning F-82B aircraft by means of the ejection seat. Test results are believed to be conservative.

1,007

Morgan, C.W., & W.L. Moore 1956 CUSHIONING FOR AIR DROP, PART V THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF FLUID-FILLED METAL CYLINDERS FOR USE AS ENERGY ABSORBERS ON IMPACT. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA-19-129-qm-150, 20 Dec. 1956. ASTIA AD 122 376.

ABSTRACT: In this report is described the design, construction and testing of energy absorbers utilizing metal cylinders either empty or fluid-filled. Energy is absorbed in the crumpling of the metal walls and in imparting kinetic energy to the contained fluid as it is discharged through properly designed orifices in the wall of the container. An equation is derived for the area and spacing of orifices in the wall of the container. An equation is derived for the area and spacing of orifices required to maintain a constant retarding force due to liquid pressure during the crushing of the cylinders. The design of the fluid-filled cylinders is based on this constant retarding force in addition to the force required to crumple the walls of the empty cylinder. The predicted performance of these energy absorbers is shown to be verified by free-fall dynamic tests. The resisting force and the energy absorbed as computed from the force-displacement curves are given. Seamless steel and aluminum tubing, commercial sheet steel cans, and cylinders formed from galvanized sheet steel were tested. A comparison of the various materials is made on the basis of cost per unit of energy absorbed

1,008

Morgan, H. 1955 BEHAVIOR OF TEXTILES UNDER IMPACT CONDITIONS; AND OTHER ABSTRACTS. (Paper, 22nd Shock and Vibration Symposium, Wright Air Development Center, Wright-Patterson AFB, Ohio, 22-23 March 1955)

1,009

Morlock, H. F., Jr. 1957 AIRCRAFT PERFORMANCE SYSTEMS RELATED TO ESCAPE SYSTEMS.
J. Aviation Med. 28:59-64.

1,010

Morris, C. W. 1947 ANATOMY AND STATISTICS AID DESIGN OF PASSENGER SEATS S.A.E. Journal 55:24-26. September 1947. (S.A.E. Preprint under title PASSENGER SEATS CAN BE COMFORTABLE, April 1947.)

1,011

Morris, D. B. 1960 HUMAN FACTORS CRITERIA IN MANNED ANTISUBMARINE WEAPON SYSTEMS
(Paper SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960.)
(Society of Automotive Engineers, Inc., New York, N. Y.)
Rep. 244D, Oct. 1960.

ABSTRACT: The human engineering aspects of Anti-Submarine Weapon combat systems are discussed with specific attention to manned airborne systems and projected future designs. Requirements of the aircrew team such as design of tactical display data, vision adequacy, and air-crew workstation design are presented. Basic human engineering criteria that should be evident in the system are discussed. (Tufts)

1,012

Morrison, N. K. & L. A. Schafer 1954 GROUND STUDY OF THE NONEJECTION METHODS OF ESCAPE FROM B-47B AIRCRAFT.
(Wright Air Development Center, Air Research and Development Command, Wright-Patterson AFB, Ohio) WADC TR 54-6, April 1954. ASTIA AD 30282.

ABSTRACT: This report covers Phase I, a Ground Study of the nonejection methods of escape from B-47B aircraft. Because the cabin space available to the crew members is so limited, it was necessary to make a thorough investigation of those body positions and movements at the disposal of the crew when evacuating the aircraft. This study, done at the Wright-Patterson Air Force Base, led to the establishment of optimum procedures to be followed by each man when leaving his station and reaching the possible escape exits, and the most feasible body positions for leaving the aircraft.

The personal equipment worn by each subject during these tests included both winter and summer flying clothing. Each procedure was performed with and without the A-1 survival kit.

Time studies of the crew evacuations were conducted at Lockbourne Air Force Base utilizing the procedures presented in this report. These studies covered crew escape through the ventral hatch, with and without the use of an escape bracket, and through the crawlway to the bomb bay. Eight crews participated in the ventral hatch tests and six crews in the bomb bay tests. Ground studies of egress through the navigator's ditching hatch and canopy were limited to the timing of individuals making personal leads disconnects and standing at their stations. The feasibility of using these exits will have to be determined during the Air Study Phase.

Analysis of the data thus accumulated indicates that the optimum method of nonejection escape from this aircraft is through the ventral hatch in a feet-first, facing-aft position utilizing the Barto escape bracket. It must be stressed that the data are based on the tests made with the aircraft on the ground and in the absence of factors that would cause a flight emergency necessitating bailout.

1,013

Morse, A.L. 1957 TECHNICAL BASES FOR SAFER AIRCRAFT. (Institute of the Aeronautical Sciences, New York, N.Y.) Preprint no. 675

ABSTRACT: The purpose of this paper is to acquaint the reader with the operations of the Aircraft Division of the CAA's Technical Development Center at Indianapolis, Indiana. The work done by the CAA includes a program involving crash tests of helicopters and smaller types of fixed-wing aircraft. Other tests and studies have helped provide better cockpit vision for the pilots of transport aircraft. Another study has analyzed every possible combination of flight paths that could end in a collision to determine angles of transport aircraft. Another study has analyzed every possible combination of flight paths that could end in a collision to determine angles of vision required for each pilot to see the other aircraft. It is proposed that the scope of the crash tests be expanded to cover the general crashworthiness of both helicopters and fixed-wing aircraft. Other testing would look to the development of means for minimizing fritting or galling in structural components subject to fatigue failures.

1,014

Moseley, H. G. 1955 OPERATIONAL EXPERIENCE WITH ESCAPE FROM HIGH PERFORMANCE AIRCRAFT. (Symposium Proceedings, The Institute of Transportation and Traffic Engineering, University of California, 1955)

1,015

Moseley, H. G. 1956 USAF OPERATIONAL EXPERIENCE WITH ESCAPE FROM HIGH PERFORMANCE AIRCRAFT. (Period: 29 Aug. 1949 through 31 May 1956). Pub. No. M-24-56, USAF, Dir. of Flight Safety Res., Norton AFB, Calif.) Aug. 1956.

1,016

Moseley, H.G., 1957. U.S. AIR FORCE EXPERIENCE WITH EJECTION SEAT ESCAPE. (PROBLEMS OF ESCAPE FROM HIGH PERFORMANCE AIRCRAFT: A SYMPOSIUM) J. Aviation Med. 28(1):69-73

SUMMARY: Escape from high performance aircraft by use of the ejection seat to date has been attended with an incidence of 23 per cent fatalities and 14 per cent major injuries. The great majority of ejection attempts were medium and low altitudes and medium and low speeds. The outstanding cause

of fatalities has been inability to separate from the seat and deploy the parachute prior to striking the ground when ejection was attempted at low altitudes, particularly when the aircraft was out of control or in a dive. Airspeed has had little effect upon the outcome, with the exception that ejection attempts at or near the speed of sound may be attended with incapacitating results of deceleration with the type of seat now being used. It is concluded that if the fatality rate is to be lowered, there must be improved provisions for escape at low altitudes and low speeds where the great majority of emergencies occur, and that if escape at supersonic speeds is to be successful, the effects of deceleration and other phenomena must be mitigated.

1,017

Moseley, H.G. & R.H. Shannon 1958 USAF EJECTION ESCAPE EXPERIENCE, 29 AUGUST 1949 THROUGH 30 JUNE 1958 (USAF, Directorate of Flight Safety Research, Norton AFB, Calif.) Rept. M-12-58, Nov. 1958.

ABSTRACT: This study analyzes 1,462 United States Air Force ejection seat emergency escapes from the period 29 August 1949 through 30 June 1958. Results to personnel are studied in relation to altitude, airspeed, altitude, availability and use of automatic equipment, and other pertinent factors. Problem areas associated with ejection escape from high performance aircraft were sought although few cases of attempted escape at supersonic speeds were available. Recommendations designed to reduce the incidence of unsuccessful (fatal) ejections are made in the areas of 1) operations and training, and 2) research and development.

1,018

Mosely, H.G. 1958 INJURIES SUSTAINED IN EJECTION SEAT ESCAPE (Report by Directorate of Flight Safety Research, Hq., USAF, 31 Mar. 1958)

1,019

Murphy, A.C. 1949 GROUND SEAT EJECTION TEST ON XF-90 AIRPLANE (Lockheed Aircraft Corp., Burbank, Calif.) Oct. 1949. ASTIA ATI 65300

ABSTRACT: Ground seat ejection test was conducted on an XF-90 fighter airplane, to determine the suitability of the seat installation. The seat attained a velocity of 54 ft/sec and an acceleration of 13 g's. It reached a vertical height of 35 ft above the cockpit and traveled a horizontal distance of 72 ft. The seat was successfully caught in the net, and no damage was sustained by the airplane, except over the claw on the actuator disconnect, however, this did not interfere with the ejection of the seat. The catapult seat installation was found satisfactory for flight.

1,020

Murphy, J. S. 1952 WHAT'S AHEAD FOR THE REAR-FACING SEATS? Amer. Aviation J., 29 Sept. 1952

1,021

Mur Vilaseca, Tomas 1953 LA ASTRONAUTICA. QUE DEBEMOS PENSAT ACERCA DE LA POSIBILIDAD DE LOS VIAJES POR EL ESPACIO? (ASTRONAUTICS. WHAT OUGHT WE TO KNOW ABOUT THE POSSIBILITY OF VOYAGES THROUGH SPACE?) Rev. Obras Publicas 101:269-279, June 1953

ABSTRACT: Survey of astronautics, including propulsion of a space vehicle, historical outline, fundamental equations of the rocket, the space station, and the trip to the moon.

1,022

Myers, H.C. Jr., & Churchill, E. 1953 ANTHROPOMETRY OF MALE BASIC TRAINEES. (Wright-Patterson AFB, Ohio) WADC Tech. Report 53-49, July 1953

ABSTRACT: Body size data for 60 measurements of over 3,000 AF Male Basic Trainees are presented for use by aircraft & equipment designers. The statistics reported for each measurement are; the mean, standard deviation, coefficient of var. standard errors of stat., range, and sel. percent.

1,023

Myers, H. M. 1947 "REVERSE SEATING ON AIR TRANSPORT COMMAND AIRCRAFT" (Wash. DC) Mem. A-6/P & S 452.031, 27 March 1947

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1,024

Nadel, A.B. 1959 SUPPORTING MAN IN SPACE: 1970-1975 (General Electric Co., Santa Barbara, Calif.) RM 59 TMP-85 Nov. 30, 1959

ABSTRACT: Reviews progress in space technology expected during the periods 1970-1975. Discusses requirements and capabilities in these areas: (1) the physical environment-atmosphere, gravitational forces, temperature, and radiation; and (2) acoustic noise and vibration.

1,025

Nading, W. D. 1946 REPORT OF FLIGHT TESTS OF AUTOMATIC PILOT EJECTION EQUIPMENT CONDUCTED AT MUROC ARMY AIR FIELD. (Air Materiel Command, Wright Field, Dayton, Ohio) Memo Rept. No. TSEAA-695-66. 25 July 1946.

1,026

Neal, J. Allen 1958 THE DEVELOPMENT OF METHODS FOR ESCAPE FROM HIGH SPEED AIRCRAFT (Historical Branch, Wright Air Development Center) Aviation Week, 7 April 1958.

1,027

Nebiker, F.R. 1961 FEASIBILITY STUDY OF AN INFLATABLE TYPE STABILIZATION AND DECELERATION SYSTEM FOR HIGH-ALTITUDE AND HIGH-SPEED RECOVERY. (Goodyear Aircraft Corp., Akron, Ohio) WADD TR 60-182, Dec. 1961. ASTIA AD 272 754.

ABSTRACT: On the basis of the theoretical and experimental wind tunnel test data obtained, it was concluded that an inflatable sphere is a practicable stabilization and deceleration system for initial recovery from high-altitude,

high-speed flight regimes (up to Mach 4.0 at 200,000 feet). Inflatable spheres tested were fabricated utilizing standard manufacturing methods and readily available materials. The recovery system tested exhibited considerable potential as an initail stabilization and deceleration recovery ststem for a disoriented or tumbling high-altitude, high-speed payload. Included are theoretical and wind tunnel test data on the effects of various shaped primary bodies on a secondary spherical body at various trailing distances. Also included is a limited amount of experimental data on flight testing of a full-scale operational unit. (Author)

1,028

Neel, H. 1951 MEDICAL ASPECTS OF MILITARY PARACHUTING. Mil. Surgeon 108(2):91-105.

1,029

Neely, F.R. 1934 DISCOMFORT IN THE SKY. Amer. Mercury, 32:113-117

1,030

Neff, R. J. 1962 A REPORT ON CONSIDERATIONS OF SEAT BELTS FOR INFANTS AND SMALL CHILDREN. (In M. K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration, Sept. 14-16, 1961) Pp. 249-252.

1,031

Neiswander, R.S. & H.T. Armstrong 1947 MOTION ASPECTS OF FLIGHT STIMULATION (Link Aviation Devices, Inc., Binghamton, New York) Eng. Rept. No. 164.233

1,032

Nelson, S.R.C. 1948 EJECTION OF PILOTS FROM AIRCRAFT In Marcus, Henri et al., Shock and Vibration Bulletin No. 7, Naval Research Lab. Rept. No. S-3229. Pp. 47-58. ASTIA ATI 75 153

ABSTRACT: Tolerance to vertical accelerations and resistance of the body to forces of certain durations are discussed. Observations are made on the effects of air blast upon the body. Safety harness and related automatic devices are described. The problems of installing the gear in aircraft and educating the pilots in the use of the equipments are outlined.

1,033

Neumann, H.L., J.F. Hegenwald, Jr., & W.R. Santshi 1962 HUMAN SUBJECT GROUND AND WATER IMPACT TESTS OF THE XB-70 ESCAPE CAPSULE. (Paper, 33rd Annual Meeting of the Aerospace Medical Assoc., 9-12 Apr. 1962, Atlantic City, N.J.)

ABSTRACT: A testing program was accomplished to validate the performance of the capsule during ground and water impact. Tri-axial acceleration histories were obtained for capsule seat structures and for the head and chest of both anthropometric dummy and human subjects under conditions simulating design parachute descent velocities. The engineering aspects of the impact attenuation system are described briefly as well as test methodology and facilities. Physiological responses to the impacts are discussed and acceleration and photographic data of dummy and human subjects are correlated.
(Aerospace Medicine 33(3):366, Mar. 1962)

1,034

New, G.W. 1955 YOU'RE IN SPACE
Air Training 4(6): 24-25, Jan. 1955

ABSTRACT: This is a subjective description of a test pilot's sensations during a flight higher than 85,000 ft. During the flight, the pilot experienced falling, spinning, weightlessness, and difficulty in orientation.

1,035

Newquist, E. A., M. D. Cassidy, et al. 1959 DEVELOPMENT OF AN EJECTABLE-NOSE ESCAPE CAPSULE.
(Lockheed Aircraft Corp., Burbank, Calif.) WADC TR 59-493, June 1959. ASTIA AD 241 590.

ABSTRACT: This report presents the results of a study to develop the optimum ejectable-nose escape capsule for use in single place high performance type aircraft. The capsule will provide safe escape throughout the speed range from zero to 900 knots EAS or a Mach number of 4 which-ever is lower, and an altitude range from sea level to 100,000 feet. A description of the capsule construction and the devices necessary for stabilization, separation, deceleration, descent, and alighting is given. Trajectories of the capsule and fuselage afterbody are plotted and the accelerations on the pilot are shown for the most ciritical case and compared to human limits. Environment problems such as pressure loss, oxygen deficiency, and carbon dioxide accumulations after separation are discussed along with the problems of surviving in extreme heat and cold on the ocean or on land. The weight requirement is estimated and compared to a current escape seat system and a super escape seat and pressure suit assumed capable of escape at the speeds and altitudes for which the capsule is designed. Volume requirements are also calculated. (Author)

1,036

Newquist, E.A. & G.F. Zimmer 1963 DEVELOPMENT OF EJECTABLE NOSE CAPSULE EQUIPMENT FOR FEASIBILITY TESTING
(Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD-TDR-62-752
ASTIA AD 401 917

ABSTRACT: This report presents the results of a project to develop hardware for an ejectable nose capsule and track test sled. Five capsules and a sled were manufactured. The ASD will conduct a track test program of 7 tests from zero to 900 Kn. EAS. Conditions for the tests are delineated herein. Aerodynamic characteristics of the capsule, and a description of the wedges are given. Cockpit details, environment, controls, separation and ejection systems, and escape sequence are discussed. Section IV presents two AF requested contract changes: (1) using a larger rocket motor than planned and (2) changing test sites. Problems and solutions created thereby are covered. Section V describes the entire test program until development of the final hardware. Materials used to manufacture the capsule are described in Section VII. Inertia loads, weight and balance, c.g., wedge alignment, and chute installation procedures are given. Conclusions include test goals, results and pertinent recommendations. Determining the c.g. on nonremovable operational capsules, weight and inertia and load factors are discussed. General capsule design and cost control are discussed.

1,037

Nichols, George 1954 DISCONTINUITIES IN RESTRAINT SYSTEMS. Chapter VI
(Northrop Corp.)

1,038

Nichols, George 1955 REPORT
(Northrop Aircraft Co.)

CONTENTS: Introduction. Discussion of restrained subject response. Analysis of idealized mechanical system: variations of restraint stiffness, and forcing function characteristics. Harness strap properties. Subject response--IBM analysis--simplified restraint and mass system: using actual strap properties with variations in forcing function characteristics. Discontinuities in restraint systems: slack strap, constant force elements, initial pre-load of harness.

1,039

Nichols, J.H. 1959 WIND TUNNEL INVESTIGATION OF STABILIZATION PARACHUTES FOR THE B-58 CREW ESCAPE CAPSULE. (Arnold Engineering Development Center, Tullahoma, Tenn.) ASTIA AD-225463 September 1959

ABSTRACT: An investigation was conducted in the PWT 16-Ft Transonic Circuit to determine the optimum stabilization parachute configuration for use with the B-58 crew escape capsule. Several types of canopies and canopy-suspension configurations were tested using a 1/3 scale model of the capsule and 1/3 scale parachutes. The most satisfactory performance was obtained with a ribbon equiflo parachute which had a flat edge and a 15-percent extended skirt, and which was suspended six equivalent body diameters behind the capsule with riser line lengths equal to two canopy diameters.

1,040

Nicholson, R.A. 1950 WIND TUNNEL STABILITY TESTS OF A ½-SCALE F-86A (FIGHTER) SEAT-PILOT COMBINATION WITH SEAT AND HEADREST FLAPS (North American Aviation, Inc., Engineering Dept., Inglewood, Calif.) Report No. NA-50-7-NAAL 167 ASTIA ATI 73 626

ABSTRACT: The one-half scale model of the seat-pilot combination for the F-86A fighter was wind tunnel tested to obtain data necessary for the determination of trajectory and attitude of the seat-pilot with various seat and headrest stabilizing flaps. Graphically depicted test results show the effect of stabilizing flaps on drag, lift and pitching moment. The model with and without any of the flaps has stable pitching moment slopes near angles of pitch of 100° and 340°. All configurations had trim points near 340° and all except the one with the side headrest flaps had trim points near 100°. At 340° the configurations with the headrest flaps had the most stable pitching moment slopes.

1,041

Nikolayev, A. 1960 ASTRONAUTS PUT ON SPACE SUITS
Sovetskaya Rossiya P. 4; 19 May 1960.

1,042

Noble, H., & L. P. Domzalski 1961 EVALUATION OF HUMAN SUBJECT REACTION IN THE FORWARD AND AFT FACING SEATED POSITIONS. (Naval Air Material Ctr., Philadelphia, Pa.) Rept. No. NAMC-ACEL-424; Proj. TED NAM AE-6303.1; ASTIA AD-259 071; 9 Feb. 1961

ABSTRACT: This report presents a comparative examination of the reactions of human subjects to simulated crash acceleration forces, when seated in a standard

Navy passenger seat aligned in either the forward or aft facing position. Environmental parameters such as seat acceleration, end velocity; anthropomorphic dummy motion and acceleration; human subject motion and acceleration; and distribution of seat member loads during a series of simulated crashes are discussed. (AUTHOR)

1,043

Noble, R., E. S. Mendelson, & D. T. Watts 1947 DYNAMIC RESPONSES IN THE EJECTION SEAT SYSTEM. (Naval Air Material Center, Naval Base Station, Philadelphia, Pa.) TED NAM 256005, Rept. No. 5, 7 Aug. 1947, ATI-206 053

SUMMARY: An analysis of oscillograph records obtained from routine ejection seat experiments on the NAES ejection seat test rig shows that the major dynamic response in the system bears a definite relationship to the time interval required for the catapult to attain its maximum pressure. This data can be directly applied in the design and development of a practical catapult for ejection seat use. (AUTHOR)

1,044

Noble, R., E. S. Mendelson & J. R. Poppen 1949 NOTE ON THE TRAJECTORY OF THE EJECTABLE SEAT.
J. Aviation Med. 20(5):343-349.

SUMMARY: A method for calculating the trajectory of the ejection seat is given. The effects of varying the angle of the seat guide rails with respect to the vertical, the ejection velocity, the speed of the airplane, and the flight altitude are investigated.

1,045

Noble, R. & W.G. Law 1950 FLIGHT TESTS OF THE GRUMMAN, MCDONNEL, AND CHANCE VOUGHT EJECTION SEATS AT LAKEHURST, N.J.
(Naval Air Material Center, Aero Medical Equipment Lab., Philadelphia, Pa.)
Topical Report XG-T-136 Ted No. NAM 256005 ASTIA ATI 91 442

ABSTRACT: The purpose of this report is to present relative trajectory and seat behavior data of the Grumman, McDonnell and Chance Vought ejection seats. Instrumented acceleration data was obtained on limited test trials, but photographic coverage was made on all ejection shots. Direct comparison of photographic results of tests made with the various seats aids in the determination of the safety of the seats when these results are compared with instrument records obtained on the test of a specific ejection seat.

As a result of the tests, it was found that at higher airspeeds the pitch rotation tends to decrease in each of the seats tested; at the higher altitudes less rotational motion was observed. The incorporation of a longer time delay between opening of the drogue and retarder chutes and the use of a smaller retarder chute will tend to diminish the opening shock forces on the pilot as airspeed increases.

1,046

Noble, H. & L. P. Domzalski 1961 EVALUATION OF HUMAN SUBJECT REACTION IN THE FORWARD AND AFT FACING SEATED POSITIONS. (Air Crew Equipment Lab, U. S. Naval Air Material Center, Phila., Pa.) Rept. NAMC-ACEL-424, Feb. 9, 1961. ASTIA AD 259 071.

ABSTRACT: This report presents a comparative examination of the reactions of human subjects to simulated crash acceleration forces, when seated in a standard Navy passenger seat aligned in either the forward or aft facing position. Environmental parameters such as seat acceleration, end velocity; anthropomorphic dummy motion and acceleration; human subject motion and acceleration; and distribution of seat member loads during a series of simulated crashes are discussed. The tests were conducted on the Air Crew Equipment Laboratory Horizontal Linear Accelerator.

1,047

Nomura, F. 1944 STRENGTH TEST OF AIRCRAFT PILOT SEAT MADE OF PLYWOOD. (Mitsubishi Heavy Industry Co., Ltd., Nagoya, Japan) ASTIA ATI-3992, February 1944

ABSTRACT: Strength tests were made on a plywood pilot seat to determine its practical value. The tested seat was attached to a V-type airframe having a load factor of 7. All tests were based on the Naval strength test regulation. Representative load tests showed that the material was satisfactory, but the shape of the pilot seat changed, due to a negative load. During break-down tests, the "sansa" type connectors, which are a characteristic of this type pilot seat, caused failure. Seat was cut in specified number of parts and studied. Study revealed several exfoliations of thin layers.

1,048

Norsworthy, M. E., P. G. Gard, & L. B. Cochran 1955 AN EVALUATION OF EXPERIMENTAL ANTI-BLACKOUT EQUIPMENT. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. No. NM 001 100 102; Rept. No. 4; ASTIA AD-89 996; 1 Nov. 1955

ABSTRACT: An evaluation on the human centrifuge of experimental anti-blackout equipment which was designed to improve protection and comfort. The equipment

which was tested did not afford a significantly greater amount of protection than the standard U. S. Navy Anti-blackout equipment. The abdominal bladders, regardless of pressure system, which covered the larger area were more effective in increasing the protection. The optimum shape and pressure were not determined. (NSAM)

1,049

North American Aviation 1947 REPORT ON TEST FIRING -PILOT'S EJECTION SEAT -XP-86 AIRPLANE. (North American Aviation, Inc., Los Angeles, Calif NA-47-931, ASTIA ATI-51600, September 1947

ABSTRACT: A test firing of the pilot's ejection seat as mounted in the XF-86 fighter was conducted. The ejection seat, with a dummy wearing full flight equipment, was fired from the XF-86 gun firing nose using a T-4 catapult and T95Ei charges, and the ejection was photographed by three motion picture cameras. The ejection was satisfactory, with monor damage to the seat which was attributed to eccentric loading during firing. The disconnect connection for microphone head set, oxygen, and G suit pressure functioned in a satisfactory manner. Inertia loads during firing were not sufficient to disturb the oxygen mask worn by the dummy. Photographic records of the test ejection provide some information, but are not sufficient to determine transient accelerations during travel of the seat along the guide rails.

1,050

North American Aviation . 1948 REPORT ON GROUND TEST FIRING PILOT'S EJECTION SEAT B-45A AIRPLANE. (North American Aviation, Inc., Inglewood, Calif.) Report No. NA-48-600, June 1948. ASTIA ATI 102 200.

ABSTRACT: The seat and a dummy were ejected from a nearly complete nose section and set in a stand on the Flight Ramp. The cockpit interior was identical to that of a finished airplane.

Ejection was considered satisfactory. Due to the lack of a net to catch the seat, considerable damage to the seat resulted. Several undesirable features were encountered during ejection, which were attributed to the coupling of the catapult gun to the seat. Forward rotation of the seat upon leaving the guide rails resulted in sufficient frictional drag in the catapult itself to appreciably reduce the ejection velocity.

Inertia loads did not remove the oxygen mask from the dummy; however, it was pulled away from his face sufficiently to expose his mouth. Air loads that would occur in flight were not simulated.

1,051

North American Aviation, Inc. 1950 STATIC TEST OF PILOT'S EJECTION SEAT FOR THE MODEL F-86E AIRPLANE - N.A.A. MODEL NO. NA-170. (North American Aviation, Inc., Los Angeles, Calif.) 13 Dec. 1950. ASTIA ATI 93 242.

ABSTRACT: The object of these tests was to demonstrate that the pilot's ejection seat complies with the strength requirements set forth in Articles D-6a to D-6i of U.S.A.F. Specification 2528-B, "Seat: Pilot Ejection, Fighter Aircraft, Type C-1b", and to determine the seat's capacity of withstanding 40g forward crash loads, although this crash condition was not required by the contract.

These tests demonstrated that the F-86E pilot's ejection seat complies with the static strength test requirements of U.S.A.F. Specification 25282-B, and that it will withstand 60 percent design ultimate load of the unrequired 40g forward crash condition.

1,052

North American Aviation Inc. 1960 EMERGENCY ESCAPE SYSTEMS (North American Aviation Inc., Columbus, Ohio) NA 60H-322, May 2, 1960

ABSTRACT: Graphs depicting escape systems (HS-1, LS-1, LW-1, and zero to hypersonic).

1,053

North American Aviation, Inc. 1960 TECHNICAL FEATURES OF THE DYNAMIC FLIGHT SIMULATOR (G SEAT). (North American Aviation, Inc., Columbus, Ohio) Rept. No. NA 60 H-442, 12 Sept. 1960.

1,054

North American Aviation, Inc. 1961 AERIAL AND SLED TESTING OF THE B-70 AIRCREW ESCAPE CAPSULE. (Paper, Annual Symposium of the Society of Experimental Test Pilots, Los Angeles, California, 6-8 October 1960; and supplemented for the Physiological Training Officer Symposium, School of Aviation Medicine, Brooks AFB, Texas, 6-10 February 1961) Report No. NA 60-1133. ASTIA Doc. No. AD-268 511.

ABSTRACT: Aerial and sled ejection tests are described wherein the B-70 escape capsule has passed or favorably exceeded specification in the following categories: (1) parachute deployment through complete range of indicated

airspeeds; (2) rate of descent; (3) low altitude airdrops of capsule; (4) 20,000 and 40,000 ft airdrops of capsule; and (5) safe escape at ground level at airspeeds of 90 knots through maximum. Remaining to be tested are performance at high Mach number and high dynamic pressure, with continued development in the areas of ground and water impact and environmental control. (Author)

1,055

North American Aviation, Inc. 1961 CLOSED ECOLOGICAL SYSTEM A LITERATURE SURVEY. (North American Aviation, Inc., Technical Information Center, Downey, Calif.) 20 November 1961. ASTIA AD 282468.

ABSTRACT: This partially annotated bibliography on the problems and experimental results of closed ecological systems covers the period from 1958 to August 1961 with the exception of a few earlier references. The references are filed alphabetically by periodical title and corporate author in one alphabet; there is both a personal author and a subject appended to the bibliography.

1,056

North American Aviation, Inc. 1961 PROJECT APOLLO; PRE-CONTRACTURAL DOCUMENTATION AND ORBITAL RENDEZVOUS: A LITERATURE SURVEY (North American Aviation, Inc., Downey, Calif.) Rept. No. SID 61-470 Dec. 29, 1961

ABSTRACT: A review of literature on Project Apollo and Orbital Rendezvous, in two parts, from August 1959 to December 4, 1961 is given. The references are listed alphabetically by corporate author and periodical title in one alphabet. Following the bibliography are both author and subject indexes. (Author)

1,057

North American Aviation, Inc. 1962 GROUND OPERATIONAL RECOVERY TESTS OF THE LW-1 EJECTION SEAT (North American Aviation, Inc., Columbus Division, Columbus, Ohio) Report No. NA60H-667, June 1962, TCREC Technical Report 62-47, Contract DA 44-177-TC-659, USATRECOM Task 9R38-01-017-61, ASTIA AD-287479

ABSTRACT: Four static, ground operational recovery tests of the LW-1 catapult-rocket escape system were conducted from 28 September 1960 through 5 October 1960 at the Columbus Division of North American Aviation, Inc., utilizing five percentile and ninety-five percentile anthropomorphic dummies fully clothed in GFAE

Army normal issue flight gear. These tests demonstrated the zero altitude, zero speed recovery capability of the escape system. Two static tests of the LW-1 catapult-rocket escape system were conducted at Air Crew Equipment Laboratory, Philadelphia, Pennsylvania, on 10 and 20 January 1962. In addition to data relative to this series of tests, analytical substantiation of recovery capabilities up to 300 KEAS and higher altitudes is included in this report.

1,058

Northrop Aircraft, Inc. 1957 INVESTIGATION OF HEAD-TORSO RESTRAINT (PROPOSAL). (Associated Projects Office, Northrop Aircraft, Inc.) AF 29(600)-790, 24 January 1957.

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1,059

O'Bryan, T.C., & H.G. Hatch 1959 LIMITED INVESTIGATION OF CRUSHABLE STRUCTURES FOR ACCELERATION PROTECTION OF OCCUPANTS OF VEHICLES AT LOW IMPACT SPEEDS. (National Aeronautics and Space Administration, Washington, D.C.) NASA Technical Note D-158, Oct. 1959. ASTIA AD 227 649

ABSTRACT: A limited investigation was made to determine the characteristics of three materials to see how they can be applied for human protection against accelerations encountered at low impact speeds. As a result, if given man's physiological tolerance to abrupt acceleration, which has not yet been well defined, an alleviation system can be designed. Foamed plastics require considerable depth to provide a given stopping distance for impact alleviation and their use would require some control of rebound. They can be made soft enough to obtain the low onset of acceleration that may be necessary for man where depth is not limited. Aluminum honeycomb is an efficient material for impact load alleviation from the standpoint of usable material depth and it exhibits very little rebound. The stiffness of the material results in a very high initial onset rate of acceleration. For many installations this may be controlled by reducing the initial loading area of contact to get the material to start failing. (Author)

1,060

Odelgard, B., & P. Weman 1957 SAFETY BELTS FOR MOTOR CARS. (Swedish State Power Board, Stockholm, Sweden) Publication Blue-White Series, No. 18

1,061

Ordway, F. I., J. P. Gardner & M. R. Sharpe 1962 SPACE MEDICINE: THE BASIC FACTORS.
In: Basic Astronautics: An Introduction to Space Science, Engineering, and Medicine. (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962) Pp. 468-471.
Sections on Vibration, Sound, Temperature, and LIght. (Chapter 12)

ABSTRACT: The effects of vibration on the human being are primarily mechanical and to a much lesser degree thermal. Vibration in space carrier vehicles has many sources such as rotating engine components, engine pulses, and gimbaling,

acoustic pressures, buffeting, and fuel slashing. Vibration produces movement and displacement of the internal organs of the body, all of which have different natural frequencies. The range is still largely unknown but the thorax and abdominal organs appear most sensitive to vibration, having a natural frequency of some 3 cps. Elastic corsets and pressure suits instead of damping this frequency merely shift it to higher values, but a rigid restraint like a cast reduces it to 1.5 cps. With regard to space flight it seems that the vibrational frequency range most detrimental to man lies between 2 and 100 cps. (CARI)

1,062

Oser, J. 1962 DEVELOPMENT OF DAMPING TREATMENTS FOR NEW CONSTRUCTION SUBMARINES. (Mare Island Naval Shipyard, Vallejo, Calif.) Progress Rept. No. 12; Rept. No. 94-39; Proj. S-F013-13-01; ASTIA AD-281 835; 1 Aug. 1962

ABSTRACT: The development of elastomeric materials to replace chromated felt in constrained-layer treatments for damping heavy plating in new construction submarines was undertaken. A treatment having a weight ratio to the treated plate of 1 to 4 and utilizing a perforated nitrile rubber damping layer was found to be almost as effective as Treatment 198, similar treatment developed by the Rubber Laboratory which utilized chromated felt. The new treatment, designated Treatment 227, consisted of an Al constraining layer 1-1/4 in. thick and a perforated nitrile rubber damping layer 1/16 in. thick. It was fastened by means of 1/2 in. thick studs on 12 in. centers to 1-3/4 in. thick steel plate. The average damping at 75 F for treatment 227 over the frequency range of 50 to 2000 cps was 6.2 % of critical as compared to 6.5% of critical for Treatment 198. It was found that the damping behavior of the nitrile rubber layer was affected similarly to the chromated felt by temperature change. Maximum damping occurred at 65 F. Substantially lower damping were obtained at 35 and 120 F. Work was continued on the development of damping treatments which will be efficient over the temperature range of 35 to 120 F. (AUTHOR)

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1,063

Parin, V.V. & V.I. Iazdovskii 1961 PUT' SOVETSKOI KOSMICHESKOI FIZIOLOGII (Advances in Space Physiology in the Soviet Union) Fiziologicheskii zhurnal SSSR (Moskva) 47(10): 1217-1226, Oct. 1961

ABSTRACT: The first and second stages of animal experiments in Soviet space medicine and biology were carried out with rocket flights. Satisfactory data were obtained on physiology and behavior under space-equivalent stresses and on the adequacy of heremetic cabins, cabin equipment, space suits, and recovery equipment. The orbital flight of the dog, Laika, confirmed that a highly organized organism can survive space flight in a satisfactory condition. Other satellite flights with different types of animals allowed continuous observations of their condition throughout the flight and during landing. The final stage was preceded by the selection and training of cosmonauts. The training program subjected the cosmonauts to simulated stresses gradually increasing in intensity until the levels expected in space were exceeded. Careful medical observations were made throughout the training. The results of this preparation were seen in the successful flight of Gagarin. In Titov's flight prolonged weightlessness affected his vestibular sense organs but not his efficiency. Recovery after the flight was rapid.

1,064

Parker, C. G. 1957 AUTOMATIC SEAT STYLE PARACHUTE PART NO. 50C7025 15, TEST OF. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TN 56-5C7, Aug. 1957

ABSTRACT: The automatic seat style parachute, developed for use in high altitude aircraft where seating space is extremely limited and provisions for back style parachutes have not been made, was evaluated. Function tests included aerial drop, bench tests, live jumps, and cold chamber tests. Recommendations are included.

1,065

Parker, P.L. 1962 DROP TESTS OF C-9 PARACHUTE CANOPIES FABRICATED WITH HIGH TENACITY YARNS AND LUBRICATED SUSPENSION LINES (Air Force Flight Test Center Edwards AFB, California, Air Force Systems Command, U.S.A.F.)Technical Document Report No FTC-TDR-62-6, 12 March 1962, ASTIA AD-272976

ABSTRACT: Tests were conducted with C-9 parachute canopies fabricated of cloth woven from type 300 nylon yarn and having lubricated suspension lines to: (1) determine the effectiveness of the lubricated suspension lines in reducing fric- damage, and (2) evaluate the suitability of the test canopies for live jumps. Twisted line, rate of descent, ultimate strength and reliability tests were conducte in accordance with USAF Specification Bulletin 505. The tests did not reveal any discernible difference in performance between the test canopies and standard C-9 canopies. Cloth woven from type 300 and type 330 nylon yarn is suitable for parachute canopies when used under the conditions tested.

1,066

Parkin, G.B. 1945 BLOWER TUNNEL TESTS ON THE FLIGHT PATH OF A MAN EJECTED NORMALLY FROM AN AEROPLANE MOVING AT HIGH SPEED. (Royal Aircraft Establishment, Farnborough) Technical Note No. Aero. 1618, March 1945. Appendix 4 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High Speed Aircraft, ASTIA ATI 7245

SUMMARY: Blower tunnel tests have been made to determine the flight path of a man when ejected with the seat from an aircraft. It has been found that for the pilot to clear safely the tail unit of a Meteor travelling at 750 F.P.S. his ejection velocity should not be less than 50 F.P.S. if he and the seat are free to part or 40 F.P.S. if he is attached to the seat. He is liable to be rotated in any direction at a rate up to 1 1/2 revs./sec. while travelling from cockpit to tail, when ejected from the aircraft at this air speed. (Author)

1,067

Paton, C.R., E.C. Pickard & V.H. Hoehn 1940 SEAT CUSHIONS AND THE RIDE PROBLEM S.A.E. Journal 47: 273-283, July 1940

1,068

Patt, D. I. 1945 COMFORT EVALUATION OF THE HAMMOCK-TYPE FIGHTER SEAT. (Wright-Patterson AFB, Ohio) WADC TR No. TSEAL 3-65-32EEE.

1,069

Patt, D. I. & F. E. Randall 1945 PRINCIPLES OF SEATING IN FIGHTER-TYPE AIRCRAFT.
(Wright-Patterson AFB, Ohio) WADC TR No. TSEAL 3-695-58, Sept. 1945.

1,070

Patt, D. I. 1946 PRINCIPLES OF COCKPIT SEATING.
(ATSC, Wright-Patterson AFB, Ohio) TR Rept. No. TSEAL 3-695-58C, Feb. 1946. ASTIA AD 50 569.

1,071

Patterson, J. L., Jr., A. S. Burt & M. J. Jones 1946 THE EFFECT UPON SCOTOPIC VISION OF CIRCULATORY CHANGES INDUCED BY NITROGLYCERINE AND CHANGE IN BODY POSITION.
(U.S. Nav. Sch. Aviation Med., Naval Air Trng. Base, Pensacola, Fla.) Research Rept. X-541.1

1,072

Paullin, R.L. and E.B. Heyl 1962 A REVIEW OF CIVIL TRANSPORT AIRCRAFT SAFETY BELT EXPERIENCE. (Paper, SAE S-9 Committee Meeting Olympia Hotel, Seattle, Washington, August 6, 1962)

1,073

Payne, C. F., Jr., & R. A. Bosee 1962 THE MECHANISM AND CAUSE OF VERTEBRAL INJURIES SUSTAINED ON EJECTION FROM U. S. NAVAL AIRCRAFT. (Paper, 33rd Annual Meeting of the Aerospace Medical Assoc., 9-12 April 1962, Atlantic City, N. J.)

ABSTRACT: Considering the available evidence, the basic mechanism responsible for the high incidence of vertebral injury on ejection from U. S. Naval aircraft is the concentration of inertial and restraint force components on the front of the vertebrae by spinal flexion. Flexion occurs because of poor positioning, lack of support, and inadequate restraint of the body. Until further improvements are made in these areas and spinal flexion kept to a minimum, it will not be possible to subject the body to its potentially tolerable limit of ejection acceleration without perpetuating the high incidence of vertebral injury.
Aerospace Medicine 33(3):348, Mar. 1962)

1,074

Payne, C.F., Jr. 1963 STUDY OF PHYSIOLOGICAL STRESSES WITH EJECTION LOADS. (Paper, Thirty-Third Annual Meeting of the Aerospace Medical Association, April 1962, Atlantic City.)

1,075

Payne, C.F. 1963 STUDY OF PHYSIOLOGICAL STRESSES WITH EJECTION LOADS. (Air Crew Equipment Lab., Naval Air Material Center, Philadelphia, Pa.) NAEC ACEL 467, 8 July 1963. ASTIA AD 409 465L

1,076

Payne, F.A. 1960 WORK AND LIVING SPACE REQUIREMENTS FOR MANNED SPACE STATIONS (In: Proceedings of the Manned Space Stations Symposium, Institute Aeronautical Sciences, New York, New York) pp. 100-104

ABSTRACT: The basic knowledge required to design the working and living accommodations for space stations is currently available. If the principles of architecture and engineering are applied to this knowledge, there is a good chance of producing operationally satisfactory manned space stations.

1,077

Payne, P.R. 1960 ANALYSIS OF B-58 CAPSULE LANDING IMPACT TRANSVERSE ACCELERATION DATA WITH HUMAN AND DUMMY OCCUPANTS. (Stanley Aviation Corporation, Denver, Colorado) Stanley Aviation Report No. 742

1,078

Payne, P.R. 1960 PRELIMINARY INVESTIGATION OF THE DYNAMICS OF A MAN-CARRYING CAPSULE SUBJECTED TO EXTERNAL FORCES. (Stanley Aviation Corp.) Rept. No. 1189, 8 June 1960.

1,079

Payne, P.R. 1961 INVESTIGATIONS OF CREW ESCAPE SYSTEM SURFACE IMPACT TECHNIQUES FOR ADVANCED AEROSPACE VEHICLES. (Frost Engineering Corp., Denver, Colo.) Rept. No. 74-1, July 1961.

1,080

Payne, Peter 1961 QUARTERLY STATUS REPT. #1 ON HUMAN BODY DYNAMIC STUDY. (Stanley Aviation Corp., Denver, Colo.) Rept. 776.

1,081

Payne, P. R. 1962 AN ANALOG COMPUTER WHICH DETERMINES HUMAN TOLERANCE TO ACCELERATION
(In: Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 271-300)

ABSTRACT: The purpose of this paper is to describe and demonstrate a small analog computer which is designed to show the physiological effect of short period acceleration on man. An arbitrary acceleration-time history can be set up on the front of the computer by "plotting" a graph with sliding beads. Calibrated dials enable the dynamic characteristics of the restraint system to be specified (such as cushion thickness, stiffness and damping, for example), and the computer can then be started. A meter reads out the peak value of the "Physiological Index", which is an arbitrary numerical scale.

An analog of this type is only as good as the experimental data upon which its analogy is based. But within this limitation it can be used for five functions

The paper concludes with a description of possible future developments, and particularly the inclusion of non-linear terms and the long period acceleration tolerance limits established in centrifuge testing.

1,082

Payne, Peter R. 1962 THE DYNAMICS OF HUMAN RESTRAINT SYSTEMS
(In: Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 195-257)

ABSTRACT: Human dynamics is in its infancy, and like all young sciences, must proceed in a series of steps which alternate between theoretical and experimental investigations.

In the sub-division of body-restraint dynamics a great deal of experimental data has now been amassed, and further progress seems to depend upon a thorough investigation of the basic principles of restraint, and the use of dyanmic theory to correlate the existing experimental information. This report is primarily concerned with proposing such a program, and with discussing in depth the approaches that should be used.

Since a satisfactory dynamic model of the human body is an essential prerequisite to a meaningful analysis of restraint dynamics, however, a fairly detailed description of our latest "human models" is also included.

1,083

Payne, P.R. 1962 INVESTIGATION OF THE DYNAMICS OF HUMAN RESTRAINT AND SUPPORT SYSTEMS
(Frost Engineering Development Corporation, 830 South Lipan Street, Denver 23, Colo.) R.F.P. No. 33(657)-62-5709-Q P.R. No. 140970 MRV Proposal No. 122-1 Aeronautical Systems Division, AFSC March 31, 1962

ABSTRACT: This document deals with a proposed research program concerned with the dynamics of human restraint and support in vehicles. A detailed breakdown of the program is given in Section 9.0 of this report.

The main body of this proposal reviews the history of the subject of "body dynamics" and then covers specific areas of theoretical research which have been carried out at Frost Engineering, these being:

Linear dynamic models of the human body.
Non-linear dyanmic models of the human body.
Dyanmic models of the head.
Fundamentals of restraint system dynamics.

Appendices deal with general non-linear theory, the use and significance of mechanical impedance measurements, and an important limit case in restraint theory.

Frost's research rpograms for the U.S. Navy and private corporations are also reviewed briefly, with respect principally to the benefits that the proposed program will derive from them.

The only deviation from the work statement of the request for proposal is a suggestion for development of a simple methodology for restraint system optimization, to embody the results of the proposed program, and to be in a form suitable for use by engineers concerned with the problems.

1,084

Pearson, H. J. 1952 EJECTION-SEAT I--DEVELOPMENT AND CONSTRUCTION OF THE MARTIN-BAKER ESCAPE UNIT.
Aircraft Production 14:154-161, May 1952

1,085

Pearson, R.G 1961 INJURY SEVERITY AS RELATED TO SEAT TIE-DOWN AND BELT FAILURE IN LIGHTPLANE ACCIDENTS. (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR 61-4, TREC Tech. Rept. 61-96, Aug. 1961. ASTIA AD 265 092L

SUMMARY: The purpose of this study was to evaluate the relationship between tie-down effectiveness and injuries sustained by 1,025 occupants of lightplanes involved in ground-object collisions, or in spin-stall crashes. Critical

injuries to the head and upper torso were found to occur even though there was adequate seat belt restraint. In approximately one-third of the 1,025 cases either seat failure or belt failure, or both, occurred. Belt failure occurred more frequently then seat failure, yet injury severity was greater when seats failed than when belts failed. The need for additional safety measures is emphasized by the findings. (Author)

1,086

Peck, F.J. 1951 STRUCTURAL TESTS-SEATS BUNKS AND LITTER INSTALLATIONS DOUGLAS C-124A AIRPLANE. (AMC, Wright-Patterson AFB, Dayton, Ohio) ASTIA ATI 93 534, 8 February 1951

ABSTRACT: The seats, bunks, litter installations and support structure mentioned in this report are structurally satisfactory for all required conditions provided that the reinforcement mentioned in B-11 is incorporated in the structure.

The litter support structure, with the exception of Part No. 43B2330, is satisfactory for 125 percent of the required ultimate down load, the four man troop seats and support structure for 115 percent ultimate load, and the one man troop seat and support structure for 120 percent ultimate load.

,087

Pecoraro, J.N. A CONTROLLABLE SUPINE SEAT FOR THE PENSACOLA CENTRIFUGE (Spec. Dev. Center, O.N.R., Pensacola, Fla.) Report SDC 9U37a-1.

,088

Pedersen, Paul E. 1961 STUDY OF PARACHUTE PERFORMANCE AT LOW SUPERSONIC DEPLOYMENT SPEEDS; EFFECTS OF CHANGING SCALE AND CLUSTERING (Cook Electric Company, Chicago, Illinois) Aeronautical Systems Division Technical Report 61-186 July 1961 ASTIA AD 267 502

ABSTRACT: Parachute design and operational data were collected on a series of rocket powered sled tests conducted on the Air Force Flight Test Center Track at Edwards Air Force Base, California. Parachute deployment velocities ranged between Mach 0.76 and 1.57. Parachute types that were investigated included Guide Surface Ribless, FIST Ribbon, Conical Ribbon, Equiflo and Hemisflo

designs. The majority of the test parachutes were designed to have a drag area of approximately 15 square feet. Limited testing was accomplished with some configurations of reduced drag area to investigate effects of changing scale. Results of this were not conclusive. Clustering of parachutes was also investigated with triple clusters of FIST Ribbon parachutes.

The data obtained during the program included inflation characteristics, opening shock factors, drag forces, inflated area-relationships, and stability of the parachutes through the velocity ranges investigated.

Associated systems, such as the deployment and release system, test vehicles and instrumentation system are also discussed.

1,089

Pengelley, C. D. 1952 MODEL TESTING TECHNIQUES FOR INVESTIGATING JETTISONING OF EVACUATION CAPSULES FROM SUPERSONIC AIRCRAFT. (Paper, Symposium on the Problems of Emergency Escape in High Speed Flight, Wright Field, Ohio, 29-30 September 1952.)

ABSTRACT: A study has been made of model testing techniques that may be used to investigate the characteristics of jettisonable capsules for evacuation from high speed aircraft up to speeds of Mach 3.5. - Dimensional theory has been presented and unless the speed of sound can be controlled, complete similarity cannot be achieved between model and full scale. Practical working compromises have been presented. - Captive wind tunnel models, and also free flight models have been studies, both ground-launched from a track and air-launched from an aircraft at high altitude. (Author's summary)

1,090

Pennell, M.L. 1950 PRELIMINARY STUDY OF SIDE BY SIDE PILOT ARRANGEMENT IN B-52 AIRPLANE
(Boeing Airplane Co., Seattle Div., Wash.) Document No. D-11185 Dec. 15, 1950
ASTIA ATI 100 380

ABSTRACT: In response to inquiry concerning the feasibility of side by side pilot arrangement for the B-52 airplane, a very preliminary study of one possible arrangement has been prepared. The arrangement presented represents a first approximation of a configuration embodying the most desirable features of side by side designs developed in previous studies outlined in Document D-11174, "History of the Development of the XB-52 Cockpit". Quantitative answers concerning weight and performance changes and definite features of an actual proposed configuration would require a great deal of additional study. The configuration sketched in this Document must therefore be considered very tentative, but the general conclusions concerning the effects of such a change are considered to be valid since they are representative of answers which were arrived at in previous studies including detail layouts and complete full scale mockups

1,091

Penny, A. R. 1956 JUMPERS DOWN AND UP
Med. Technicians Bull. 7(4):139-141, July-Aug. 1956

ABSTRACT: The personnel of a naval parachute unit conduct tests in connection with the design, use, improvement and adaptation to naval aircraft operations of parachute and ejection seat systems; pilot's personal safety equipment and flight gear; and aerial delivery of supplies and cargo. A medical corpsman equipped with medical kit is in attendance during all jumps to treat any injuries that may occur. Injuries sustained during test jumps are usually minor, consisting of bruises about the face and neck sustained from parachute lines and risers and due to opening shock forces. More serious injuries consist of leg sprains and fractures usually caused by ground impact

1,092

Penrod, K. E. 1942 BAILING OUT ABOVE 30,000 FEET.
(Wright Air Development Cts., Wright-Patterson AFB, Ohio)
Memo Rept. EXP-M-49-696-6A, 27 Nov. 1942.

1,093

Penrod, K. E. 1942 OXYGEN REQUIREMENTS IN PARACHUTE DESCENT FROM 30,000 FEET
(Wright Air Development Ctr., Wright-Patterson AFB, Ohio) Memo Rept.
EXP-M-49-696-6; 24 July 1942

1,094

Penrod, K. E. 1944 OXYGEN FLOW REQUIREMENTS FOR BAILING OUT AT 42,000 FEET
(Wright Air Development Ctr., Wright-Patterson AFB, Ohio) Memo Rept.
ENG-49-696-7J; 24 March 1944

1,095

Penrod, P. R. 1958 RELIABILITY ANALYSIS OF ESCAPE SYSTEM COMPONENTS PRESENT AND FUTURE
(North American Aviation, Inc., Los Angeles, Calif.)
Rept. no. NA 58-1496 26 Nov. 1958 ASTIA AD 256 385

CONTENTS:

1,096

Pernini, H. M. 1958 SURVEY AND COMPILATION OF CAPSULE SYSTEMS DATA, VOLUME I
(Armour Research Foundation, Chicago, Ill.) WADC Tech. rept. 57-661,vol 1

Summary: This report summarizes the results of design and development activities which have been conducted to early 1958, in the field of emergency escape capsule systems for high-performance aircraft. Decriptions of 30 escape capsule systems are presented. Summaries are also given of the investigations of jettisonable nose sections conducted by NACA and of pertinent portions of the Mann ed Supersonic Flight Manual. (Author)

1,097

Pernini, H. M. 1958 SURVEY AND COMPILATION OF CAPSULE ESCAPE SYSTEMS DATA. VOLUME II.
(Armour Research Foundation, Chicago, Ill.) WADC Tech. Rept. No. 57-661.

1,098

Pernini, H. M. 1958 SURVEY AND COMPILATION OF CAPSULE ESCAPE SYSTEMS DATA VOLUME III.
(Armour Research Foundation, Chicago, Ill.) WADC Tech. Rept. No. 57-661.

ABSTRACT: A comprehensive annotated bibliography of all the references contained in the survey in addition to other pertinent escape capsule literature is presented. (unclassified abstract)

1,099

Perreault, W. D. 1951 IMPROVED AIR SAFETY GETS TOP PRIORITY
American Aviation 15(24):13-14, Nov. 1951

ABSTRACT: Recent discussions on safety have been held among presidents of all scheduled airlines, the CAB chairman and the CAA administrator. From these preliminary meetings have come several tentative proposals for improved operation. These trends are evident: (1) A top level committee of airline, CAA, CAB, Air Transport Association, Air Line Pilots Association and Aircraft Industries Association representatives will be formed to monitor safety of airline operations on a regularly scheduled basis. (2) Development of a reliable flight recorder will be high on the list of equipment activities.(3) An attempt will be made to eatablish an equitable method of handling crew members whose obvious shortcomings might endanger flight operations. (4) CAA will be urged to require all aircraft operating in the vicnity of high-density traffic to be equipped with certain minimum communications equipment. (5) Airlines will be required to revamp cockpit procedures, simplify them where possible, and step up refresher courses for all pilots. Flight deck discipline will get particular emphasis. (6) Installation of high-intensity approach and runway lights and use of voice-type markers in place of present coded marker identifiers will be accelerated. (7) Maintenance and overhaul procedures will be examined to see if the ever-lengthening overhaul and inspection periods are a contributing factor in known shortcomings. (8) Airborne radar will be given renewed attention. On the whole industry is cool to presently available radar.

1,100

Perry, David R. and Lidie C. Dyer 1956
INCIDENCE, NATURE, AND EXTENT OF INJURY IN CRASH LANDINGS AND BAILOUTS
(Artic Aeromedical Lab., Ladd Air Force Base, Alaska)
November ASTIA AD 116 239

ABSTRACT: Data were analyzed to establish the effects of terrain, weather, and type of aircraft upon the number and extent of injuries in crash landings

and bailouts. Based on data obtained from a worldwide survey of major airplane accidents, the rate of fatal or major injury in swampy terrain is 3.4% for a bailout and zero for a crash landing. For flat farmland, the probability of a fatal or major injury for either a bailout or a crash landing is about 2 out of 10 persons. For desert terrain the probability of fatal or major injuries in a bailout is 2 out of 10 as compared to 1 out of 10 in a crash landing. For terrain consisting of small hills, the probability of a fatal or major injury is 1 in 10 for bailouts and 3 in 10 for a crash landing. For a crash landing in wooded areas, the probability of fatal or major injury is 9 out of 10. In mountainous terrain, the indicated probability of fatal or major injuries is 2 out of 10 for a bailout and 6 out of 10 for a crash landing. The probability of fatal or major injury when crash landing in open water is 6 out of 10 as compared to 3 out of 10 for a bailout. Major accidents occurring in Arctic regions are studied with reference to bomber-and jet-type aircraft, jet fighters, trainer aircraft, and all other aircraft. A total of 33 persons were involved in bomber crash landings, of which 6.1% were fatalities. For cargo aircraft, 21.7% of bailouts were fatal, and 17.4% of the crash landings were fatal. Bailouts from jets resulted in 23.1% fatalities. Crash landings involved 28.6% fatalities. No fatalities were reported from trainer aircraft. All other types of aircraft involved 4 fatal injuries. (ASTIA)

1,101

Peschel, F.M. 1946 SEAT ASSEMBLY - PILOT'S JETTISONABLE XP-84 STATIC TEST. (Republic Aviation Corp., Engineering Research Div., Farmingdale, New York) ASTIA 49496, February 1946

ABSTRACT: Proof load tests were made on the pilot's jettisonable seat assembly of the XF-84 jet fighter. The test specimen was mounted on an actual set of guide rails in an attitude duplicating gun having the same working dimensions as the actual ejection device. The guide rails and dummy gun were attached to a rigid jig which could be mounted in various positions to allow convenient application of the test load. Tests included a seat bottom down load test, a seat back load test, a simultaneous safety belt and lap belt load test, and a lap belt mount up load test. All tests were successfully completed to 80% of the ultimate load. No appreciable permanent set or excessive deflection was noted after approaching limit load in any of the test conditions, with the exception of a failure of the shoulder strap support member. It was concluded that the pilot's jettisonable seat assembly is satisfactory for use in the XF-84 fighter.

1,102

Pesman, Gerard J. 1950 ANALYSIS OF MULTIENGINE TRANSPORT AIRPLANE FIRE RECORDS
(National Advisory Committee for Aeronautics Washington) NACA RM E9J19 May 1, 1950

ABSTRACT: An analysis has been made of Civil Aeronautics Administration and Civil Aeronautics Board commercial airplane fire records collected during the 10-year period ending July 1, 1948. The results of the analysis show that:
1. Gasoline was most frequently the initial combustible ignited in flight and ground fires and is considered to be the most hazardous of the combustibles carried.
2. Although electrical-ignition sources are the most frequent flight-fire ignition source by a small margin, the exhaust system is concluded to be the most hazardous ignition source.
3. Engine failures were the most frequent cause of the union of combustible and ignition source that resulted in flight fires.
4. Fuel-plumbing-system failures were the most frequent cause of fires occurring during ground operation.
5. The evidence concerning crash fires was not sufficiently extensive to provide information concerning the factors that affect the start and the spread of fire.

In order that future records may be more useful, all crash accidents should be studied to determine why fire does or does not occur and to establish data that relate the occurrence and the spread of fire to airplane design and operation.

1,103

Peters, G.A., C.A. Mitchell, & Frank H. Smith 1962 J-2 SPACE MAINTENANCE: PRELIMINARY STUDY
(North American Aviation, Inc. Rocketdyne, Canoga Park, Calif.) Report no. ROM 2181-1004, July 16, 1962

ABSTRACT: Two subjects wearing pressurized space suits performed two selected work tasks (removing and replacing oxidizer bypass ducts and gas generator spark plug assembly) on a J-2 engine during a preliminary investigation of space maintenance conducted at Rocketdyne June 18-22, 1962. The pressure suits were found to be uncomfortable and tiring after a work period of about an hour, and they greatly increased the complexity of, and time expended on, comparatively simple tasks. The results contain discussions on the design of space tools, pressure suit and glove limitations, component removal and replacement task difficulties, and supplemental environmental factors affecting job performance. Implications for further research are made in regard to problem areas which could be involved in the performance of space maintenance tasks on propulsion system equipment.

1,104

Peters, W.H. & R.W. Kluge 1948 PROGRESS REPORT FOR JANUARY, 1948 ON THE SUPERSONIC COCKPIT
Cornell Aeronautical Laboratory of Cornell Research Foundation, Inc. Buffalo, N.Y Report BC-531-S-1 ASTIA ATI 66 853

ABSTRACT: This progress report is the first to present specific progress made since inception of the program. To determine the present status of each of the many subjects involved, bibliographies have been compiled and sifting of this material is in progress; personal contact has been made with manufacturers of aircraft which will operate or already have operated near to the sonic velocity. Methods of approaching some of the various problems have been devised and are presented. These will permit the future work to be conducted most efficiently. Tentative physiological limitations have been selected, many from German reports, to permit survey of flight phenomena within a reasonable range. Results of a few cursory investigations, such as the displacement of an optical image through a shock wave and the realm of fluid mechanics in which flight will exist, are presented. Part I of this report covers the library research and Part II presents a summary of the conferences with aircraft manufacturers.

1,105

Peterson, H. L. 1961 CABLE AND PISTON DRAG PARAMETER INVESTIGATION FOR HYDRAULIC AIRCRAFT--ARRESTING ENERGY ABSORBERS. (Research, Inc., Minneapolis, Minn.) ASD TN 61-65, June 1961. ASTIA Doc. No. AD 268 173.

ABSTRACT: An investigation was conducted to obtain information on the parameters affecting operation or control of hydraulic energy absorbers used in barrier systems. The influence of independent variables on cable drag was investigated by pulling a test cable (wire rope) through a water filled tube at velocities up to 200 feet per second. Drag forces and tube water pressures were recorded for various test configurations. The variables included water tube length and diameter, smooth and rough test cable and varying amounts of water bleed. Results were analyzed and compared with full scale barrier tests. The variation of piston drag with tube diameter was also investigated. Results, using both single and double piston arrangements were compared to the full scale barrier tests. (Author)

1,106

Peterson, R.L. 1962 AN INVESTIGATION OF THE COMFORT PROPERTIES OF THE NET SEAT CONCEPT (Technical Memorandum 1958-1959) (Flight Dynamics Lab., Aeronautical Systems Div., Wright-Patterson AFB, Ohio) ASRMDD-TM-62-50

ABSTRACT: Results are presented on the evaluation of the comfort properties of the net concept for possible integration in future aerospace vehicles. A description of the experimental net seat delineator, with illustrations, is

included. The three angular positions of special interest in vertically launched long duration space missions are defined. The results indicate that this seating concept provides a high degree of comfort for both short and long duration (up to 36 continuous hours) occupancy and that further evaluation of this concept's capability during periods of relatively high sustained accelerations and low frequency vibrations should be investigated. (AUTHOR)

1,107

Peterson, R.L. 1962 AN INVESTIGATION OF THE SUSTAINED ACCELERATION PROPERTIES OF THE NET SEAT (Flight Dynamics Lab., Aeronautical Systems Div., Wright-Patterson AFB, Ohio) ASRMDD-TM-62-58, Aug. 1962 NASA N 62-17259

ABSTRACT: This report presents the results of an in-house net seat sustained acceleration text program to evaluate the acceleration capability of the net seat concept during simulated launch and reentry profiles. Results of these human centrifuge experiments indicate that the prototype net seat provides the space crew member with an excellent support-restraint system with which to withstand application of transverse (chest to back) accelerations up to 16.5G's

1,108

Pfingstag, C. J. 1953 PILOT'S ABILITY TO SIMULATE AN EMERGENCY ESCAPE WITH VARIOUS TYPES OF EJECTION SEATS WHILE SUBJECTED TO A FLUCTUATING ACCELERATION
(Aviation Medical Acceleration Lab., Naval Air Development Center, Johnsville, Pa.)
Proj. TED no. ADC AE-6303 3 Nov. 1953 ASTIA AD 54 281

1,109

Phillips, L. 1960 INTEGRATED FLIGHT CAPSULE PILOT RESTRAINT, 1 JUNE 1959 - 1 MARCH 1960 (Vought Aeronautics) 7 April 1960

This report discusses the pilot restraint system study accomplished during the preliminary design of the Integrated Flight Capsule. Present day pilot restraint systems were evaluated, and methods of eliminating their major defi-

ciencies investigated. However, the majority of the study effort was directed towards the design of an optimum pilot restraint system. The integration of the pilot restraint and the pilot's flight garment was developed for several of the more promising methods of restraint. A mock-up of these methods was fabricated and a feasibility evaluation performed. Several of the restraint methods used in the mock-up appear to be feasible methods of pilot restraint when used in conjunction with an integrated flight garment. Several of the pilot restraint methods considered appear to warrent further development toward providing the pilot with an optimum restraint system. This study was not concerned with the design of the garment, however, it was considered during the design of the system. Several studies in the area of head restraint are presented. The methods suggested will support the head in the event high loads are experienced by the pilot, but keep at a minimum any hinderance or any restriction of head movement during the long periods when head restraint is not required

1,,110

Phoebus, C. P. 1957 PROBLEMS OF ESCAPE FROM HIGH PERFORMANCE AIRCRAFT: A SYMPOSIUM.
J. Aviation Med. 28:57-100, Feb. 1957.

ABSTRACT: A series of papers presented at a symposium on escape from high performance aircraft are included in this article. The papers are concerned with history of the escape problem, ejection seat escape, engineering problems, human tolerance to escape, accessory equipment and testing problems, psychologic factors in escape, and predictions for the future.

1,,111

Pickert, Gordon D. 1945 ULTIMATE LOAD TESTS OF WMCA NO. 224 RADIO OPERATOR'S SEAT - MODEL c-82
Warren McArthur Corporation, Bantam, Conn. (Fairchild Engine and Airplane Corporation, Aircraft Div., Hagerstown, Md.) Jan. 2, 1945 ASTIA ATI 110525

ABSTRACT: The purpose of the test described in this report was to apply static loads simulating acceleration forces on the Warren McArthur No. 224 Radio Operator's Seat to determine its behavior up to ultimate design loads. In all tests, the load was applied directly to the seat unit to remove the slack in the joints. Then additional increments were added until the ultimate load was reached. After each increment was added the load was reduced to the original increment. In this manner set was noted. During the seat and back load tests increments were added by means of weights on a platform suspended from a shiffle tree or equalizing platform. The load was applied on a platform over the initial shot bag load.

wo pieces of plywood were laid across the back to support the load in this est. The belt load was applied with a spur-geared chain hoist through a semi-ircular form in a leather belt. A traction dynamometer between the form and he hoist measured the loads. Measurements were taken with sliding wooden deflec-ion guages from the unit to the test rig. Deflections and sets were noted and lotted to warn off incipient failures. In addition photographs were taken at he initial and final loads and the negatives were later superimposed to give a ositive print which shows the behavior of the seat under load. The results f the tests showed that the seat unit supported the ultimate loads without fail-re or appreciable set. Controls operated perfectly after all tests. From the esults of the tests it may be concluded that the seat as designed is sufficient-y strong.

112

ckert, G.D. 1945 ULTIMATE LOAD TESTS OF RMCA NO. 294, FLIGHT ENGINEERS AND RADIO OPERATOR'S SEAT (Model XF-12) (McArthur, Warren Corp., Bantam, Conn.) ASTIA ATI-46359, April 1945

TRACT: Static loads simulating acceleration forces were applied on the ren McArthur No. 294 flight engineer's and radio operator's seat to ermine its behavior up to ultimate design loads of 1700-lb down load on t with the base horizontal and 1600-lb belt load at 45° to the seat frame. seat unit supported all ultimate design loads without failure and the of loads without permanent set. It is concluded that the seat as designed sufficiently strong.

13

, Leroy D. 1961 HUMAN ENGINEERING PRINCIPLES OF DESIGN FOR IN SPACE MAINTENANCE. (Behavioral Sciences Lab., Wright-Patterson AFB, Ohio) ASD TR 61-629, ASTIA AD-271 066, November 1961

TRACT: Results of research on problems related to human performance of tenance actions in space systems are reviewed. The interactions of ory, psychomotor, and motor functions are discussed, along with problems mote-handling applications in the space environment. (Author)

1,114

Pinc, B. W. 1956 MC-3, MC-4, ALTITUDE SUIT ASSEMBLIES, DESCRIPTION, FITTING AND MAINTENANCE. WADC TR 56-654; ASTIA AD 110 668.

ABSTRACT: MA-2 helmet: This is a K-1 frame, face ring, and shell, which feature a long neckpiece, a deep neck seal bladder, a 3-way-stretch insert in the neckpiece, snap fasteners, a facepiece with a new 24-v high-resistance heating circuit and an in-flight feeding port, 3/8 in. -id oxygen hose, and A1C-10 microphone and earmotors. MC-4 suit: Zippers are located at the wrist and ankle. A shortened front-fly zipper is featured, and the suit torso is closed by a chest zipper from the small of the back to the neck. Chest and back closures are heavy duty; all others are medium weight. A full torso bladder extends from the shoulders to mid-thigh, completely surrounding the chest, abdomen, hips, and upper thighs and passing through the crotch. The leads to the torso bladder and capstans are restrained extensions of the bladder systems (14 in. long) and are equipped with positive lock connections. Lacing extends up the inner thigh, the small of the back, and down the chest. Adjustable cords are at the waist and groin. There are suit-to-suit snaps and suit-to-helmet snaps at the front zipper top; suit-to-helmet snaps are at top back of the collar. The MA-1 anti-G suit is built into the altitude suit for pressure against the legs, thighs, and lower abdomen. MC-3 suit: After the first procurement of 1073 garments, this suit will be identical to the MC-4 suit, but will lack the built-in anti-G suit. Gloves: These are characterized by pressure lead on top at the thumb side, positive lock bayonet connections, padded palm zipper, and elastic wristband. The Berger glove is an all-leather construction. The Clark glove has a leather palm and nylon back, and back lacing adjustment. Seat kit regulator: The new, automatic assembly has a seat pan attached to the airman and acts as a cushion.

1,115

Pinkel, Irving and Edmund G. Rosenberg 1956 SEAT DESIGN FOR CRASH WORTHINESS (Paper, National Advisory Committee for Aeronautics, April 17, 1956, Cleveland, Ohio)

ABSTRACT: From a study of many crash deceleration records, a simplified model of a crash deceleration pulse is suggested which incorporates the essential properties of the pulse. The model pulse is considered to be made up of a base pulse on which are superimposed one or more secondary pulses of shorter duration. The results of a mathematical analysis of the seat-passenger deceleration in response to the airplane deceleration pulse is provided. On the basis of this information, presented as working charts, the maximum deceleration loads experienced by the seat and passenger in response to the airplane deceleration pulse can be computed. This maximum seat-passenger deceleration is found to depend on the natural frequency of the seat containing the passenger, considered as a mass-spring system.

Seat failure is considered to be a progressive process, which begins when the seat is deformed beyond the elastic limit. Equations are presented which relate the energy available to deform the seat beyond the elastic limit to the maximum seat-passenger deceleration, seat natural frequency, and seat strength. A method is presented that shows how to arrive at a combination of seat strength,

natural frequency, and ability to absorb energy in deformation beyond the elastic limit to allow the seat to serve without failure through an airplane deceleration pulse taken as the design requirement. These qualities of the seat can be obtained from measurements made under static conditions.

Data are presented from full-scale laboratory and crash studies on the deceleration loads measured on dummy passengers in seats of standard and novel design. The general trends indicated by theory are obtained.

1,116

Pinkel, I.I. & E.G. Rosenberg 1957 SEAT DESIGN FOR CRASH WORTHINESS. NACA Rep. 1332, 1957 (Supersedes NACA TN 3777) ASTIA AD 109 316

ABSTRACT: On the basis of deceleration data obtained in full-scale crashes, a description of crash deceleration pulses is presented which is suitable for seat design. Charts are presented for obtaining the maximum deceleration loads experienced by the seat and passenger in response to their crash deceleration pulses. Finally, a method is presented for determining the seat strength, spring stiffness, and deformation beyond the elastic limit required to serve in a crash deceleration pulse of given description. Measurement of passenger decelerations in full-scale laboratory and crash studies shows that the general principles presented in the report apply.

1,117

Pinkel, I. I. 1959 A PROPOSED CRITERION FOR THE SELECTION OF FORWARD AND REARWARD FACING SEATS. A.S.M.E. Prep. (59-AV-28).

ABSTRACT: Some crash-deceleration records of NASA crash-research programme are used as a basis for estimating the relative merits of both systems. Computed values of relative crash tolerance of the seating systems are used for the selection criterion. Numerous assumptions respecting the incidence of different types of injury are made and the results are admitted to be very general.

1,118

Pinkel, I. I. 1960 AIRCRAFT SEATING. Mechanical Engineering, 82 (2) 60-63.

1,119

Pletcher, K. E., & S. E. Neely 1960 USAF EMERGENCY ESCAPE EXPERIENCE 1949-1959 (Paper, 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960)

1,120

Pletcher, K. E. & S. E. Neely 1961 USAF EMERGENCY ESCAPE EXPERIENCE--1950-1959
Aerospace Medicine 32(6):524-534, June 1961.

ABSTRACT: Ten years' experience of escape from USAF tactical aircraft are reviewed in an effort to establish the actual hazards connected with emergency escape as opposed to those which experience has shown to be of less importance than the amount of attention they have received. The analysis makes use of tables and graphs to show major accident figures for the period under study, the role of escape in fatal accidents, the effect of ejection seat on escape statistics, type of emergency precipitating ejection, amount of terrain clearance, aircraft attitude, difficulties initiating ejection and after egress, water landing, and survival after ejection. Two new developments in escape are discussed: rocket catapults and capsules. (Tufts)

1,121

Pletcher, K. E. 1961 HUMAN FACTORS IN AEROSPACE PATHOLOGY
Aerospace Medicine 32(1):6-11, Jan. 1961.

ABSTRACT: The relationship between pathology and aircraft accident prevention is discussed. Some relatively rare conditons are mentioned which are amenable to both clinical and pathologic detection and which have been definite, probable, or possible causes of either aircraft accidents or incidents: thyroiditis, sarcoidosis, latent malaria, and sickle cell disease. Some more commonly occuring conditions mentioned are myocardial infarction or coronary insufficiency, cerebrovascular accidents, inhalation of noxious fumes, stress and fatigue, smoking, frugs, and larval idiopathic and posttraumatic epilepsy. The most common conditions such as aeroembolism, hypoxia, and the like also are mentioned. (Tufts)

1,122

Pogrund, R.S. 1962 PHYSIOLOGICAL ASPECTS OF THE SPACEMAN. In: Brown, K., and L.D. Ely. Ed., Space Logistics Engineering (New York: John Wiley and Sons, 1962) p. 55-135

ABSTRACT: The complexity of space logistics engineering for the comfort of the astronaut in a space vehicle is described as a function of mission duration and of the operational requirements and performance capabilities expected. The following physiological parameters are reviewed: (1) vehicle-induced stresses (propulsion, noise, vibration, accelerations, zero gravity, re-entry, emergency escape); (2) internal environment of the space capsule (sources of oxygen supply, handling food, biological photosynthesis systems, methods of carbon dioxide elimination, water and waste control, toxicological considerations, temperature and humidity regulation); (3) radiation hazard shielding requirements, low-level chronic exposure hazard); and (4) psychological stress (isolation, confinement, and sensory deprivation)/

,123

oppen, J.R. 1938 EFFECTIVENESS OF PNEUMATIC BELTS IN COUNTERACTING ACCELERATION. (Discussion.) J. Aviation Med. 9:214-215, 233

124

ppen, J.R. 1946 PILOTS ESCAPE FROM HIGH PERFORMANCE AIRCRAFT INTERIM REPORT ON LIVE EJECTION FROM AIRCRAFT IN FLIGHT AT LAKEHURST, N.J. ON 30 OCT '46 (Naval Air Experimental Station, Philadelphia, Pa.) Dec. 1946. ASTIA ATI 48167

STRACT: The first live ejection from high performance aircraft was made om a JD-1 bomber at 5000 ft with airspeed of 250 mph. Prior to the live ection from the bomber, 42 live ejections were made in the test tower using wder charges and catapults to approximately duplicate the acceleration pected, and 5 dummy ejections at 200-350 mph were made from the bomber. e 28-ft chute attached to the seat failed on the live ejection and at proximately 2000 ft the subject left the seat, fell 500 ft. and opened his t chute and made an uneventful descent. The subjective reaction of the bject are described and the cause of the failure of the 28-ft parachute is plained

1,125

Poppen, J. R. 1947 HUMAN TOLERANCE TO ACCELERATIONS APPLIED FORM SEAT AND HEAD DURING EJECTION SEAT TESTS.
(Naval Air Experimental Station, Philadelphia, Pa.) Rept. TED No. NAM 256005, Jan 31, 1947.

1,126

Poppen, J. C. 1950 PROTECTIVE HELMETS—THEIR INTEGRATION WITH OTHER EQUIPMENT. J. Aviation Med. 21(5):414-418.

SUMMARY: 1. The impetus to the development of protective helmets is outlined.
2. Methods of construction and general configuration of the more commonly worn protective helmets are briefly described.
3. The need for better integration between the helmet and contiguous equipment is defined.
4. The need for better integration of all personal equipment is emphasized.

1,127

Poppen, J. R. 1953 SOME FACTORS INFLUENCING SEAT DESIGN LOADS.
(Eng. Dept., Douglas Aircraft Co., El Segundo, Calif.) Rept. ES-17277 Feb. 1953.

1,128

Poppen, J. R. 1954 THE NEED OR DESIRABILITY OF FOOTRESTS ON UPWARD EJECTABLE SEATS.
(Eng. Dept., Douglas Aircraft Co., El Segundo, Calif.) Rept. ES-17693, June 1954.

1,129

Poppen, John R. 1957 INTRODUCTION AND HISTORY OF THE AIRCRAFT ESCAPE PROBLEM The Journal of Aviation Medicine 28: 57-59, Feb., 1957

ABSTRACT: The history of escape from aircraft starts with the parachute which was followed by the Martin-Baker upward ejection seat. There are four physio-

logic aspects of the gravitational forces involved in ejection just as there are for all gravitational forces in flying. Research on the ejection seat has been performed by all branches of the military services to determine the best design criteria and to define the human tolerance factors

1,130

Poppen, J. R. 1958 SUPPORT OF UPPER BODY AGAINST ACCELERATIVE FORCES IN AIRCRAFT
J. of Aviation Medicine 29(1):76-84, January 1958

ABSTRACT: There is increasing need for the direct support of the upper part of the aviator's body against increasing vertical forces. In a study of the mechanical support and mass distribution of the upper part of the body, principles are determined to be applied in the design of personal equipment to accomplish this support. The objectives are (1) the reduction of dynamic response between the upper and lower masses to lower the compressive impact loads on the lumbar spine, and (2) the use of greater thrust, higher velocities and higher trajectories in upward ejection seats. Certain preliminary tests are reported which confirm the validity of the principles defined and give promise that effective means of providing the desired support can be foreseen.

1,131

Poppen, Modlin 1957 F106A TORSO RESTRAINT SYSTEM. Preliminary Study. (Radioplane Co.) Rept. No. AMM66, April 1957

1,132

Powers, E.E. 1945 VELOCITY AND ACCELERATION MEASUREMENTS OF PILOT SEAT EJECTION CATAPULT. (Army Air Forces Materiel Command) 27 Nov. 1945. ASTIA ATI 52658.

ABSTRACT: Ultra high-speed motion pictures were made of four tests of the firing of the pilot-seat ejection catapult in order to study the velocities and accelerations involved when the ejection gun is fired. A pneumatic brake was used to preload the system, thus increasing the initial load, and the catapult under initial braking loads of 1.2g, 1.6g and 1.9 g. The motion pictures were assessed for space-time-evaluation, and the values of velocities and accelerations were plotted. Acceleration curves show a fluctuation of acceleration prior to reaching maximum acceleration. It is recommended that further tests be conducted to determine whether the fluctuation in acceleration is consistent.

1,133

Preece, C.D. 1960 BANG! ARE YOU ALIVE?
Air Clues, 14(6):176-180 March 1960

ABSTRACT: Between January 1, 1953, and August 31, 1959, 168 RAF personnel ejected, and of these 130 were successful.
The main purpose of this letter is not to analyse the unsuccessful cases, but to pose a question. Are aircrew given, and do they give themselves, a fair change when the occasion demands that they reach for the handle?

1,134

Pribil, R.F. 1956 HIGH-SPEED TRACK TESTS OF EJECTION SEAT AND PILOT'S EQUIPMENT, F-100 AIRPLANES. TEST NO. 2.
(North American Aviation, Inc.) Report No. NA-56-750-2
30 August 1956.

1,135

Provost, C. J. 1961 EMERGENCY RECOVERY OF GONDOLA PARACHUTE.
(Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD Tech. Note 61-4. ASTIA AD 253 207.

SUMMARY: An 82.3-foot nominal diameter parachute system was modified and prepared for integration with the WADD Gondola III (Stargazer) in such a way that the gondola and crew could be recovered. By locating a 96-inch diameter ring 150 inches above the gondola's suspension attachment points, a telescope, mounted directly on top of the gondola, could rotate freely on a 360° axis, and a 1-inch minimum clearance at maximum and minimum elevations could be assured. Twelve 1/2-inch wide suspension risers have a maximum strength of 23,380 pounds. The parachute assembly will recover a gross load of 3,650 pounds at release air speed of 40 knots from an altitude of 800 feet above ground. More gross weight tests should be conducted to determine the opening characteristics of the parachute canopy at anticipated service altitudes. (Author)

1,136

Putnam, V. K. 1959 SOME HUMAN ENGINEERING ASPECTS OF SEVERAL UNCONVENTIONAL AIRCRAFT
(Paper Fourteenth Meeting of the Flight Test Techniques and Instrumentation Panel, 11-15 May 1959, Athens, Greece)
(Advisory Group for Aeronautical Research and Development, Paris, France)
AGARD rept. no. 244 May 1959 ASTIA AD 243 008

ABSTRACT: Interest by the military services, notable the U. S. Army, in the potential of reatively high speed (compared to helicopters) aircraft that have the capability of vertical take-off, has been sufficient to finance the development of experimental testbeds of several types of VTOL aircraft. At the present time none of these aircraft has been sufficiently developed and tested to permit a comprehensive discussion of performance, stability, airframe dynamics and other objective factors which require extensive analysis. On the other hand, several of these aircraft have been flown sufficiently to permit observations to be made on subjective, or human engineering characteristics such as control, noise, downwash effects, etc. These characteristics, which are readily apparent to the pilot and strongly affect his opinion of the aircraft, are discussed. (Author)

1,137

Putt, D. L. 1952 TRENDS IN AIRCRAFT DEVELOPMENT AND RESEARCH -- IN THE AIR FORCE
SAE Journal 60(3):43-44, March 1952

ABSTRACT: Excerpts: "If there is one key word in our development effort today that word is reliability. The human mind and body cannot be relied upon in the years ahead to participate adequately in combat flight operations.

"The attainment of greater reliability by automatic means is, of course, the major trend. It will increase the number of component parts in equipment and emphasize the need for miniaturization.

"Recent development of the transitor, an electronic device about the size of a grain of wheat, will result in the elimination of many vacuum tubes and greatly accelerate equipment miniaturization, which will bring about a drastic reduction of the size and weight of electronic gear having much greater reliability and life."

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

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1,138

Quinnel, R.K. 1956 THE HUMAN COMPONENT IN EXTRATERRESTRIAL FLIGHT TAC Surgeon's Bulletin (Langley AFB, Va.) 6(11): 1-24, Nov. 1956
See also: Medical Newsletter 29(4): 27-40 Feb. 15, 1957

ABSTRACT: A general discussion is presented on the physiological stresses to be encountered in extraterrestrial flight such as accelerations, vibrations, cosmic radiations, and weightlessness. Within the cabin, control of pressurization, temperature, oxygen, carbon dioxide, and body odors is required, as well as adequate illumination and presentation of the instrument panel. Vision outside the cockpit may be important only for psychological reasons.

1,139

Quinnell, R.K. 1957 THE HUMAN COMPONENT IN EXTRATERRESTRIAL FLIGHT Canad. Serv. Med. J. 13(4): 245-258

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

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1,140

Radio Corporation of America 1960 STUDY OF INSTRUMENTATION AND TECHNIQUES FOR MONITORING VEHICLE AND EQUIPMENT ENVIRONMENTS AT HIGH ALTITUDE. INSTRUMENTATION AND MONITORING TECHNIQUES. (Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC TN 59-307 June 1960 ASTIA AD 268 090

ABSTRACT: Instrumentation techniques are presented which are available within the state-of-the-art; an instrumentation system is proposed for the monitoring of high-altitude environments encountered by typical vehicles. The high altitude environmental effects on typical vehicles and equipment are summarized. The present airborne-instrumentation state-of-the-art is presented for measuring temperature, pressure, strain, vibration, acceleration, radiation, meteorite detection, and acoustic noise. A feasible instrumentation system is discussed for monitoring these deleterious environments. (Author)

1,141

Radke, A. O. 1956 THE APPLICATION OF HUMAN ENGINEERING DATA TO VEHICULAR SEAT DESIGN. (Bostrom Research Laboratories Publications, Milwaukee, Wisc.) No. 117.

ABSTRACT: A detailed report including graphs and picutres of vehicle seats with the areas of position, posture, static comfort and vibration isolation integrated into the final design.

1,142

Raeke, J.W. 1959 IMPACT PROTECTION CHARACTERISTICS OF FLIGHT HELMETS. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: This study represents an attempt to determine the impact protection characteristics of three types of flight helmets. Tests were conducted at a constant impact velocity of 17.6 ft/sec. and at three impact energy levels:

60, 107.5 and 136.5 ft lbs. Peak resultant acceleration, rate of onset of acceleration, energy absorption efficiency and in several cases impact stress, were determined either directly or indirectly. High speed motion pictures of helmet shell deformation augment the aforementioned quantitative data. Results show that even under the relatively mild test conditions each helmet type displayed at least one undesirable characteristic. The impact response of each helmet type could be significantly improved by relatively minor design or fabrication changes; however, the test as a whole points up the need for a set of minimum acceptable performance standards. (J. Aviation Med. 30(3):199, Mar. 1959)

1,143

Raeke, J.W., W.R. Santschi & J.F. Hegenwald, Jr. 1962 ALTITUDE EVALUATION OF THE XB-70 ESCAPE CAPSULE
Paper: 33rd Annual Meeting of the Aerospace Medical Association, Chalfonte-Haddon Hall, Atlantic City, N.J., April 9-12, 1962

ABSTRACT: The B-70 escape capsule represents an advanced and sophisticated method of providing crewmembers with emergency pressure and respiratory protection in addition to escape capability. The capsule will maintain a minimum pressure level of 5 psi (27,000 feet) and is pressurized with a 60% oxygen-40% nitrogen gas mixture to maintain a sea level equivalent oxygen partial pressure. The capsule was extensively evaluated in the altitude chamber to insure adequacy and reliability of operation. Human subjects were exposed to 10-second decompressions from 8000 to 50,000 feet with encapsulation being initiated at approximately 43,000 feet on warning light actuation. Rapid recompression inherent in capsule pressurization was also evaluated as was the rapid decompression resulting from capsule door seal deflation preparatory to egressing from the capsule at 40,000 feet. All aspects of capsule operation at simulated altitude are discussed including biomechanics of capsule operation, noise levels, recompression-decompression rates and respiratory and pressure adequacy. Physiological data such as EKG and arterial blood oxygen saturation are examined in relation to simulated emergency pressure environments.

1,144

RAF Physiological Research Unit 1941 FLIGHT TESTS ON FRANK'S HYDROSTATIC SUIT.
(RAF Institute of Aviation Medicine, Franborough) FPRC No. 339. 30 July 1941.

ABSTRACT: Four subjects tested FFS in planes. They reported that the suit caused no severe discomfort or incovenience in climbing in and out of planes. Vertigo occurred when looking back under 6 "g". Complete visual protection was obtained up to 8 to 9 "g" for about 10 seconds.

1,145

RAF Physiology Lab. 1941 FRANKS' SUIT: PROGRESS
F.P.R.C. Report No. 339a, October 1941

1,146

RAAF Flying Personnel Research Committee 1941 LETTER FROM RAAF FLYING PERSONNEL RESEARCH COMMITTEE TO AIR LIAISON OFFICER, AUSTRALIA HOUSE 3 OCT. 1941. WAM-101-1, FPRC No. 358 (b)

ABSTRACT: Reports that Cotton suit gives protection up to 9 to 10 "g".

1,147

RAF 1942 AIR MINISTRY PAMPHLET NO. 141.
(1st Edition, 1942) Franks Flying Suit--Mark II.
Cited Kennedy, W. A. et al. 10 April 1944.

1,148

RAF Physiological Lab. 1942 DEVICES FOR PROTECTING PILOTS FROM THE EFFECTS OF HIGH ACCELERATION WITH PARTICULAR REFERENCE TO TRIALS OF THE FRANK'S SUIT. (Farnborough) FPRC No. 498, 20 Nov. 1942.

ABSTRACT: At 8 "g", 250,mm Hg aortic blood pressure is needed for clear vision at 20 "g", 625 mm. The heart has difficulty in contracting against even 200 mm Hg.

Service trials of FFS in planes show one to two "g" increase in tolerance. Farnborough experimental trials always show 2 "g" increase, often 4.5 to 8 "g" increase with experienced subjects when 3/4 to 1 3/4 gallons of water are used in the suit.

Pilots complain of loss of "feel" when wearing suit. The danger of pilot's exceeding "g" load of plane is evident. It is recommended that pilots not be protected beyond 6 "g" and that FFS never be used in planes not cleared for 9 "g"

Advantages of FFS is that pressure gradient is produced automatically and independently of any external control.

1,149

RAF, Physiological Laboratory 1942 DEVICES FOR PROTECTING PILOTS FROM THE EFFECTS OF HIGH ACCELERATION WITH PARTICULAR REFERENCE TO TRIALS OF THE FRANKS SUIT. (R.A.F. Physiological Laboratory) F.P.R.C. 498 (National Research Council, Canada) Report #C-2853, 20 November 1942.

ABSTRACT: A brief review is made of the physiology of blackout and the principle of protecting man against it by prevention of venous pooling. The Franks suit is now developed to a state where large scale production is possible. It is the most effective anti-G device available. It is felt that the use of Franks suit should be considered not only on account of the absolute G threshold achieved but also the gain in fighting efficiency at 4 - 5 G. It is clear from the trial reports that all users of the suit are struck by the comfort ease of control and normality of vision under G values which without the suit are tolerated but with some impairment of efficiency. If the suits are widely used the additional strain placed on the heart will need careful observation. The suits should not be used except in aircraft cleared to at least 9 G.

1,150

RAAF, Flying Personnel Research Committee 1942 NOTE OF PROGRESS OF THE PNEUMODYNAMIC SUIT. (EXTRACT FROM AUSTRALIAN FLYING PERSONNEL RESEARCH COMMITTEE REPORT, F.R. 27) FPRC Report 407-a, December 1942.

1,151

RAAF, Flying Personnel Research Committee 1943 TRAINING AND SELECTION OF AIRCREW FOR SPECIAL DUTIES, ON THE EFFECTS OF HIGH "G" AND THE USE OF C.A.A.G. SUIT. Min. Comm. Anti-G Problems Research, Appendix A, FPRC, RAAF - FR 49, 15 June 1943.

1,152

Randall, F.E. 1944 PRONE POSITION
(U.S. AAF Materiel Center, Engineering Div., Aeromedical Laboratory) Memo. Rept. ENG-49-695-32P, 25 Feb. 1955

ABSTRACT: Beginning with a base platform a series of tests was run on the best positions. It was found that a variable adjustment for the chest offered the best concession to individual likes and dislikes. Comfort was a function of liking the position plus time spent in the given position. Periods up to one hour were spent without undue fatigue, providing a head sling was provided. Thus, an adjustable head sling was rigged to aid the individual in holding the head in such a position as to look forward without undue strain on the dorsal

In an emergency, inflation of the suit and delivery of oxygen under pressure occur automatically. The fully inflated suit causes moving limitations. The effect, together with the fatigue caused by the pressure breathing, limits wearing of the inflated suit to brief periods. Also the manufacturing of the suit is described. The material is nylon-cotton of light weight which are porous enough for adequate ventilation.

1,158

Range, R.W. 1944 SANITARY PROBLEMS IN TRANSPORTING THE SICK AND WOUNDED BY AIR (PART 6 OF 6 PARTS) (HYGIENISCHE FRAGEN BEIM KRANKEN - UND VERWUNDETENTRANSPORT MIT DEM FLUGZEUG)
ASTIA ATI 59290

ABSTRACT: Sanitary problems in transporting the sick and wounded by air are discussed and illustrated by describing the Ju-52 ambulance airplane, which has a capacity of 15 wounded and 4 crew members. The airplane was equipped with litters, safety belts, medical instruments, bandages, and oxygen tanks, as well as lavatory facilities and bed pans. The temperature of the cabin, which was sound-proofed against engine noise, was regulated according to the need of the sick. Facilities for hot and cold beverages for the wounded were provided. Patients infected with contagious diseases were not allowed to be transported with other sick or wounded. No dogs or other animals were allowed.

1,159

Raulston, B. O., & C. F. Lombard 1951 PHYSIOLOGICAL, BIOCHEMICAL, AND ANATOMICAL EFFECTS OF ACCELERATION ON THE BODY RELATIVE TO PILOT POSITION IN HIGH SPEED AIRCRAFT. (Dept. Avia. Med., Univ. of Southern Calif.) Final Rept. M-35-51 (Apr. 9, 1946 to Aug. 31, 1950) 10 July 1951.

1,160

Rawlins, J. S. P. 1953 DEVELOPMENT OF A FLYING HELMET AND OF A PROTECTIVE HELMET.
(Flying Personnel Research Committee, Gt. Brit.) Rept no. FPRC 847, Aug 1953 19 p. AD 30 749

Summary: A new protective helmet was designed which uses four layers of continuous filament nylon with an extra layer 2-inch wide coronally across the forehead and another wedge-shaped layer extending backward over the frontal area, and with a final layer of staple weave on the outside. An inner padding of 3/8-inch layers of medium-and soft-density polyvinyl chloride comented together is provided for the frontal region. The harness is made of nylon tape of 1000-lb. breaking strain which has the property of stretching under tension.

A flying or inner helmet is designed (Type-F) which incorporates noise-excluding capsules. A flat telephone comparing well with the Type-32 was found acceptable for use with the helmet. A smaller, lighter telephone is being investigated. A connecter will be provided which is covered with conventional braided cotton insulation and leaves the helmet at the rear. A new oxygen-mask clip is described which permits easy attachment and detechment with one hand. The helmet was subjected to wind and impact tests as well as actual service trials. Results indicated that the inner helmet was intirely satisfactory; the outer helmet was satisfactory from the point of view of shape and weight, but deficient as far as accuracy of fit was concerned. Results of study of both head sizes and helmet sizes indicated tha, owing to shrinkage during casting the outer shell in manufacture, differences as great as 0.5 inch in diameter were present.

1,161

Rawlins, J. S. P. 1955 UNDERWATER ESCAPE
Flight Deck, Winter Issue

1,162

Rawlins, J.S.P. 1956 DESIGN OF CRASH HELMETS.
The Lancet, 6 Oct. 1956

ABSTRACT: Most present-day crash helmets are based not upon scientific theory but upon established lines which have resulted from mis-interpretation of the mechanism of head injury.
When the physics of head injury are studied, it is immediately clear that a theoretically sound helmet is neither difficult to design nor necessarily expensive to manufacture.
Although the shape and details of a properly designed crash helmet may vary with the purpose for which it is intended, its basic properties will always be the same-resistance to penetration, resistance to deformation, reduction of accelerations, and absorption of kinetic energy.

1,163

Rawlins, J.S.P. 1956 INVESTIGATION INTO PROBLEMS OF ESCAPE FROM A SUBMERGED N-139 AIRCRAFT.
(Inst. Aviation Med., R.A.F., Farnborough) FPRC Rept. No. 994, Dec. 1956.

1,164

Rawlins, J.S.P. 1958 UNDERWATER EJECTION. Flight (8 Aug 1958): 195-196.

ABSTRACT: This article gives a factual account of a series of practical investigations into methods of escape from submerged aircraft - in particular, use of the ejection seat in aiding such escapes. Sometimes as a result of official secrecy, but often because of the reticence and modesty of the participants, hazardous experiments of this kind go unpublizied.

1,165

Rawlins, J. S. 1961 A SYSTEM FOR ESCAPE FROM SUBMERGED AIRCRAFT. Rev. Med. Aero (Paris) 2:197-200, Dec. 1961

1,166

Rawlins, J. S. 1963 A SYSTEM FOR ESCAPE FROM SUBMERGED AIRCRAFT. Industr. Med. Surg. 32:73-75, Feb. 1963.

1,167

Ray, J. T., & J. I. Niven 1951 THE PERCEPTION OF THE VERTICAL. XII. THE POINT OF SHIFT FROM VISUAL TO POSTURAL FRAMES OF REFERENCE. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.21., 8 Feb. 1951

1,168

Redden, R. J. 1961 URINE COLLECTION AND DISPOSAL DEVICE FOR PRESSURE SUIT. (International Latex Corp., Dover, Del.) Contract AF 33(616)7344, Proj. 7164; ASD TR 61-329; ASTIA AD-267 150; Aug. 1961

ABSTRACT: The design, fabrication, and testing of a urine collection and disposal system, to provide a means to remove urine from within a full pressure suit during long periods of use, in a weightless environment, and to provide a means of sampling each individual specimen of urine, are discussed. The prototype system consists of three basic parts: (1) a urinal to collect the urine within the suit, (2) a valve to allow removal of the urine from the suit, and (3) a collecting bag with valving to provide for disposal of the urine. The testing program provides a means of checking conformance to the design objectives as far as possible in the presence of gravity. Tests were performed both with and against gravity. Some of the components, designed for optimum performance in a weightless condition, could be adequately tested only under that condition. Weightless tests were not conducted. (AUTHOR)

1,169

Reed, N.W. 1949 REDESIGNED PILOT'S SEAT (105-9533904) ULTIMATE STRENGTH TEST-MODEL L-13 (LIASON) AIRPLANE. (Consolidated Vultee Aircraft Corp., San Diego Div., Calif.) ASTIA ATI-80029, August 1949

ABSTRACT: An ultimate strength test was conducted on the redesigned pilot's seat of the L-13 liaison airplane. The seat was attached to tubular supports by means of wedjit brackets welded to a steel plate fastened to the jig bed. Loads were applied in increments of 15% up to proof load. After application of proof load, the load was removed to read permanent set deflections and to look the seat over for visible set. The seat was then loaded in increments of 10% to design ultimate load. The seat withstood the specification loads satisfactorily and is therefore considered structurally adequate.

1,170

Rehman, I. 1962 MULTI-DUTY HELMET (U.S. Patent 3,030,627, April 24, 1962)

ABSTRACT: A multi-purpose helmet is described and illustrated which is adapted to be fitted to the individual head. It is composed of both rigid concave and resilient flexible concave members.

1,171

Reihm, H.D. Jr., 1962 HELMET IMPACT TESTS. (Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio) MRL-TDR-62-19. April 1962. ASTIA AD 283950

ABSTRACT: Several helmets, designed and tested to determine which shell thickness and which type of suspension afford maximum protection during high-energy collisions and provide comfort during normal use, are discussed. There are many factors which influence the design of a satisfactory crash helmet; however, a combined analysis of three of its basic properties-reduction of acceleration, reduction of the rate of onset of acceleration, and the absorption of kinetic energy-is sufficient to reveal the relative performance of each helmet design. Tests which determine these basic properties are discussed. An analysis of the data correlated in graphical form shows an optimum helmet thickness and most satisfactory suspension system of those studied.

1,172

Reininger, E., E. T. Carter and others 1958 CARDIOVASCULAR EFFECTS OF A PRESSURE SUIT ON THE DOG. WADC TR 57-700; ASTIA AD 155 662.

ABSTRACT: The purpose of this study is to evaluate the efficiency of a specially constructed altitude suit for dogs. Thirteen animals were fitted with this suit and four of them served as controls. Control experiments were differentiated solely by the preclusion of pressurization of the suit. Physiological evaluation of this pressure suit was accomplished by observing the general hemodynamic effects of the device when activated. It was observed that even while the animals were at ground-level, pressure breathing with this particular suit resulted in a marked depression of cardiac output. This effect was associated with a decrease in systemic blood pressure and a rise in central venous pressure. It also appeared that, in spite of fairly efficient application of counterpressure over the torso, poor pressurization of the neck and limbs probably limits and general efficiency of the suit. Certain modifications of the suit were recommended to improve its effectiveness as a counter-pressure garment. (Author)

1,173

REM, Inc. 1959 A PROPOSAL FOR RESEARCH AND DEVELOPMENT IN THE COMBINED ACCELERATION-VIBRATION PROBLEM, PARTICULARLY FOR CREWMAN PROTECTION IN SPACE VEHICLE SEATING SYSTEMS
(REM, Inc., Portland, Oregon) Letter #311. 23 July 1959.

1,174

Renbourn, E. T. and H. C. W. Stockbridge 1961 WAR OFFICE CLOTHING AND EQUIPMENT PHYSIOLOGICAL RESEARCH ESTABLISHMENT. Ergonomics (London) 4(1)73-79. Jan. 1961.

1,175

Rex, Martin A. 1960 FINAL SUMMARY REPORT ENGINEERING AND FABRICATION SERVICES FOR FREE FLIGHT TESTS OF AIRCRAFT CATAPULTS
(American Machine & Foundry Co., Niles, Illinois for Frankford Arsenal, Philadelphia 37, Pa.) Contract DA 11-022-507-ORD-3049 AMF Project MR1098, May, 1960, ASTIA AD 238 141

ABSTRACT: The engineering and fabrication services program was provided by the American Machine & Foundry Company under contract for Frankford Arsenal. The program was broken down into four ventures, namely, Venture No. 1 the Design and Assembly of a Parachute Recovery System for Tests Seats: Venture No. 2, the Design, Modification, and Assembly of three Catapults T18 with cartridge for each; Venture No. 3, The Design and Fabrication of three Free-Flight Test Seats; and Venture No. 4, the Performance of a Test Firing Program using the Catapult T18 and the Rocket Catapults.

1,176

Reynolds, John P. 1951 TESTS ON GUN, DELAYED FIRING, DRAG PARACHUTE EJECTOR, & EJECTION SEAT - AND APPENDIXES A AND B - MEMORANDUM REPORT ,(Weapons Components Div., Wright-Patterson Air Force Base, Dayton, Ohio) Serial No. WCEE-672-145B3-2 ASTIA ATI 116 632

ABSTRACT: This is a report of tests conducted to check the operation and performance of the delayed firing, drag parachute ejector gun submitted by Picatinny Arsenal on Contract (33-038)-49-1969-E for use on the ejection seat.

1,177

Rhein, L. W. & E. R. Taylor 1962 INCREASED SKELETAL MUSCLE ACTIVITY FOLLOWING IMPACT. (Aeronautical Research Lab., Holloman AFB, New Mex.) Report No. ARL-TDR-62-26, Dec. 1962.

1,178

Rhoads, C. S. 1950 EFFECTIVENESS OF EJECTION SEAT TRAINING WITH SPECIAL REFERENCE TO SDC DEVICE NO. 6EQ-2. (Richardson, Bellows, Henry, & Co., Inc.) Technical Rept. No. SDC 383-5-1, ASTIA ATI 91 514.

ABSTRACT: Investigations were made of the effectiveness of an indoctrination program and the relative effectiveness of the SDC Device no. 6EQ-2 and the Research Tower in improving pilot attitudes toward the use of ejection seats. The indoctrination program comprised a lecture by a flight surgeon, a training film, and ejection on either the Research Tower or Device 6EQ-2. The Research Tower, developed in England, consists of a typical ejection seat which travels upward 45 ft. or more on a 100-ft. rail when a standard ejection cartridge is exploded beneath the seat. Device 6EQ-2 was designed to be mobile, reduce ejection-seat travel to 12 ft., and provide procedural training by including a dummy cockpit. The attitudes of 82 Navy and Marine pilots toward the use of the ejection seat were measured by a questionnaire survey before and after ejection-seat training. One group received training on the Research Tower and the other on the SDC trainer. Similar pretraining data for a group of reserve pilots were used for comparison. The 2 training devices proved equally effective. In general, the attitudes expressed toward the use of the ejection seat were more favorable after the training program than before. However, little or no change in the more personal attitudes was noted. A copy of the attitude questionnaire is included.

1,179

Rhodes, R. P., & R. G. Gilbert 1956 REPORT ON HOOD AND HATCH UNDERWATER JETTISON TRIALS. (de Havilland Aircraft Co.) Sept. 1956

1,180

Richards, M. A. 1962 ANALYSIS OF A HIGH SPEED ENCAPSULATED SEAT CREW ESCAPE SYSTEM FOR ZERO SPEED AND ZERO ALTITUDE CAPABILITY. (Weber Aircraft Corp., Burbank, Calif.) Contract AF 33(616)7923; Proj. 1362; ASD TDR 62-242; ASTIA AD-284 455; Aug. 1962

ABSTRACT: The equations of motion for six degrees of freedom of a high speed encapsulated crew escape system were developed and formulated into the analog computer. The computer study revealed bad lateral response primarily due to downstream divergence effects on the towed drag body stabilizer. Longitudinal G loads were marginal or unacceptable at 800 kn E. A. S. depending on Mach number. Lateral G loads in the transonic range were generally severe and not acceptable. A thrust to c.g. misalignment of 1.5 in. caused erratic trajectories at low speeds but was negligible at high speeds. An improved system employing a flat platyrrhin forebody with longitudinal and lateral spoilers coupled with two downstream surfaces that behave like lateral afterbodies was introduced. For improving thrust "self seeking" nozzle sensitive to coriolis acceleration of the rocket exhaust was proposed. A technique for estimating human tolerance limits to simultaneous longitudinal and lateral acceleration was developed. (AUTHOR)

1,181

Richardson, Bellows, Henry and Co. 1950 EFFECTIVENESS OF EJECTION SEAT TRAINING WITH SPECIAL REFERENCE TO DEVICE 6-EQ-2 (Office of Naval Research. Special Devices Center, Port Washington, N.Y.), Report no. 383-5-1, November 1950.

1,182

Richter, G. EFFECT OF FORCES ON A CATAPULT SEAT: MEASUREMENTS MADE IN THE HIGH-SPEED WIND TUNNEL OF THE D.V.L. (Kraftmessungen an einem Katapultsitz im Hochgeschwindigkeitswindkannel der D.V.L.) ASTIA ATI 51053

ABSTRACT: A model of a seat with pilot on it was tested in a wind tunnel to determine air forces, air moments, and the influence of the Mach number in order to furnish data for the calculation of the flight path and the twist moment of the seat after it has been catapulted. A forward twist has to be avoided because in this position, high accelerations can not be endured by the human body.

The scale of the model was 1:3 with four different prolongations of the back rest. Lift resistance and moment were measured at various angles of rotation and at various Mach numbers. Schlieren pictures were taken at the highest Mach numbers. Contrary to the lift and resistance, the twist moment is largely dependent upon the prolongation of the back rest. At high Mach numbers, the moment is influenced favorably, the lift is not influenced, and the resistance increases rapidly after M = 0.7. At large angles of rotation, the prolongation of the back rest does not influence the aerodynamic forces considerably. The moment was positive, i.e., twisting in a favorable sense at all rotation angles and velocities only at the largest back rest prolongation. Secondary drive and resistance moderately increase with prolongation. The influence of the Mach number did not manifest itself clearly.

1,183

Richter, H. 1940 PHYSIOLOGISCHE BETRACHTUNGEN UEBER DAS SITZKATAPULTIEREN (Physiological Analysis of the Effects of Catapulting by an Ejection Seat) July 1940. ASTIA ATI 60910

ABSTRACT: The physiological effects of catapulting flying personnel by means of an ejection seat from the He-280 jet fighter were investigated. The seats were released at accelerations of 10 and 12 g. Possible injuries are compression of the spinal column, brain concussion, hemostatic effects and injuries to the inner ear. Cardiograms were taken before the seat was catapulted, during ejection and after the seat was stabilized. In order to avoid possible bodily injuries, it is recommended that the catapult of the ejection seat be made with the pilot in a prone position, in which accelerations up to 16 g can be endured without ill effects.

1,184

Richter 1940 SCHUSSVERSUCHE MIT DEM KATAPULTSITZ (Ejection Seat Test) Oct. 1940. ASTIA ATI 51210

ABSTRACT: An evaluation was made of ejection tests with a German Heinkel catapultseat, and the method is given for determining the piston pressure, friction, acceleration and velocity. Graphical data represent ejection altitudes dependent on the piston pressure and the maximum accelerations acting on the catapult seat. At a known weight of the occupied catapult seat and the minimum ejection height expected, the minimum piston pressure and the acceleration acting on the body can be determined.

1,185

Richter, H., tr. J.B. Bateman 1945 CATAPULT SEAT He 280 (Ernst Heinkel Flugzeugwerke G.m.b.H., Seestadt Rostock, Research Civision) V.B. 3009, Pages A-17156 to A-17186, 21 Oct. 1940. Translated as Appendix 8 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High-Speed Aircraft ASTIA ATI No. 7245

ABSTRACT: The investigation dealt with the following subjects: 1) Testing of the catapult cylinder (drawing No. 280.101-25) 2) Tests on rapid opening valve, drawing No. 280.101-26. 3) Tests on compressed air cylinder with reservoir attachment, Drawing No. 280.101-14. 4) Experiments on ejection of sand bags from mockup He 280 (high speed moving pictures and indicator diagrams) 5) Seat ejections with human subjects on the inclined track (high speed moving pictures and indicator diagrams) together with various types of measurement of acceleration and electrocardiograms). (Author)

1,186

Richter, H., tr. J.B. Bateman 1945 EJECTION EXPERIMENTS WITH THE CATAPULT SEAT (Ernst Heinkel Flugzeugwerke (Seestadt Rostock) Research Division) V.B. 3009, Appendix 2, Pages A-17138 to A-17155, 7 Nov. 1940. Translated as Appendix 9 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High-Speed Aircraft ASTIA ATI 7245

ABSTRACT: Following upon the ejection experiments with sandbags, ejections of human subjects were undertaken with the cooperation of Professor Wacholder of the Physiological Institute, University of Rostock, and his assistant Doctor Aeffner. We made two experiments with Mr. Voss (VSA) and Mr Wegner (Statik); both subjects were ejected, the first at 12 and the second at 10 g. In each case electrocardiograms were recorded with electrodes on the right and left wrists. The procedure was first to record the heart beat before ejection, then during ejection, and finally once again some time after the completion of the ejection. The electrocardiograms obtained are recorded in Figure 5. Here, having discussed the matter with Professor Macholder, I wish to bring together a statement of all the processes which might cause injuries of any kind to experimental subjects in this work: 1) Compression

1,187

Rickards, M. A. 1957 A STUDY OF THE UNSTABILIZED AFT-FACING EJECTION SEAT. (Weber Aircraft Corporation, Burbank, Calif.) DR 5609

1,188

Rickey, K. L. and T. W. Temple 1962 RESEARCH ON AN ELECTRONIC INSTRUMENTATION SYSTEM FOR TESTING EMERGENCY CREW ESCAPE SYSTEMS (Technology, Inc., Dayton, Ohio) Contract AF 33(616)7440; Proj. 1360, ASD TDR 62-628, Aug. 1962, ASTIA AD-286 831

ABSTRACT: A complete instrumentation system is presented for testing escape capsules ejected downward from a test vehicle traveling at supersonic speeds and high altitudes. The capsule, which contains an instrumented 95th percentile dummy, is installed in an inverted position in the test vehicle, a modified MB-1 Pod, carried by a B-58 aircraft. Instrumentation systems are located in both the pod and the capsules. Instrument readings and the ejection sequence are recorded photographically in the pilot's station. A ground support console for ground checkout of the systems and an instrumentation trailer for "quick-look" receiving station capability were also developed. (AUTHOR)

1,189

Riddell, F.R. & R.W. Detra 1959 RETURNING ALIVE FROM SPACE (Avco Mfg. Corp., Avco Research Lab., Everett, Mass.)

ABSTRACT: The paper discusses three problems of re-entry: deceleration, heat, and terminal landing conditions. (CARI) Hypersonic gliders and pure drag re-entry vehicles are compared. The drag vehicle has inherent advantages over the hypersonic glider which are usually not generally observed.

1,190

Risinger, B.W. 1960 PILOT ACCELERATION PROTECTION IN THE INTEGRATED FLIGHT CAPSULE (Chance Vought Aircraft, Inc., Dallas, Texas) CVA EOR-12843, 31 March 1960.

1,191

Ritchie, M.L., C.A. Baker 1957 PSYCHOLOGICAL ASPECTS OF COCKPIT DESIGN - A SYMPOSIUM REPORT (University of Illinois & AML) Contract No. AF 33(616)-3000, TR 57-117, proj. & task: 6190-71573, 71556, April 1957, ASTIA No. AD-118079

ABSTRACT: This report contains the papers and discussions of the WADC symposium on the Psychological Aspects of Cockpit Design, which was held October 24, 25, 1956. Seven papers were presented which represent in-service and contractor efforts in the Air Force and the Navy programs to improve flight instrumentation. In addition to these papers a panel discussion was held on each of three subjects: "Problems and Methods in Cockpit Research", "Problems and Methods of Whole-Panel Flight Evaluation and "Whole-Panel Design Objectives to be met in Future Aircraft."

1,192

Roberts, J. F. 1960 REPORT OF PROJECT NR AB 3959 "USER TESTS OF THE SNAP FASTENER, STATIC LINE, CARGO PARACHUTE, DEVELOPMENTAL". (Army Airborne & Electronics Board, Fort Bragg, N. Carolina) 17 Oct. 1960

CONCLUSION: (a) The Snap Fastener, Static Line, Cargo Parachute, Developmental, is suitable for use with cargo parachutes and air delivery systems. (b) The Snap Fastener, Static Line, Cargo Parachute, Developmental, is unsuitable for use with personnel parachutes.
RECOMMENDATIONS: (a) That no further consideration be given to Snap Fastener, Static Line, Cargo Parachute, Developmental, in its present state of development (b) that a snap fastener suitable for use with personnel parachutes, cargo parachutes, and air delivery systems be developed. (AUTHOR)

1,193

Roberts, K. A. 1961 WE CAN BUILD A CRASH-PROOF CAR. SAGA, Oct. 1961. Pp. 17-21; 91-93.

ABSTRACT: This article contains a detailed report and illustrations of a "Magic Bumper", seat belt, and "Ensolite" which Professor James Ryan claims could prevent one-half of all injuries and deaths suffered in automobile accidents every year. The "Magic Bumper" absorbs collision shocks by hydraulic device and would cost less than fifty dollars a car installed. The seat belt adjuster allows passengers complete freedom of movement but cinches tight upon any impact. Unbelievable "Ensolite" 1-inch cushioning, proposed for padding inside cars, can absorb bouncing raw eggs without cracking them.

1,194

Roberts, L. B. & W. E. Mann 1945 SEATS FOR TRUCKS (4x4) 1/4 TON (PEEP) (Armored Medical Research Laboratory, Fort Knox) Project #5-12, February 1945.

1,195

Robertson, K.V. n.d. FLIGHT TRIALS OF C.A.A.G. SUIT. (Report, Comm. Flying Personnel Research) FPRC, RAAF -FR 97

1,196

Robertson, S. H., W. H. Shook & J. L. Haley, Jr. 1962 CRASH INJURY BULLETIN: MODIFICATIONS TO THE PASSENGER SEAT BELT TIEDOWN ATTACHMENTS IN THE U. S. ARMY HU-1 SERIES BELL IROQUOIS HELICOPTER. (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR 62-1, TCREC Tech. Rept. 62-45, May 1962.

ABSTRACT: Report is made of weaknesses in the occupant tiedown system in the HU-1 Series helicopter as disclosed by analysis of several accidents. A quick "off-the-shelf" interim fix is presented to make the existing system four times more effective.

A permanent fix is suggested that would ensure the strength of the tiedown to be equal to the seat-belt strength. (Author)

1,197

Robertson, S. H. 1962 DYNAMIC TEST OF AN EXPERIMENTAL TROOP SEAT. (U. S. Army Transportation Research Command, Fort Eustis, Virginia, contract with Aviation Crash Injury Research, Phoenix, Arizona) AvCIR 62-5; Contract DA 44-177-tc-802; TCREC TR 62-48; ASTIA AD-283 604L; June 1962

1,198

Roegner, H. F. 1960 CRASH INJURY EVALUATION: U. S. ARMY AO-1BF MOHAWK MOCKUP, BETHPAGE, LONG ISLAND, NEW YORK, 31 MARCH 1960. (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR-12-PV-117, TREC Tech. Rept. No. 60-45, August 1960

ABSTRACT: This report contains an evaluation of Grumman AO-1BF U.S. Army "Mohawk". The purpose of the evaluation was to: (1) Evaluate the overall crashworthiness of the basic aircraft structure. (2) Determine the existence, if any, of certain features which could lead to the unnecessary exposure of crew members to serious or fatal injury in the event of a survivable-type accident. (3) Make recommendations for remedial action in order to decrease the exposure of the crew members to certain injury causation factors. (4) If necessary, recommend additional crash safety design be integrated into the basi overall design of the aircraft. The above work was accomplished through a detailed crash injury evaluation of the entire aircraft, its components and equipment, in combination with references to technical manuals and personal contact with members of the Grumman engineering staff. This is the final repor on the crash injury evaluation.

1,199

Roegner, H. F. 1960 CRASH INJURY BULLETIN: PART I - ATTACHMENT OF SEAT BELTS IN THE HU-1A HELICOPTER; PART II - STOWAGE OF EQUIPMENT UNDER TROOP SEATS. (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR 69-0-120, September 1960, TREC Tech. Rept. No. 60-61

ABSTRACT: This report gives detailed instructions on the correct and incorrect method of installation of the seat belt in the HU-1A helicopter. In the second section, the stowage of equipment under troop seats is discussed. Accident experience with seats in this aircraft indicates that the seats will fail when under moderate crash loads. It is, therefore, important that the area directly beneath all occupied troop seats be kept free of loose equipment.

1,200

Roegner, H. F. 1960 IMPROPER INSTRUCTION IN THE USE OF SAFETY BELTS IN THE H-21 HELICOPTER MANUAL in Injury Prevention Bulletin. (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR-65-0-111, March 1960

ABSTRACT: This report contains two instruction bulletins to pilots on the aircraft seat and harness. One bulletin gives the correct instructions for fastening the seat belt and harness. The second bulletin gives improper and fatal instructions. The report emphasizes that to ensure full bodily restraint the safety belt must be drawn through the openings on both sides of the seat support structure before fastening.

1,201

Roegner, H.F., G.J. Walhout & J.D. Davenport 1961 CRASH INJURY INVESTIGATION: U. S. Army G-91 RECONNAISSANCE JET FIGHTER ACCIDENT, FORT RUCKER, ALABAMA, 1 FEBRUARY 1961. (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR 61-2, TREC Tech. Rept. 61-91, July 1961.

ABSTRACT: Report is made of crash injury investigation involving a U.S. Army G-91 aircraft to determine cause of fatality. Wreckage was examined at crash site, photographs obtained, and reconstruction of the approximate kinematics of the crash sequence made. It was concluded that the fatal injury was caused by a blow to the head and recommended that the ejection seat, since it is designed to provide safe escape at all altitudes and speeds, be utilized as an escape device in lieu of "riding the aircraft in" in a crash landing, with the exception, possibly, of crash landing on a well prepared surface or runway.

1,202

Rogers, K. 1943 STATIC TESTS OF PLYWOOD SEAT ASSEMBLY. (Boeing Airplane Co., Wichita, Div., Kans.) Report No. 75-6321 ASTIA ATI-104 192, March 1943

ABSTRACT: Tests were made to see if the seat was structurally satisfactory to meet the requirements and to determine the ultimate strength of the seat for the shoulder harness load.

1,203

Rohles, F. H., M. E. Grunzke, & H.H. Reynolds 1962 A DETAILED ACCOUNT OF CHIMPANZEE PERFORMANCE DURING THE BALLISTIC AND ORBITAL PROJECT MERCURY FLIGHTS. (6571st Aeromedical Research Lab., Holloman AFB, N. Mex.) Rept. No. ARL TDR 62-15; Proj. 6893; ASTIA AD-282 687; July 1962

ABSTRACT: The insults of prolonged periods without sleep, the suturing of the physiological sensors, and the long period of restraint before launch, did not affect performance during flight; this also appeared true of the prolonged breathing of 100 per cent oxygen under reduced atmospheric pressures for the time period of these flights. The noise and vibration accompanying launch did not affect performance during flight. Accelerations accompanying launch and re-entry in excess of 7 G's had an immediate effect upon performance; however, recovery to a prelaunch level appeared to be rapid. Adaptation to weightlessness took place during the long exposures to the weightless state, and re-entry accelerations did not have as severe effect upon performance as during the shorter flight. Eating and drinking were accomplished during weightlessness without difficulty. The visual processes, as measured, were unaffected by the rigors of space flight; this was also true of temporal response processes as well as continuous and discrete motor behavior. The pellet and water dispensers functioned properly during weightlessness. The chimpanzee appears to be a highly reliable subject for future space flights. (AUTHOR)

Two space flights with chimpanzees were made as part of the Project Mercury program. In the first flight the subject was placed through a ballistic trajectory and during the flight had to perform a continuous and discrete avoidance task. During a second flight in which the capsule orbited the earth twice, a chimpanzee had to perform a complex multiple operant task.

1,204

Rokhlin, G. A. 1959 AN AUTOMATIC PARACHUTE-CANOPY RELEASE Byulleten' izobreteniy 1959(15):69

ABSTRACT: A device for the stabilizing parachute of the ejection seat, actuated by dynamic air pressure. To lower the safe ejection altitude, by automatically selecting the most convenient operating moment when the parachute drag has reached its optimum value, the device is provided with an adjustable spring locked with the aid of a ball-type lock by a spring-loaded core. This core is connected by means of ball lock and a spring plug (whose tang is compressed by a brake ring with adjustable compression) with a rod with a lung on its end to which the parachute is fastened.

1,205

Rollings, W. 1950 SEAT INSTALLATION PILOT, CO-PILOT, JUMP AND REAR. (Bell Aircraft Corporation, Buffalo, New York) Report No. 48-909-011, ASTIA ATI-105794, May 1950

ABSTRACT: This is a detailed report of the following subjects: installation of the four-man rear troop seat; seat assembly jump; pilot and co-pilot seat assembly; and the Eraus Product Company Report #31.

1,206

Roman, P. 1958 SEMIRIGID ENVELOPE AS A MEANS OF PROTECTION FROM IMPACT. (Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC TR 58-123.

1,207

Roos, C. A. 1959 BIBLIOGRAPHY OF SPACE MEDICINE
U. S. Armed Forces Med. J. 10(2):172-217, Feb. 1959
See also National Library of Medicine, Washington, D. C., Public Health Service Publ. no. 617, 1958.

ABSTRACT: This compilation of 446 references covers aspects of space medicine such as sealed cabin problems, acceleration and deceleration, fractional and zero gravity, cosmic radiation, nutrition in space flight, survival problems, psychological and social problems, ground crew problems, and extraterrestrial aspects. Entries are arranged chronologically starting with 1958 and going back as far as 1928.

1,208

Root, D. M. 1958 SOME FUNDAMENTAL CONSIDERATIONS IN THE SELECTION AND DESIGN OF ESCAPE CAPSULES. (Paper, Society Automotive Engineers National Aeronautical Meeting, Los Angeles, Calif., Sept. 29 - Oct. 4, 1958)

1,209

Rose, B. and W.R. Martin 1942 REPORT ON THE VISIT OF LIEUTENANT T. FERWERDA, U.S. NAVAL AIR STATION, ANACOSTIA, D.C., TO THE ACCELERATOR HUT, NO. 1 C.I. U. MARCH 25 to APRIL 13, 1942, FOR THE PURPOSE OF TESTING OUT AN ANTI-G SUIT. (Min. Exec. Assoc. Comm. Aviation Med. Research, NRCC) Appendix D, July 1942

1,210

Rose, B., & Accelerator SectionStaff 1943 THE PROTECTION AGAINST G AFFORDED BY THE CANADIAN PROTOTYPE FRANKS FLYING SUIT AS ESTIMATED BY TESTS MADE IN THE CENTRIFUGE. (Rept. to Associate Committee on Aviation Medical Research, Nat'l. Research Council of Canada) NRC Grant No. AM5 Rept. No. 9, File No. A.H. 100-5, 1 Sept. 1943

1,211

Rose, B. 1944 PROTECTION AGAINST G AFFORDED BY THE CANADIAN PROTOTYPE FRANKS FLYING SUIT AS ESTIMATED BY TESTS MADE IN THE CENTRIFUGE. Proc. Assoc. Comm. Aviation Med. Research, NRCC, Appendix X, 29 September 1944

1,212

Rose, B., & W. K. Stewart 1944 REVIEW OF THE PRACTICABILITY OF AND NECESSITY FOR ANTI-G DEVICES IN THE RAF WITH PARTICULAR REFERENCE TO THE FRANKS' FLYING SUIT MK. III. (RAF, Institute of Aviation Medicine, Farnborough) FPRC 584, July 1944.

1,213

Rose, C. W. 1948 WHEN CAN WE STOP GUESSING ABOUT SAFETY BELTS? National Safety News, October 1948.

1,214

Rose, E.S. 1949 MODEL TESTS OF SEAT EJECTION FROM A FREE-SPINNING MODEL OF THE F-80A AIRPLANE. (Air Materiel Command, Wright-Patterson AFB, Ohio) ASTIA ATI-55252, May 1949

ABSTRACT: Model tests of seat ejection from the F-80 Airplane in spinning flight are described. These tests were conducted to determine the minimum distance by which the pilot and ejection seat avoid striking the aircraft. The test ejections were performed from a free-spinning model of the airplane The criteria of dynamic similarity for free-spinning tests are briefly discussed. Test results are presented, and the conclusion is drawn that the ejection seat is a possible means of pilot escape from the F-80A airplane, while in spinning flight.

1,215

Rose, H.W. & P.H. Ripple n.d. VISUAL PROBLEMS OF PILOT IN PRONE POSITION (USAF School of Aviation Medicine, Randolph Field, Texas) Proj. 21-24-011, Rept. No.

ABSTRACT: Visual problems imposed by the prone position in flight were investigated. Test persons were subjected to elevated gaze in a pront-position bed. Determination was made of their muscle balance, their ability to maintain elevated binocular gaze, and the lateral limits of their binocular vision during elevated gaze. During elevated gaze of 15 to 30 degrees, all the subjects experienced discomfort. With elevation of 20 degrees or more, the discomfort was serious, probably to the point that the subject could not perform with precision intricate tasks such as piloting aircraft.

1,216

Rose, H. 1945 PROOF TEST OF A GUNNER'S SEAT. (Douglas Aircraft Company, Inc., Santa Monica, Calif.) Report No. 9579, ASTIA ATI-104797, February 28, 1945

ABSTRACT: The subject seat was loaded to limit load in the belt load, and down load conditions, with the seat facing forward. It was then swiveled around to the aft facing position and re-tested. It again was satisfactory in the belt load condition, but failed to meet the down load requirements. After being redesigned somewhat, the seat was retested in the final condition, and proved satisfactory.

1,217

Rosenbaum, D. A. 1957 EXPLOSIVE DECOMPRESSION STUDIES WITH ANIMALS WEARING FULL BLADDER SUIT AND HELMET. (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 57-685; ASTIA AD-142 149; Nov. 1957

ABSTRACT: Studies on 17 dogs, wearing a full bladder suit and helmet while connected to an automatic oxygen regulator, show that no apparent residual pulmonary pathology results following explosive decompression (30 msec) through 10 psi and 14 psi.

1,218

Rosenbaum, D.A. 1958 EXPLOSIVE DECOMPRESSION OF ANIMALS WITH A FULL BLADDER SUIT (MC-4 TYPE), HELMET AND AUTOMATIC REGULATOR Jour. Aviation Med., 29(3): 248, March 1958

ABSTRACT: Studies were conducted of unanesthetized dogs decompressed from ground level or 8,000-65,000 feet to 72,000 feet in 30 milliseconds. The animals wore a

l bladder pressure suit and full head helmet, and breathed from a modified MB-2 ulator. Pathologic examination revealed little or no pulmonary damage, and no inical abnormalties were observed. Transient atelectasis probably occurred, but "blown-out" by the high breathing pressure.

219

senberg, I. 1962 TESTS OF PARACHUTE ASSEMBLY AND ATTACHED SURVIVAL KITS USED WITH THE F-106 MODEL "B" EJECTION SEAT. (Air Force Flight Test Center, Edwards AFB, Calif.) ASTIA AD-272 178, February 1962

BSTRACT: This report presents the results of functional suitability tests onducted on parachute assemblies and attached survival kits as used with he F-106 Model "B" Ejection seat. Fifty-eight test were made during the rogram.

t was determined that the kits can be retained during exposure to wind-last at indicated airspeeds up to 450 knots at 1000 feet altitude, and that he deployment line between the drag chute and the main canopy can damage he parachute pack.

,220

oss, H. E. 1961 A "SIT-ME-DOWN" SPACESUIT Spaceflight 3(4):151-152, July 1961

ABSTRACT: A list of problems involved in the designing of space suits, and the author's criticism of present designs are presented. (JPL)

1,221

Ross, J. C., G. D. Ley et al 1962 INFLUENCE OF PRESSURE SUIT INFLATION ON PULMONARY DIFFUSING CAPACITY IN MAN. In J. Appl. Physiol. 17:259-262, March 1962.

1,222

Ross, Malcolm D. 1958 NAVY INTERESTS IN SEALED CABINS (American Rocket Society) Pub. No. 694-58

1,223

Rossbacher, R.I. and G.W. Baker 1962 STATUS SUMMARY OF FEASIBILITY STUDY OF SHAPED CHARGE SEPARATION OF THE AIRCRAFT FLIGHT CAPSULE II (Naval Weapons Lab.) NWL Report No. 1790 Jan 23, 1962

ABSTRACT: Developments since the aircraft feasibility experiments of 1959-60 are summarized. Materials and assembly techniques have been developed which have been functionally tested and are considered likely to prove serviceable. Light weight laminated plastic structures have been developed which will contain the back blast. Additional safety tests are reported.

1,224

Roth, H., C.F. Lombard, A.G. Gross and A.Z. Klain 1948 STUDIES OF NEW MATERIALS FOR CONTROLLED IMPACT ENERGY ABSORPTION. (Paper, nineteenth annual meeting of the Aero-Medical Association, Toronto, Canada, June 1948) Department of Aviation Medicine, University of Southern California. Contract N6ori77, Task 1, 31 March 1951.

ABSTRACT: Utilizing newly developed impact-test apparatus enabling greatly improved resolution of force-time relations during impacts, preliminary studies were made of various materials which might find application in the protection of the human body (especially the head) against impact forces. Both theoretical analysis and experimental results demonstrated that low-density materials exhibiting largely non-resilient behavior under impact forces have definite value in design of protective equipment.

1,225

Roth, H P., C.F. Lombard, A.G. Gross, A.Z. Klain & S.W. Ames 1949 IMPACT ACCELERATION OF THE HUMAN HEAD USING PROTECTIVE HEADGEAR. (Dept. of Aviation Med., University of Southern Calif.) Proj. Nr 161 014 Progress report. 18 March 1949.

1,226

Roth, H. P., C. F. Lombard, A. G. Gross and A. Z. Klain 1951 STUDIES OF NEW MATERIALS FOR CONTROLLED IMPACT ENERGY ABSORPTION (Office of Naval Research, Washington, D. C.) March 1951 Contract N6ori77.

SUMMARY: Utilizing newly developed impact-test apparatus enabling greatly improved resolution of force-time relations during impacts, preliminary studies were made of various materials which might find application in the protection of the human body (especially the head) against impact forces. Both theoretical analysis and experimental results demonstrated that low-density materials exhibiting largely non-resilient behavior under impact forces have definite value in design of protective equipment.

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hwell, W.S. and E.G. Sperry 1952 FOOTRESTS ON UPWARD EJECTION SEATS. (Wright Air Development Center, Wright-Patterson AFB, Dayton, Ohio) WADC Technical Report 52-208, ASTIA ATI 184800, September 1952

TRACT: Tests were conducted to determine the importance of footrests on ction seats, using a 100 foot vertical ejection seat test tower and a k-up which simulated the control wheel, instrument panel and rudder pedals the B-47B pilot's position.

e paths followed by the toes and knees during ejection were varied by chang- the catapult, size and weight of shoe and position of the leg at the time ejection.

ree principle test conditions were studied:

a. Footrests removed, feet extended on rudder bar.
b. Footrests removed, feet retracted against seat.
c. Footrests in place, feet extended on rudder bar.

ults were recorded by (a) high speed motion pictures, (b) accelerometers ced on the man's hip and on the seat, and (c) time and distance magnet splacement to measure velocity. The subject was briefly examined before d after each test.

is recommended that footrests be included on all ejection seats, to pportleg weight below the knees and to provide about 3 inches additional ee clearance during ejection.

is further recommended that sharp leading edges on footrests be avoided order to eliminate the possibility of leg injury when the feet are not sitioned during ejection.

e security classification of the title of this report is Unclassified.

,228

othwell, W. S. and E. G. Sperry 1953 ESCAPE FROM AIRCRAFT BY DOWNWARD EJECTION
J. of Aviation Medicine 24(4):322-327 August 1953

ABSTRACT: In certain aircraft downward ejection offers advantages insofar as avoidance of fixed obstacles within the cockpit or on the upper surfaces of the fuselage is concerned. It is also desirable in multiplace jet aircraft to have some crew members eject downward in order to avoid the collision hazard which might exist if all used upward ejection. The absence of protruding structures on the under surface permits the use of lower ejection velocity which may be attained with an acceleration within physiological tolerance limits for negative G. However, special problems exist regarding harness suspension and support of the extremities.

1,229

Rowen, B. 1961 BIOASTRONAUTICS SUPPORT OF THE X-15 PROGRAM. (AF Flight Test Center, Edwards AFB, California) Rept. No. FTC TDR 61-61. ASTIA Doc. No. AD-268 665.

ABSTRACT: One objective of the X-15 program is to obtain the pilot's physiological response to flight at increased speed and altitude. This objective is accomplished with the pilot wearing the new A/P 22S-2 full pressure suit in eighteen X-15 operations. The suits were evaluated for a flight time of 171 hr and a ground time of 554 hr. The A/P 22S-2 has major improvements over the original MC-2 full pressure suit with respect to increased visual area, ease of donning, and removability of gloves. A new system of electrical connections was installed through a pressure seal to facilitate data acquisition and to void the older snap pad arrangement used in the MC-2 suit. Flight test data showed that the continuous electrical lead has greatly increased reliability in data acquisition.

1,230

Roxburgh, L.H.L. 1947 A REVIEW OF ENVIRONMENTAL FACTORS AFFECTING COMFORT IN AIRCRAFT (Flying Personnel Research Committee, Farnborough, England) RPRC 686 June 1947 ASTIA ATI 96436

ABSTRACT: (1) The factors to be considered in air conditioning of an aircraft are reviewed and, where these differ from ground practice, are discussed in more detail. (2) Possible solutions to the problems of rapid climatic change are indicated. (3) An assessment is made of the desirability of air recirculation

1,231

Roxburgh, H. L. & J. Ernsting 1956 THE PHYSIOLOGY OF PRESSURE SUITS. (Inst. Aviation Med., R.A.F., Farnborough) FPRC Rept. No. 983, Nov. 1956

1,232

Roxburgh, H. L. 1961 BIOLOGICAL PROBLEMS OF ESCAPE AT HIGH ALTITUDES. In Bergeret, P., ed., Escape and Survival: Clinical & Biological Problems in Aero Space Medicine. (London, New York, Paris: Pergamon Press, 1961) AGARDograph 52. Pp. 1-4. ASTIA AD 261 881

ABSTRACT: Experimental work of a biological nature on escape at high altitudes is difficult to undertake, for stresses are involved which cannot be simulated in combination on the ground. At the present time, by far the most important means of escape from aircraft is the ejection seat. Escape by ejection seat at high altitude exposes the man to a series of physical insults about which our knowledge is oncomplete. Of particular interest are the following subjects: decompression, cold, and anoxia.

1,233

Royal Aircraft Establishment 1953 PARACHUTE TESTS IN AFRICA (AUTUMN, 1952)
Royal Aircraft Establishment, Farnborough) Interim Rept., M.E. Dept. Test Note

1,234

Rudeseal, P. R. 1954 HUMAN SUBJECT DOWNWARD EJECTION SEAT TESTS FROM B-47 AIRCRAFT
(Directorate of Flight and All-Weather Testing, Wright-Patterson Air Force Base, Ohio)
Tech. note no. WCT-54-100 Nov. 1954 ASTIA AD 88 324

ABSTRACT: "A series of downward seat ejection tests were conducted from the navigator-bombardier position with human subjects of a B-47 aircraft to demonstrate that this was a safe method of escape. Prior to conducting the tests with human subjects, a series of tests were performed with instrumented anthroprometric dummies to measure the force on the hands tending to break the handgrip during ejection. After the forces were determined, a shock absorbing device was installed in the handgrip system which enabled human subjects to be ejected at 425 knots IAS from 10,000 feet without injury. This proved that downward seat ejection was a feasible means of escape up to 425 knots IAS from the B-47 aircraft." (DFAWT summary)

1,235

Rudolph, J. 1952 STATIC TEST-PROTOTYPE 32G EJECTION SEAT AND RAILS-MODEL F-94C. (Lockheed Aircraft Corp., Burbank, Calif.)
Report No. 8667, July 3, 1952. ASTIA ATI 162 996

ABSTRACT: At the request of the F-94C Project Structures Engineer, static tests were conducted on the 32 G ejection seat rails. The seat was in the fully extended position during the tests. Inertia, catapult, and air loads at both low and high airplane speeds were simulated. Attention was given to the effect produced by the offset catapult.

1,236

Rudoy, B.L. 1963 THE SUIT OF THE COSMONAUT
(Translation Services Branch, Foreign Technology Div., Wright Patterson AFB, Ohio)
FTD-TT-63-189/1 28 Feb. 1963 ASTIA AD 299 858
Original Source: Russian Book: Novaya Zhizn'Stekla, Series IV, Tekhnika, Nr. 2, 1963, pp. 27-28.

ABSTRACT: The cosmonauts suit must protect him from extremely high temperatures and from radiation and gamma rays. Such a suit will be made of glass fiber fabric coated with a thin layer of aluminum. The surface of such an ultra-light weight suit reflects about 90% of the entire irradiating heat, and the remaining part of the heat is scattered in the glass fiber layer.

1,237

Ruff, S. 1937 KOPFVERLETZUNGEN BEI FLUGUNFÄLLEN, IHRE ENTSTEHUNG UND MOGLICHKEITEN ZU IHRER MINDERUNG (Head Injuries During Flight Accidents, Its Origin and Possibilities to Its Decrease)
Luftfahrtmedizin 1: 355-360

1,238

Ruff, S. 1937 UNFALLERFAHRUNGEN (Protection Against Possible Injuries Caused by Airplane Crashes) Part V of 10 parts.
March 1937. ASTIA ATI 60742

ABSTRACT: Protective measures against possible injuries to flying personnel by airplane crashes were investigated. Statistics show an overwhelming number of head injuries in airplane crashes. The causes of the injuries were investigated, and suggestions for the protection of personnel are presented. It is suggested that in addition to the crash-helmet, the pilot should be fastened to the seat by several belts (one belt around the abdomen being insufficient) The back strap should be tight enough and fastened in such a manner as to prevent a forward surge of the body. Suggestions for cockpit-seat improvements are made.

1,239

Ruff, S. 1943 ATTEMPTS AT RESCUE FROM HIGH ALTITUDES. (Versuche zur Rettung aus grossen Hoehen) ASTIA ATI-55446,

ABSTRACT: A discussion is given of the possibilities of saving air crews after loss of cabin pressure at high altitudes. Light pressure-suits which automatically inflate after loss of cabin pressure, emergency dives to lower altitudes, and parachutes as rescue measures are considered. A parachute equipped with an oxygen breathing device, and an automatic release mechanism which opens the parachute at about 13,000 feet is suggested.

1,240

Ruff, S. & R. Schroedter 1957 EINE SCHLEUDER FUR BESCHLEUNIGUNGSUNTERSUCHUNGEN (A Catapult for Acceleration Tests)
Luftfahrttechnik Pp. 38-39

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f, S. 1958 ÜBER BESCHEUNIGUNGSUNTERSUCHUNGEN AM MENSCHEN (Concerning Acceleration Investigations on Humans)
tsche Versuchsanstalt für Luftfahrt Rept. 902

2

ckas, J. A. 1962 DEVELOPMENT OF FLYING OUTFIT, FULL PRESSURE, HIGH ALTITUDE TYPE A/P 22S-2.
(Aeronautical Systems Division, Air Force Systems Command, Andrews AFB, Washington, D. C.) AF33(600)36525, ASD-TR-61-469, March 1962.
ASTIA AD 329 373.

STRACT: Increased capability in range, altitude and speed of military aircraft ecessitated the development of an improved full pressure, high altitude flying tfit. This report describes the efforts, methods of approach and solutions o problems encountered in developing one type of pressure garment.

In addition to the changes in position of the diaphragm, pressurization of the anti-blackout suit increased the overall intrarectal pressure by an amount sufficient to support a column of blood from any point in the abdomen to a level above the diaphragm without a contribution by the vascular walls.

The overall increase in intrarectal pressure appeared to be produced by increased tension or stretching of the diaphragm.

The distance from the base of the heart to the base of the skull was reduced by an amount sufficient to provide a protection of about 0.5 g during exposure to 5 g.

In addition to this mechanism for protection there is probably an increase in blood pressure at heart level to account for the remainder of the protection produced by the anti-blackout equipment.

1,243

Russian Press 1937 RUSSIAN METHODS: PHYSICAL TRAINING OF FLYING PERSONNEL, GLIDER PILOTS AND PARACHUTISTS.
(RAF, Institute of Aviation Medicine, Farnborough)
FPRC Report 30,

1,244

Ryabchikov, Ye 1962 IN THE CITY OF "THE CELESTIAL BROTHERS" (Translation Services Branch, Foreign Technology Div., Wright-Patterson AFB, Ohio) FTD-TT-62-1583/1+4 9 Nov. 1962 ASTIA AD 292 600
Original Source: Pravda August 7, 1962, P. 4

ABSTRACT: This article gives a brief description of the temperature chamber, pressure chamber, and silence chamber used in the training of Russian cosmonauts. It also describes the cosmonauts' experiences in the centrifuge, weightless basin, and the training panel.

1,245

Ryan, J. J. & E. R. Podnieks 1958 SAFETY DEVICES FOR GROUND VEHICLES. (Automotive Safety Research Project, Univ. of Minnesota, Minneapolis, Minn.) USAF Rept., 31 July 1958.

1,246

Ryan, J. J., & E. R. Podnieks 1958 SAFETY DEVICES FOR AUTOMOTIVE VEHICLES. (Automobile Safety Research Project, University of Minnesota) 31 July 1958

1,247

Ryan, James J., and Egons R. Podnieks July 1958 FINAL REPORT OF RESEARCH ON SAFETY DEVICES FOR GROUND VEHICLES. (Air Force Missile Development Center, Holloman AFB, N. Mex., 31 July 1958)

1,248

Ryan, J.J., & J.P. Stapp 1959 HUMAN EXPERIMENTS ON AIR TRANSPORT CRASH PROTECTION. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: Modulated Deceleration. It has been found in experimental tests with human subjects on the principle of the hydraulic cylinder and piston for controlled attenuation that: (1) Hydraulic shock absorbers afford maximum protection to human occupants upon crash; (2) inherent design makes possible protection for different loads, speeds and displacements; and (3) maximum energy absorption is provided with minimum weight, complexity and modification.

Applicability on Air Transports. Although the human tests were made with the automobile as the research vehicle, including restraints accompanied by quick retraction of dangerous projections, the hydraulic energy absorber may be applied in air transport crash protection as follows: (1) attachment to seat tracks in a jet airliner; (2) distribution of absorber forces in aircraft structure; and (3) individual absorbers on seat supports. This paper includes calculations, designs and conclusions for maximum human protection in aircraft utilizing hydraulic shock absorbers. (J. Aviation Med. 30(3):201, March 1959)

1,249

Ryan, J. J. 1960 AUTOMATIC SEAT BELTS
(Univ. of Minnesota, May 9-11, 1960)

ABSTRACT: In this paper, it is suggested that if automatic seat-belts were installed in automobiles the public would be glad to utilize them as an injury prevention device. The automatic seat-belts are attached to the seat by a mechanism which continually keeps them retracted to the rear of the seat in proper position for immediate use. When the ends of the seat-belt on each side of the passenger are clasped and pulled forward slowly, the belt may be easily fastened in front. If the belt is pulled rapidly the automatic locking device clamps it. The driver is not restrained in forward, lateral, or rotary motion. When the buckle is released the two ends of the seat-belt retract to the back of the seat. If a sudden force is applied by the body on the seat-belt as in an accident the belt is locked tight and the passenger is restrained securely. Several safety factors are added to the seat locking device to insure protection. The seat is anchored to the floor with cables in such a way that it may only move for the adjustments established by the car manufacturers. The use of automatic seat-belts will prevent the distaste observed by the present haphazard arrangement and will allow convenience and security.

1,250

Ryan, James J. 1960 SAFETY DEVICES FOR GROUND VEHICLES
U.S. Department of Health, Education and Welfare, Public Health Service, National Institutes of Health Grant # RG-6284 (C-1) April 1, 1959-September 1, 1960

ABSTRACT: The primary object of this research is the investigation of means to reduce injury and death caused during automotive accidents. The high frequency of crashes make imperative the development of methods for most effectively decelerating the vehicle and properly packaging the occupants. Equipment has been developed for the evaluation of the hydraulic shock-absorbing bumper and the seat belt assembly so essential in accomplishing these goals. Preliminary testing and modification of these devices is

performed on the Project's machine for applying high-impact loads. The data obtained from human tests with seat belts is applicable to most endeavors utilizing human limitations in deceleration. The tests have shown the similarity of the dynamics of a human with an equivalent mechanical figure and have pointed out the effectiveness of force measurement by models in place of a human. The tests have also shown the forces that must be resisted under conditions of deceleration which are established up to the limit of material strengths. The determination of the magnitude of the forces humans can withstand about the pelvic regions and the chest is of great importance and will be sought by further studies.

1,251

Ryan, J.J. 1961 HUMAN CRASH DECELERATION TESTS ON SEAT-BELTS. (Paper, Annual Meeting of the Aerospace Med. Assoc., Chicago, Ill., 26 April 1961)

ABSTRACT: Tests have shown that seat-belt forces applied to the human subject in deceleration are sinusoidal in character, are determined by the natural frequency of the spring-mass system and by damping, and are dependent upon the time history of the forces applied at the belt connections. The development of favorable seat-belt characteristics is described. The limiting forces are dependent upon the ability of the pelvic bone system to transmit the sinusoidal rearward and downward forces exerted by the belt on the body. A secondary problem is the rotation of the upper torso about the seat-belt after impact. The results of these force applications from tests are noted. Criteria of aircraft design are suggested to allow maximum impacts without immobilizing injury, permitting immediate evacuation. (Aerospace Med. 32(3):246, March 1961)

1,252

Ryan, J.J. 1962 AUTOMOTIVE HUMAN CRASH STUDIES
In Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, Pp 345-354

ABSTRACT: The development of safety devices for vehicles has required research into the application of engineering principles for the mechanical reduction of impact forces. It has been shown that the forces exerted on a human supported by a seat-belt may be reduced four times through proper engineering design of the vehicle and the belt. Further studies with human beings in the seat-belt environment using the apparatus available require an extension of the engineering with bio-physics and applied medicine.

253

an, J.J. 1962 CRASH DECELERATION TESTS WITH HUMAN SUBJECTS (Paper, Fourth Annual Meeting of the Human Factors Society, Boston, Mass., Sept. 14, 1960)

1,254

yan, J.J. 1962 MECHANICAL REDUCTION OF IMPACT FORCES BY AUTOMOTIVE DESIGN. (Presented before the Annual Meeting of the American Med. Assoc., New York, 27 June 1961) Published in Research Review 6(2):1-37 by the National Safety Council, Chicago, June 1962.

1,255

yan, J.J. 1962 REDUCTION IN CRASH FORCES. In Cragun, M.K., ed., The Fifth Stapp Automotive Crash and Field Demonstration Conference, Sept. 14-16, 1961. Pp. 48-89

,256

Rye, J.R. 1949 QUALIFICATION TESTS OF A PILOT'S SEAT ACTUATING CYLINDER (152-58037) FOR AIR FORCE APPROVAL. (North American Aviation, Inc., Los Angeles, Calif.) Report no. NA-49-174, ASTIA ATI-59336, March 1949

ABSTRACT: Qualification tests were requested on a pilot's seat actuating cylinder designed for the F-86 fighter. With the exception of the low temperature test, all tests were conducted with AN-0-366 specification hydraulic oil. For the low temperature test (-65°F), the actuating cylinder was made of parts with dimensions that allowed minimum clearances and were within 10% of the worst conditions the prints allowed. The finishes on sliding surfaces were determined on a Profilometer and found to be within the tolerances the prints allowed. It was concluded that the actuating cylinder satisfactorily passed qualification tests in accordance with the requirements of specification AN-C-66.

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

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1,257

Sabbagh, E.N. 1956 PERFORMANCE CHARACTERISTICS OF CUSHIONING MATERIALS IMPACTED UNDER A HEAVY WEIGHT HIGH IMPACT SHOCK MACHINE. (Lowell Technological Institute Research Foundation, Mass.) Rept. for Dec. 1954- June 1955, Contract No. AF18(600)-127, Rept. No. TR-55-229, Feb. 1956. ASTIA AD 90 856

ABSTRACT: The energy absorption characteristics of cushioning materials impacted under a heavy-weight high-impact shock machine (AD 90 917) are reported as analyzed by an analog computer system. Test specimens were fabricated in the shape of circular cylinders; the diameter of the circular bases was 24 in. and the thickness of the specimen was either 2, 4, or 6 inches. Specimens for tests at standard conditions were stored for 5 days on racks in an air-conditions testing room at 70 degrees F and 56% RH. Cushioning materials tested at -67 degrees F and 160 degrees F were conditioned in a temperature chamber for 3 to 4 hours prior to testing. The impacting hammer had a static weight of 1.28 psi over the area of the sample throughout the tests. The velocity of the hammer at the time of initial contact varied from 20 to 50 fps in increments of 5 fps. Graphs of energy are presented for 36 materials. Test results are also given in tabular form for certain values of thickness and velocity in order to present strain data, values of resilience, and other information. Results for 15 additional materials, for which insufficient quantities were available for complete tests, are also presented in tabular form. The tests show that the expanded polystyrenes are the best energy absorbers. Wood fiberboard, high-density wool pads, and cane fiberboard, respectively, follow the expanded polystyrenes in energy absorbing capacity.

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Salter, N. 1952 THE EFFECT OF DEGREE OF ELBOW FLEXION ON THE MAXIMUM TORQUE DEVELOPED IN PRONATION AND SUPINATION. J. Anatomy 86:197-202.

1,259

Sandborg, H. 1959 EJECTION SEAT FOR SUPERSONIC SPEED. Medd. Flyg Navalmed Namnd 8(2):22-3

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Santa Maria, L.J. 1958 THE EFFECTS OF VENTILATING AND HIGH AMBIENT TEMPERATURES ON FLOW RATES NECESSARY TO MAINTAIN COMFORT IN A FULL PRESSURE SUIT Jour. Aviation Med., 29(3):249, March 1958

ABSTRACT: A study was made of the effects of ventilating and high ambient temperatures on the ventilating flow required for maintenance of comfort in subjects wearing a full pressure suit. Total and evaporative heat loss, mean skin temperature, and rectal temperature were measured in 3 subjects maintained for 2 hours at a simulated altitude of 18,000 feet, with ambient temperatures of 150°, subjects were thermally comfortable with ventilating flow rates averaging 800 liters/minute. With 90° ventilating air, flow rates as high as 900 liters/minute were inadequate to maintain thermal comfort.

1,261

Santi, G.P. 1948 EJECTION FLIGHT TESTS CONDUCTED WITH P-82B AIRPLANE AT MUROC ARMY AIR FIELD (Air Material Command, Wright Field, Dayton, Ohio) Memorandum Report No. MCREXA 7-45341-3-5. 10 May 1948, ATI 63579

ABSTRACT: A series of twenty flight tests were conducted with regard to human- and dummy-subject pilot ejection from a TF-80C fighter airplane. Five of these tests were conducted with a human subject. A modified Lockheed Aircraft Corporation ejection seat equipped with the M-1 aircraft personnel catapult was used. Satisfactory ejection of a pilot with gear totaling approximately 300 lb can be accomplished from an airplane in flight up to indicated airspeeds of at least 500 mph. The stabilization parachute functioned satisfactorily in initiating operation of the automatic-parachute and safety-belt accessory equipment.

1,262

Santi, G. P., T. C. Hill, & V. Mazza 1949 PILOT EJECTION FLIGHT TESTS CONDUCTED WITH A TF-80C AIRPLANE AT MUROC AND HAMILTON AF BASES. (Air Material Command, Wright-Patterson AFB, Ohio) Rept. No. MCREXA-7-45341-4-1, Aug. 15, 1949

1,263

Santi, Gino P. 1953 FLIGHT TESTS OF DOWNWARD AND REARWARD EJECTED SEATS CONDUCTED WITH A B-29 AIRPLANE
(Wright Air Development Center, Wright-Patterson Air Force Base, Ohio) WADC TR 53-360 ASTIA AD 76 427

ABSTRACT: A series of 29 tests was conducted to investigate downward and rearward ejection of aircrew personnel as methods of emergency escape from disabled aircraft. All the tests were made in flight from a B-29 airplane. Tests data was obtained from recording instruments and photographic airplanes.

The results show that these methods of escape are feasible and should be further investigated.

The tests were conducted by personnel of the Aircraft Laboratory, Wright Air Development Center, at Edwards Air Force Base in February and March 1947.

1,264

Santi, G.P. 1955 ACCELERATION PROBLEMS IN EJECTION-SEAT DESIGN. In U.S. Assistant Secretary of Defense (Research and Development) Washington D.C., Shock and Vibration Bulletin No. 22 Supplement. ASTIA AD 94 697

1,265

Santos, F. R. 1951 PROBLEMAS MÉDICOS DA SAÍDA DE EMERGÊNICIA DOS AVIÓES DE GRANDE VELOCIDADE (Medical problems of Emergency Escape From High Speed Aircraft)
Imprensa Medica, (Rio de Janeiro) 27:81-92, Feb. 1951

1,266

Santos, F. R. 1952 SALTO PARAQUEDAS, DECISAO E PROBLEMAS. (PARACHUTE JUMPING: DECISION AND PROBLEMS) Imprensa medica, Rio de Janeiro 28(459):51-67

ABSTRACT: The decision to bail out from an airplane is influenced by factors related to the aircraft (type, condition, position in the air, velocity, and degree of maneuverability), by factors related to the altitude (degree of anozia, temperature, and distance from anti-aircraft fire in combat), by terrain features, and by atmospheric conditions. Factors determining the degree of safety during the jump are as follows: acceleration during free fall, deceleration during opening of the parachute, and impact on hitting the ground.

An analysis of 50 fatal instances (17.5%) out of 400 emergency bailouts revealed the following causes: (1) bailout elevation was too low, 48%: (2) the parachute got caught in the plane, 10%; (3) the subject was hit by the plane during fall, 20%; (4) other causes (parachute was improperly adjusted prior to jump, parachute caught fire from burning plane, drowning of airman), 22%. Bone fractures on hitting the ground occurred three times less in experienced parachute jumpers than in those who had never jumped. In conclusion, the most important reasons for the unsuccessful outcome of emergency bailouts are summarized.

1,267

Saul, E. V., M. W. Raben, L. B. Seronsy, L. Weiner, et al. 1958 HUMAN ENGINEERING BIBLIOGRAPHY. 1956 - 1957. (Naval Engineering Psychology Branch, Office of Naval Research, Wash., D. C.) Contract NONR 494(13), ONR Rept. ACR 32, Oct. 1958

ABSTRACT: Personnel responsible for the human factors considerations in the design and development of equipment have a major need for rapid and easy access to the literature pertinent to their work. This bibliography is one of a planned series of annual bibliographies of literature pertinent to human engineering designed to meet this need. There are five main parts: 1) a topical outline that defines over 300 topic headings, 2) an index that relates the bibliographic entries with the topic headings, 3) an alphabetic index of search terms, 4) an annotated bibliography, and 5) an index of authors.

1,268

Saul, E. V. 1959 HUMAN ENGINEERING BIBLIOGRAPHY, 1957 - 1958 (The Project Staff, Human Engineering Information & Analysis service, Institute for Applied Experimental Psychology, Tufts University) ONR 1 RT ACR-43; ASTIA AD-235 970: Oct. 1959

1,269

Savely, H.E., W.H. Ames, & H.M. Sweeney 1946 LABORATORY TESTS OF CATAPULT EJECTION SEAT USING HUMAN SUBJECTS. (AMC, Wright Field, Dayton, Ohio). Memo Rept. TSEAA 695-66C Oct. 1946. ASTIA ATI 119947

ABSTRACT: The purpose of this report is to present the results of ejection seat experiments on the 30-foot test tower using the T2 catapult. Successful

utilization of the present type catapult ejection seat requires a solution to the following problems: (a) Reduction of the added acceleration imposed on the occupant because of the effects of cushioning, compression of the body, and slipping forward in the seat. (b) Provision of safeguards against extreme flexion or extension of the neck during the ejection stroke. Before human subjects are used with the next higher fractional charge of cartridges of Type IOW 6030-S, namely the 67.7-gram charge, either in aircraft or in experimental tests, a larger number of subjects should be used with the lower fractional charges in order to find a solution to the problems detailed in this report. An indoctrination program involving ejection on a test tower should be required of all personnel flying airplanes equipped with ejection seats. The two 100-foot test towers now under construction will provide experimental conditions more nearly simulating those in aircraft.

1,270

Savely, H. E., & W. H. Ames 1948 ARM RESTS ON EJECTION SEATS. (Air Technical Service Command) TSEAA 695-66 G, Jan. 1948.

ABSTRACT: Experiments were conducted to find the preliminary measurements of the body mass supported by arm rests during seat ejection. It was found that arm rests on ejection seats are beneficial in relieving the lower back of a significant portion of the load resulting from acceleration from seat to head.

1,271

Savely, H.E. 1952 HUMAN PROBLEMS IN ESCAPE FROM HIGH-SPEED AIRCRAFT. Air Univ. Quart. Rev., 5(2): 65-67.

ABSTRACT: (1) The use of high-pressure masks, breathing helmets, and elastic vests has proven disadvantageous (painful distension of unprotected facial areas, pooling of blood in the limbs, leakages through the masks). - (2) Determinations of human acceleration tolerance by means of catapult devices revealed that an average of 20 g's for 1/10 second, or 25 g's for .01 second is withstood without injury. The rate of application of the ejecting force has an influence on the interaction between man and seat; slower application of force will make higher ejection velocities tolerable. (3) Measurements carried out on the linear decelerator (deceleration cart) have shown that man can tolerate up to 45 g's wearing a simple crash harness. The rate of application of the decelerating force determines again the effect on the human organism (shock signs were observed at deceleration rates of 1360 g/sec., while a rate of 493 g/sec. caused no ill effects at decelerations up to 40 g). Experimental investigations of decelerations of longer duration with the body rotating in one or more planes are still outstanding. (4) Wind-blast effects were measured under simulated conditions in wind-

tunnel tests on unprotected humans at wind speeds up to 425 m.p.h (normal bailouts) and up to 470 m.p.h (test seat ejections). Blasts at sonic speeds were directed at dummies wearing an A-13A oxygen mask and U.S. Air Force F-3 helmets. Tissues of the body protected from the direct force showed no ill effects. Medium-weight winter flying clothing affords ample protection against high-altitude temperatures (up to 80,000 ft.)

1,272

Savely, H.E. 1955 THE PHYSIOLOGY OF ESCAPE
(Paper, Symposium on Escape from High Performance Aircraft, Oct. 1955.)

1,273

Savely, H.E., & J.P. Henry 1957 A NEW LOOK AT AVIATION PHYSIOLOGY
J. Aviation Med. 28(6):531-534

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Savory, D.J. and A.E. White 1961 QUALIFICATION TESTS AND ANALYSES INITIATORS, CARTRIDGE ACTUATED, T25 and T26. (Frankford Arsenal, Philadelphia Pa.) WADD TR 59-309, ASTIA AD-258 548, March 1961

ABSTRACT: Tests were conducted to determ ine whether the miniaturized T25 and T26 initiators satisfied the performance requirements for the larger M3 and M5A1 initiators they are intended to replace. The T25 and T26 initiators were subjected to a complete qualification test program consisting of the following tests; safety pin pull, drop, low temperature ignition, locked-shut safety, performance, primer indent, environmental, and water immersion. The performance of these initiators during the tests was evaluated and compared with the performance characteristics of the M3 and M5 initiators. The average performance of the T25 and T26 initiators matches or exceeds that of the M3 and M5A1 design requirements and specifications. It is recommended (1) that the T25 and T26 initiators be standardized for use in aircraft escape systems after modification of the T289 cartridge to meet pressure differential requirements, and (2) that the mounting ears on the initiator caps be lowered to provide a more convenient mounting surface, similar to that of the M3 initiator. (Author)

1,275

Schafer, Howard C. COLD-WEATHER ENVIRONMENTAL TESTS OF ROCKET CATAPULT MK 2 MOD 0 (AIRCRAFT EJECTION SEAT)
(U. S. Naval Ordnance Test Station, China Lake, Calif.) NAVWEPS Report 7875 NOTS TP 2858 May, 1962 ASTIA AD 275430

ABSTRACT: A series of cockpit environmental tests was conducted on one model of a rocket catapult used for pilot ejection to check winter temperature parameters. Major results are reported on the temperature environment within the cockpit of an F9F aircraft in an arctic environment. Severe low temperatures were obtained by keeping the canopy snow- and ice-free during part of the test period, which included the coldest part of the Alaskan winter.

This report includes three tables and three graphs. Weather parameters are touched upon, as they tended to decrease minimum cockpit temperatures. Vertical temperature gradients on the rocket catapult are discussed.

1,276

Schellong, F. & M. Heinemeir 1933 ÜBER DIE KREISLAUFREGULATION IN AUFRECHTER KÖRPERSTELLUNG UND IHRE STÖRUNGEN (Concerning the Circulatory Regulation in Perpendicular Body Position and Their Disturbances)
Zeitschrift für die gesamte experimentelle Medizin (Berlin) 89: 49-60

1,277

Scher, S. H. 1948 PILOT ESCAPE FROM SPINNING AIRPLANES AS DETERMINED FROM FREE-SPINNING-TUNNEL TESTS
(U. S. National Advisory Committee for Aeronautics, Washington, D.C.) Research Memo No. L8D28, Sept. 9, 1948

1,278

Scher, S. H. & L. J. Gale 1949 WIND-TUNNEL INVESTIGATION OF THE OPENING CHARACTERISTICS, DRAG, AND STABILITY OF SEVERAL HEMISPHERICAL PARACHUTES.
(National Advisory Committee for Aeronautics, Washington, D. C.) NACA Tech. Note 1869.

ABSTRACT: An investigation has been conducted to determine the opening characteristics of several hemispherical parachutes and to study influence of the parachute design variables on these opening characteristics. The effects of design variables on the drag and stability characteristics of the parachutes were also evaluated

1,279

Scher, S.H. 1951 PILOT ESCAPE FROM SPINNING AIRPLANES AS DETERMINED FROM FREE-SPINNING-TUNNEL TESTS. NACA TN 2485 Oct. 1951

ABSTRACT: Procedure for pilot escape from spinning airplanes has been determined by means of tests in which pilot escape was simulated from 21 airplane models spinning in the Langley 20-foot free-spinning tunnel. The results in general indicated that the pilot should bail-out of the outboard side. Calculated centripetal accelerations acting on the pilot during a spin are presented.

1,280

Scherberg, M.G., & H. Ferguson 1952 INVESTIGATION OF THE ACCELERATION AND JOLT HISTORIES DURING ESCAPE FROM HIGH SPEED AIRCRAFT (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 52 278, Oct. 1952. ASTIA AD 5010.

ABSTRACT: Accelerations having short durations (less than 5 sec) and orders of magnitude above 2 g were represented by the equation of motion, $X = K \times 2$, where $\ddot{x}$ and $\dot{x}$ are the velocity and acceleration, respectively, and K is a positive constant. Calculations of the maximum acceleration expected at a given time (t) after the initiation of escape were made to obtain upper bounds for escape acceleration histories depending only on the initial velocity of escape. Graphs of these upper bounds are given for t = 0.5 to 4.0 sec and for initial speeds at 200-mph intervals, from 400 to 1800 mph. For upper bounds from t- 0.0 to 0.5, the method was not applicable; an alternate method is given for these values. Graphs which show the rate of onset of acceleration (defined as a jolt and represented by the third derivative $\dddot{x}$)as a function of the initial acceleration are included for initial speeds from 400 to 1800 mph in 200-mph intervals. Contrary to the upper-bound results, the jolt results appeared to be valied at transonic and supersonic as well as at sub-sonic speed. However, they measured only the jolt caused by acceleration decay. The accelerations parallel and normal to the spine of a person in a tumbling escape unit were calculated for an assumed hypothetical case. These alternately increasing and decreasing accelerations caused a shaking phenomenon which may be beneficial to the escaping person.

1,281

Scherlis, S., & E.C. Andrus 1943 STUDIES ON THE INFLUENCE OF PNEUMATIC LEGGINGS UPON THE FLOW AND DISTRIBUTION OF BLOOD. CAM No. 115, 18 Feb. 1943.

ABSTRACT: Used from 4 to 34 subjects for different procedures.
(a) Inflation of leggings either with or without simultaneous inflation of an abdominal belt produces no circulatory change except a transient, significant rise in venous pressure in arms.
(b) Inflation of leggings either with or without a belt has a very favorable effect on circulatory changes produced by 1 "g" on the tilt table. (1) Fall in arterial pressure is prevented. (2) Cardiac acceleration is prevented. (3) Cardiac output is sustained.
(c) The mechanism of this action is thought to be as follows: (1) External pressure of leggings is transmitted to veins and opposes hydrostatic congesting pressure there. (2) Normal peripheral resistance in arterioles is increased, and constriction is necessary to maintain cerebral blood flow.
(d) Under gravitational forces greater than 1 "g", belts and leggings would probably be inadequate, might even prove detrimental by opposing venous return from the legs. Also under high gravitational force, more pressure is needed, theoretically, around the calves than around the thighs. This differential is not provided by leggings.
(e) It is suggested that the tilt table is a valuable testing instrument for anti- "g" devices.

1,282

Schleicher, R.L. 1947 STATIC TEST PILOT'S AND CO-PILOT'S EJECTION SEAT FOR THE MODEL B-45A AIRPLANE -NAA MODEL NO. NA-147 (North American Aviation, Inc. Los Angeles Calif.) Report NA 47-1207, ASTIA ATI- 102369, December 1947

ABSTRACT: Tests were conducted to static load the pilot's and co-pilot's ejection seat and to demonstrate that the strength of the seat was sufficient to meet the requirements as outlined in the A.A.F. Specification No. 25279. A production type pilot's and co'pilot's ejection seat fabricated per N.A.A. Drawing No. 147-53025 was used in the tests. The seat was supported at the catapult gun attachment and by the rollers. Loads were applied by hydraulic struts and metal straps except in the down load on the seat back in which case lead weights were used. In each test condition loads were applied in increments of 20, 40, 60, 66-2/3, 80, 90, and 100% of design load. Photographs were taken of each condition at 100% design load. The tests reported herein, show that the pilot's ejection seat (147-53025) meets the strength requirements of A.A.F. Specification No. 25279.

1,283

Schleicher, R.L. 1948 CASTING CLASSIFICATION - BRACKET ASSEMBLY - PILOT'S EJECTABLE SEAT ROLLER ATTACHING (147-53034 (A) FOR THE MODEL B-45A AIRPLANE -NAA MODEL NO. NA-147. (North American Aviation, Inc., Los Angeles, Calif.) Report No. NA-48-788, ASTIA ATI-114 626, July 1948

ABSTRACT: The test was conducted to establish by static test the classification for x-ray inspection of this casting in accordance with the Army Handbook for Airplane Designers, Volume I, Eight Edition, Revision 7, including Amendment #2. The specimen and set up included one magnesium alloy sand casting, Spec. AN-QQ-M-56 comp. A condition HTA tested for the conditions shown to be critical by the design stress analysis. The casting was supported in a steel jig, which simulated the airplane structure, and was loaded by means of two hydraulic struts. The tests results showed there was .005" deflection at limit load and no indication of yield after limit load of 4100# was removed. At design ultimate load of 6150 there was .010 deflection and no indication of failure.

1,284

Schleicher, R.L. 1948 CASTING CLASSIFICATION BASE ASSEMBLY - NAVIGATOR'S SEAT (147-53107 (A) FOR THE MODEL B-45A AIRPLANE - NAA MODEL NO. NA-147. (North American Aviation, Inc., Los Angeles, Calif.) ASTIA ATI 114 800, July 1948

ABSTRACT: Classification for X-ray inspection of this casting in accordance with the Army Handbook for Airplane Designers was established by static test. Test results showed a .011" deflection at limit load and no indication of yield after limit load of 1377# was removed. At design Ultimate load of 2066# there was .022" deflection and no indication of failure. Results showed this casting to be in Class A-1.

1,285

Schmidt, I. 1938 BIBLIOGRAPHIE DER LUFTFAHRTMEDIZIN. (Bibliography of Aviation Medicine)
(Berlin: J. Springer, 1938)

ABSTRACT: The first volume of an important bibliography, covering the literature in aviation medicine and high-altitude research up to the end of the year 1936. Constitutes a survey of world literature on the subjects of psychophysiology of the flier, altitude research, acceleration research (including centrifugal forces parachute jumping, and air sickness), accidents, effects of sound, fatigue, flying sickness, flying fitness and aviation hygiene.

1,286

Schmidt, I. 1943 BIBLIOGRAPHIE DER LUFTFAHRTMEDIZIN. ZWEITE FOLGE. EINE ZUSAMMENSTELLUNG VON ARBEITEN UBER LUFTFAHRTMEDIZIN UND GRENZGEBIETE, 1937 BIS ENDE 1940. (Bibliography of Aviation Medicine, Part Two). Luftfahrtmedizin Vol. 8, No. 1, March 1943.

ABSTRACT: The second volume of an important bibliography, covering the literature in aviation medicine and high-altitude research through the years 1937 to the end of 1940. Constitutes a survey of world literature on the subjects of psychophysiology of the flier, altitude research, acceleration research (including centrifugal forces, parachute jumping, and air sickness), accidents, effects of sound, fatigue, flying sickness, flying fitness and aviation hygiene.

1,287

Schmidt, I. 1948 BIBLIOGRAPHY OF AVIATION MEDICINE. VOLUME III. (Incomplete) (School of Aviation Medicine, Randolph Air Force Base, Texas)

ABSTRACT: A compilation of reports pertaining to Aviation Medicine and its borderline fields, covering the years 1941 through 1945, and including supplementary references for the year 1940.

After the present material had been supplemented above all by Anglo-American literature, it was supposed to be published as the third volume of the "Bibliographie der Luftfahrtmedizin". But the war prevented its completion. As we believe that these references will be of interest to many an aeromedical scientist they will be disseminated for public use. The references concern first of all German publications, but include also those foreign papers which have been accessible. Anglo-American references have been omitted, since they are all listed in the "Bibliography of Aviation Medicine" by E. C. Hoff and J. F. Fulton.

1,288

Schmidt, R. V., et al. 1961 PASSENGER SAFETY AND COMFORT CRITERIA STUDY IN DYNAMIC ENVIRONMENTS. (Northrop Corp., Norair Div., Hawthorne, Calif.) PB-67, Sept. 1961

1,289

Schneider, J. 1950 PROTECTIVE EQUIPMENT FOR THE FLIER. German Aviation Medicine, WW II (Dept. Air Force, 1950) I, 645-648

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Schneider, J. *1950 PROTECTIVE MEASURES FOR THE PREVENTION OF INJURIES, ESPECIALLY SPINAL FRACTURES IN AIRCRAFT ON SKIDS.* German Aviation Medicine, WW II, pp. 612-614.

1,291

Scholander, P.F. 1943 FINAL REPORT ON TEST OF ANTI "G" DEVICES FOR PILOTS (ANTI-BLACKOUT DEVICE) (Elgin Field, Proof Dept.,AAF Proving Ground Command) Serial No. 7-43-9., 4 Nov. 1943.

ABSTRACT: (a) The Berger Bros. gradient pressure suit and the Clark Wood arterial occulusion suit were compared by 24 experienced pilots. Both suits were effective in preventing blackout up to 8 to 9.5 "g" in planes. Both effectively prevent "g" fatigue.
(b) When 2 to 3 "g" are held continuously for two to ten minutes, the AOS produces severe pain or distracting discomfort in the limbs. No discomfort is produced by the GPS when 2 to 3 "g" are held continuously for 20 minutes. Hence the GPS is preferred by most pilots. Both suits are comfortable when worn outside aircraft and offer good flotation.
(c) The GPS pressure equipment operates satisfactorily from the standard instrument vacuum pump with special oil filter in tests up to 33,000 feet. The few failures encountered in the tests could be easily prevented in the future. The AOS requires an electric motor, pump, and switch to power it. Serious failures in the powering devices occurred. Out of 4 pumps tested, one was completely broken in the process and 2 partially broken.
(e) Very good photographs of the GPS and AOS are included, also photograpsh and diagrams of the two valves and graphs of their performance at altitude.

1,292

Scholander, P.T. 1944 TEST OF IMPROVED PILOT COMFORT IN FIGHTER TYPE AIRCRAFT. (Army AF Proving Ground Command, Eglin Field, Fla.) ASTIA ATI-83234, 26 January 1944

ABSTRACT: Four (4) test flights in a BC-1 airplane and eight (8) test flights in P-51B airplane showed that sitting in a hammock type seat, carrying parachute and dinghy, offers a considerable comfort during long sustained flights (1 to 4-3/4 hours) and is secure during acrobatics.

1,293

Schreuder, O. B. 1951 MEDICAL RESEARCH MUST CONTINUE TO DEVELOP PROTECTIVE EQUIPMENT FOR THE HUMAN PILOT. Tech. Data Digest 16:2, May 1951.

1,294

Schroeder, H. A. 1951 **PREVENTION OF INJURIES DUE TO CRASH.** J. Avia. Med. 22:306-311, Aug. 1951

1,295

Schroers, R. 1951 **SOME DEVELOPMENT FOR GREATER CRASH SAFETY IN AIRCRAFT** (Civil Aeronautics Administration) Oct. 1951

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Schroers, R. J. 1952 SOME DEVELOPMENTS FOR GREATER CRASH SAFETY IN AIRCRAFT
SAE Quarterly Transactions 6:241-251, April 1952

1,297

Schwarz, E.R., & W.J. Hamburger 1946 IMPACT INVESTIGATION ON TEXTILE MATERIALS. (Textile Div., Massachusetts Institute of Technology, Div. of Industrial Cooperation Contract #2-6343; Fabric Research Laboratories, Inc., Contract #C45589; U.S. Army Air Corps, Materiel Div., Wright Field, Dayton, Ohio, Order #N33-038 AC-12462) June 30 , 1946, ASTIA ATI No. 87219

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Schwarz, E. R., et al. 1946 IMPACT INVESTIGATION ON TEXTILE MATERIALS. (Textile Div., Mass Inst. of Technology, Div. of Indl. Cooperation) Progress Rept. No. 11, 10 Sept. 1946

1,299

Schwichtenberg, A.H. 1961 MEDICAL ASPECTS OF SPACE FLIGHT
Ann. Rev. Med. 12: 299-322, 1961

ABSTRACT: A great deal of research has been conducted in the field of space flight travel. However, the application of the knowledge gained from the research has been slow because of the lack of communication among the scientists, engineers, and physicians. There are many medical implications that can be attributed to various flight stresses. The author discusses the flight stresses as well as commenting on selection of astronauts, function of man in space, and man-machine relationships.

1,300

Seiker, H. O., E. E. Martin, O. H. Gauer & J. P. Henry 1953 A COMPARATIVE STUDY OF TWO EXPERIMENTAL PNEUMATIC ANTI-G SUITS AND THE STANDARD USAF G-4A ANTI-G SUIT.
(Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC-TR 52-317, Feb. 1953.

1,301

Self, T. M. 1951 MATS ADOPTS REARWARD SEATING
Aviation Week 54(26):59-60, June 25, 1951

ABSTRACT: Military Air Transport Service announces that all the future transport planes it orders will be equipped with seats facing the rear of the plane. MATS carried members of the Aviation Writers Association to their annual convention in New York in the first Boeing C-97 to be fitted with permanent rearward-facing seats; 20 more C-97's are to be similarly outfitted.

Thirty pairs of double folding seats, arranged in two rows, are built to withstand 16 G. Built according to designs by the Aero Medical Laboratory of the Air Force's Air Materiel Command, at first glance they seem rather

spare. They have only an inch-thick foam rubber cushion over contoured seat and back pads, and arm rests, and another small pad at the back of the head. But they actually are more comfortable and less fatiguing than the deep cushions used on commercial aircraft.

The primary object of the seats is safety. Crash deceleration is absorbed by entire back, neck, and head, and parts of the arms and legs. Laboratory tests show the body can take 40 G for short periods without injury.

Some transport manufactureres are afraid of the psychological factors involved in rearward seating. The two main arguments: (1) Passengers will wonder why all planes are not equipped with them, will be nervous about flying in ships with present forward-facing seats, and will be too crash conscious; (2) Americans are used to facing forward and will resist any change. A foreign flag carrier spokesman discounts both these arguments. The British and Australians have used rearward seating for some time with success. The Airworthiness Division of ICAO has decided to continue rearward-facing seats as a recommended project. International Air Transport Assn. feels the idea is theoretically sound but wants evidence of benefits counterbalancing the cost and effort involved.

MATS' recent switch is a result of five years' investigation and development by the Air Materiel Command in conjunction with MATS. (Journal of Aviation Medicine 23(1):88, Feb. 1952)

1,302

Sells, S.B. & C.A. Berry, eds. 1961 HUMAN FACTORS IN JET AND SPACE TRAVEL: A MEDICAL-PSYCHOLOGICAL ANALYSIS
(New York: Ronald Press)

ABSTRACT: Contents include: "Medical Aspects of Jet and Space Travel" by A. Graybiel; "Natural Environment and the Environment of Flight" by H.B. Hale; "Radiobiology and the Environment of Flight" by G.L. Hekhuis; "Basic Aspects of Skilled Performance" by W.A. Wilbanks; "Human Operator Performance Under Non-normal Environmental Operating Conditions" by W.G. Matheny; "Group Behavior Problems in Flight" by S.B. Sells; "Human Qualifications for and Reactions to Jet Flight" by C.A. Berry; "Human Requirements for Space Travel" by S.B. Sells and C.A. Berry; "Protective Medicine in Jet and Space Flight" by J.A. Norton; "Air Craft Accidents and Flight Safety" by H.G. Moseley; "Human Factors Related to Jet Aircraft" by T.G. Hanks; "The Engineered Environment of the Space Vehicle" by H.G. Clamann; "Operational Aspects of Space Flight" by A.M. Mayo; and "Speculations on Space and Human Destiny" by H.B. Webb.

1,303

CURRENT WORK PROGRAM

Senna, J. 1959 HUMAN FACTORS ANALYSIS OF PROTECTION REQUIREMENTS (BALLISTIC, CRASH, ACOUSTICAL, AND VISUAL) FOR ARMY AIRCRAFT AND AIRCREW SYSTEMS. (Current project at U.S. Army Quartermaster Research and Engineering Command, Natick, Mass.)

Description: A series of studies has been completed on systems for providing optimal protection to the pilot and aircrew against the hazards encountered in the military environment. Emphasis has been on human factors problems which must be solved to provide such protection. Particular attention is devoted to influencing the design of clothing and equipment used.

1,304

Serocki, E. L. 1959 DOWNWARD EJECTION SEAT (ECP 420) LOW ALTITUDE FLIGHT TESTS (Boeing Airplane Co., Wichita, Kansas) Doc. No. D3-2280; Contr. No. AF33(600) -32863. April 1959

Summary: The low and intermediate airspeed tests conducted on the downward ejection seat (ECP 420) at low altitude were successful although seat-dummy separations were delayed to some degree during each test. Both high speed tests were unsuccessful due to deployment failure of the recovery parachute.

The tests have shown that a separating device on the downward seats is necessary to assure rapid controlled separation of the seat and occupant after ejection. This ejection event is the primary factor in establishing the minimum altitude for safe emergency escape.

During the two low speed tests the dummy separated from the seat and the parachute was fully inflated approximately 290 feet and 350 feet below the airplane. The parachute was fully inflated approximately 220 feet below the airplane during the intermediate airspeed test. (AUTHOR)

1,305

Shannon, Robert H. 1959 USAF SEAT EJECTIONS (January 1, 1959 - December 31, 1959)
(Directorate of Flight and Missile Safety Research, Norton Air Force Base, California) No. M-10-60 July 1960 ASTIA AD 242728

ABSTRACT: The data contained in this report were compiled from questionnaires completed by crewmembers who used the ejection seat as a means of escape during inflight emergencies and from aircraft accident reports submitted on accidents

involving ejection during 1959. Intentional or inadvertent ejections subsequent to ground impact are not included.

It is the intent of this report to advise research and development agencies of current problem areas and to provide operating personnel with an up-to-date analysis of USAF ejection experience.

These data provide the background information for extensive aircrew indoctrination concerning pre-ejection, ejection, and post-ejection conditions.

1,306

Shapland, D.J. 1961 THE USE OF MATHEMATICAL MODELS TO INVESTIGATE THE EFFECTS OF PROTECTIVE SUPPORTS ON THE HUMAN BODY DURING ABRUPT ACCELERATIONS. (Stanley Aviation Corp., Denver, Colo.) Rept. No. 781, Sept. 1961.

1,307

Sharp, J. E. 1962 CONSIDERATIONS FOR A LAP-BELT-SHOULDER HARNESS ASSEMBLY (In M. K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration, Sept. 14-16, 1961) Pp. 253-254.

1,308

Shaw, R.S. 1947 HUMAN TOLERANCE TO ACCELERATION IN DOWNWARD SEAT EJECTION (AMC, Wright-Patterson AFB, Ohio) Memo Rept. TSEAA 695-74C 12 Dec. 1947.

CONCLUSIONS: In downward seat ejection, velocities of 28.5 feet per second can be safely accomplished using a 24-inch stroke.

The standard safety belt and shoulder harness with the addition of toe straps provide adequate fixation of subjects in this ejection. (DACO)

1,309

Shaw, R.S. & H.E. Savely 1947 ACCELERATION-TIME DIAGRAM FOR CATAPULT EJECTION SEATS. (Aeromedical Lab. Wright-Patterson AFB, Ohio) Memo Rept. TSEAA 695-66D, 11 Feb. 1947

1,310

Shaw, R. S. 1947 TEST FIRING OF FD CATAPULT FOR DOWNWARD SEAT EJECTION. Memo Rept. No. MCREXD 695-74-I, May 1947

1,311

Shaw, R.S. & J.P. Henry 1948 THE PRESSURIZED HELMET AS A NEGATIVE G PROTECTIVE DEVICE. Aero Medical Laboratory Serial No. MCREXD4-695-74-E, Air Material Command Memo Rept. TSEAA-695-74E

ABSTRACT: In MR. No. TSEAA-660-100 entitled "Emergency Pressure Suit", dated May 5, 1946, a pressurized helmet is described, and its use as a negative g protective device is suggested. Inasmuch as most of the injury from negative acceleration of several seconds duration is related to over-distension of the blooc vessels of the head, it is reasonable that such a helmet applying counter pressure to these vessels would provide some degree of protection. This work was undertaken to determine the amount of protection such a device would afford. This report describes preliminary experiments to evaluate the pressurized helmet as a protective device against negative acceleration. The preliminary experiments suggest that: (a) Pressure breathing with a pressurized helmet does not significantly raise negative g tolerance. (b) The use of the pressurized helmet with the glottis closed raises negative g tolerance by an amount similar to the positive g tolerance increase obtained from the anti-g suit.

1,312

Shaw, R. S. 1948 TEST FIRING OF T-7 CATAPULT FOR DOWNWARD SEAT EJECTION. (Wright Air Devel. Command, Wright-Patterson AFB, Ohio) WADC MCREXD-695-741; 11 May 1948.

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Shaw, R. R. 1952 NOTES ON BACKWARD FACING SEATS. (Dept. Civil Aviation, Commonwealth of Australia). July 1952.

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Shaw, R. R. 1956 RELATIVE COMFORT IN FORWARD AND BACKWARD FACING SEATS. (Dept. Civil Aviation, Australia) Rept. SM-18, Issue 2; 25 May 1956.

1,315

Shea, F. 1953 CIR CALLS FOR STRONGER CABINS.
Aviation Week, 59(16):98-99. 19 Oct. 1953.

ABSTRACT: In the controversy over forward-facing versus aft-facing seats in transport planes, it is felt that there has not been enough evidence collected by investigators of air crashes to justify one in preference to the other. The crash of a DC-6 at Elizabeth, N.J., on Feb. 11, 1952, is described, and it is stated that the investigators of this accident reported that the casualty rate would have been just as high with aft-facing seats as with the forward-facing seats, which were standard on this plane. However, it is definitely recommended that seats in transports be reinforced for lateral g forces. Present seats are designed to bear only 1 and 1/2 g laterally, and it is recommended that they be strengthened to stand loads as high as 35 g laterally.

1,316

Sheffield, F.C. 1942 "G" MEN OF THE AIR ON PILOTS FLATTENING OUT: AVOIDING THE PHYSIOLOGICAL ILL EFFECTS OF VIOLENT ACCELERATION.
Flight, 41:134-135

1,317

Shepard, L.F. 1962 OMNI-DIRECTIONAL HIGH ALTITUDE HELMET
(U.S. Patent 3,030,626, April 24, 1962)

ABSTRACT: A brief description and illustration are given of a helmet attached to a pressure suit used in high altitude flying. A rotatable pressure seal is included for maintaining pressure within the suit during movement of the helmet.

1,318

Sheperdson, R.M. 1956 SPECIFICATION FOR IMPACT BAG INFLATING UNITS FOR THE GAM-67 MISSILE. (Radioplane Co., Van Nuys, Calif.)
Contract No. AF33(600)-23893, Rept. No. 1123, 15 March 1956.
ASTIA AD 89 711

1,319

Siegel, A. I. & R. H. Tabor 1958 STUDY TO ASSESS THE EFFECTIVENESS AND UTILIZATION OF FULL PRESSURE SUITS. (Applied Psychological Services, Villanova, Pa.) Rept. No. NAMC ACEL-373; ASTIA AD 200 528.

ABSTRACT: The Mk II full-pressure suit assembly was investigated in the F8U-1 aircraft. Control access in the suit was marginal. Some controls were unreachable or inoperable at various suit pressurization. Head mobility was restricted but the helmet was considered generally comfortable. The intelligibility of the communication system was acceptable. Suit donning was accomplished in 10 to 18 min. Increased ventilation for the pilot particularly before becoming airborne was necessary. Some pilots were unable to complete the airstart, spin recovery, and ejection procedures. Aircraft abandonment under simulated conditions ranged from 20 to 85 sec.

1,320

Siegel, A. I., J. Bulinkis, R. Hatton, & K. Crain 1960 STUDY TO ASSESS THE EFFECTIVENESS AND UTILIZATION OF FULL PRESSURE SUITS: A Technique for the Evaluation of Operator Performance in Pressure Suits and Other Flight Apparel. (Naval Air Materiel Ctr., Philadelphia, Pa.) NAMC-ACEL-435; 29 April 1960

ABSTRACT: The need for a rigorous method for evaluating perceptual and motor performance in full pressure suits and other flight apparel has been a continuous one in Naval aviation. The present report describes a method, based on a series of generally accepted measurement techniques, for meeting this need. The scheme is based on determinations of performance capability of the following types: rate of movement, psychomotor coordination, manual dexterity and light manipulatory performance, work space requirements, visual field, anthropometric flexibility, manipulative area, and effort required for task performance. In addition, the design of an apparatus which will allow for the accomplishment of standardized measurements in each of these areas is described. (AUTHOR)

,321

ieker, H.O. 1952 DEVICES FOR PROTECTION AGAINST NEGATIVE ACCELERATION ero Medical Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC TR 52-87, Part I, June 1952. ASTIA AD 2135

STRACT: Previous experimental work has shown that negative acceleration is lerable within certain physiological limits. This report summarizes studies which human subjects were exposed to negative acceleration with and without

protection. The tolerance limit for negative acceleration in unprotected subjects in the upright seated position was found to be 2.5 g. The acceleration was limited to this level by the subject's discomfort and the bradycardia noted in the electrocardiogram. At 3 g, in addition to marked discomfort, conjunctival hemmorrhages and cardiac asystoles were noted. When the subject in the upright seated position was protected by means of counterpressure about the head and neck, the tolerance to negative acceleration was increased to 5 g. The tolerance limit for negative acceleration was found to be 4 g in the negative g aspect of the USAF prone position bed.

1,322

Sieker, H. O. 1952 DEVICES FOR PROTECTION AGAINST NEGATIVE ACCELERATION. PART II: FLIGHT STUDIES (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 52-87, Pt. 2; ASTIA AD-6891; Nov. 1952

ABSTRACT: Each of 6 subjects wearing neck-sealing full-pressure helmets flew 5 to 15 maneuvers involving from -1.0 to -3.0 g for 5 to 40 sec. An M-7 negative-g valve mounted on the F-84E aircraft in place of the standard positive-g valve automatically provided a helmet pressure of 25 mm of Hg for each negative g obtained. Maneuvers limited to -2 g were also flown by 3 pilots without pressure in the helmet. All pilots agreed that the pressurization improved their comfort during the maneuvers. The helmet restricted peripheral vision, and some pilots felt that the helmets were hot and stuffy. Negative-g maneuvers were estimated to be of the most value only in evasive tactics of fighter vs fighter; however, accelerations above -3 g require extensive aircraft modifications. (ASTIA)

1,323

Sieker, H.O, E.E. Martin, O.H. Gauer, & J.P. Henry 1953 A COMPARATIVE STUDY OF TWO EXPERIMENTAL PNEUMATIC ANTI-G SUITS AND THE STANDARD USAF G-4A ANTI-G SUIT. (Wright Air Development Center, Air Research and Development Command, Wright-Patterson AFB, Ohio) WADC TR 52-317, Feb. 1953. ASTIA AD 12716.

ABSTRACT: Two new types of pneumatic anti-g suits have been examined which apply pressure to a greater portion of the lower part of the body than the standard C-4A suit. The two suits consist of (1) complete coverage trousers composed of a connected system of circumferential bladders and (2) full pressure trousers. These two types of anti-g suits provide 0.7 to 0.9 more

protection against acceleration than the standard G-4A anti-g suit which afforded 1.8 g protection. A comparative study of the effect of the three types of protection on arterial pressure, venous pressure and vertical heart-to-head distance was undertaken on human subjects. During acceleration the inflation of the two experimental suits maintained mean arterial pressure at eye level and venous pressure at heart level higher than did the G-4A suit under the same conditions. The shortening of the heart-to-head distance was not significantly different with the three types of protection. It is believed that greater protection is afforded by the experimental anti-g suits because they apply greater pressure evenly to a larger portion of the lower part of the body than the G-4A suit is able to do. By this means they increase peripheral arterial resistance and venous return to the heart more effectively than the G-4A anti-g suit.

The two experimental suits have been shown to be an effective and comfortable type of protection against acceleration. Within the limits of blackout or comfort tolerance of the subject, these suits have been demonstrated to be safe for human use. Moreover, they may be incorporated into a combination altitude, anti-g and exposure suit. These new anti-g suits have the disadvantage of being bulky, poorly ventilated and in the case of the full pressure suit, difficult to don. It is concluded that further study, testing, modification and development of these anti-g suits should continue.

1,324

Sierra Eng. Co. c.1955 A TECHNICAL DESCIRPTION OF SIERRA SAM AND FAMILY THE ANTHROPOMETRIC (ANTHROPOMORPHIC) TEST DUMMIES.
(Sierra Eng. Co., Calif.)

1,325

Sierra Engineering Co. 1955 SIERRA SAM AND FAMILY - ANTHROPOMETRIC TEST DUMMIES.
(Serra Engineering Co., Serra, Calif.)

1,326

Sierra Engineering Co. 1959 GENERAL DESCRIPTION OF THE SIERRA SAM MODEL 263 95th PERCENTILE ANTHROPOMETRIC (ANTHROPOMORPHIC) TEST DUMMY.
(Sierra Eng. Co., Sierra, Calif.)

1,327

Sifuentes, S.S. 1958 SEAT BACK-PASSENGER-IMPACT ABSORPTION CHARACTERISTICS DEVELOPMENTAL TEST MODEL 22. (Convair, San Diego, Calif.) Rept. #SL58-177, 16 June 1958.

1,328

Silkey, F.R. & Michael Rickards 1955 INVESTIGATION OF A METHOD FOR IMPROVING THE PERFORMANCE OF UPWARD EJECTION SEATS (Wright Air Development Center, Air Research and Development Command, United States A.F., Wright-Patterson AFB, Ohio) Contract No. AF 33(616)-3025, Task No. 13437, December 1955, ASTIA AD-105255

ABSTRACT: The rapid increase of the maximum speed of USAF aircraft designs has resulted in a situation where, utilizing available seat thrust devices, sufficient clearance between the ejected seat-man combination and the aircraft vertical stabilizer cannot be guaranteed. The objective of this report is to present an investigation of one method for solving the tail clearance problem. The method is to increase the vertical height of the ejection seat trajectory by means of stabilizing the seat in a high lift attitude as soon as possible after the seat is separated from the aircraft. This report presents an analysis of the problems involved for stabilized high lift upward ejection seats. It is concluded that stabilizing the upward ejection seat produces definite improvement in the seat performance. It must be noted however that the stabilized high lift seat configuration will not be the same for large and small aircraft.

1,329

Silverman, A. J., S. I. Cohen, G. D. Zuidema & L. L. Vickery 1958 PSYCHOLOGIC BIOLECTRIC ASSESSMENT OF G-SUIT PROTECTION. (USAF, Wright Air Dev. Div., Wright-Patterson AFB, Ohio) WADC TN 56-400. ASTIA AD 97 278.

ABSTRACT: Performance of a psychomotor task and arousal as measured by GSR were assessed on six subjects who were centrifuged at 3 g for ten rides, while protected and again while unprotected by an anti-g suit. Results suggested less arousal and better sustained performance when protected by the suit.

1,330

Simmons, C.F. 1950 WINDBLAST PROTECTIVE VISOR ASSEMBLIES FOR USE WITH HELMETS AND OXYGEN MASKS. USAF Technical Report 6037, Sept. 1950. ASTIA ATI 87407

ABSTRACT: Problems incident to the development of wind blast head-protection equipment for use by aircrew men during seat ejection were studied. The equipment was tested by using both live subjects and dummies ejected from airplanes flying at speeds up to 485 mph. Tests were also made with wooden model heads using an altitude chamber to produce air blast in excess of 500 mph. It was determined that a modified P-1 helmet and a modified A-13A oxygen mask plus a visor mechanism will remain on the wearer at 485 mph.

1,331

Simmons, C.F. 1953 HUMAN FACTORS IN PERSONAL EQUIPMENT FAILURES. (Aero Medical Lab., Wright-Patterson AFB, Ohio) WADC Technical Rept. 53-244, December 1953 ASTIA AD 25 507

ABSTRACT: In-service conditions pertaining to the effectiveness of standard AF personal equipment are reviewed; type p-3 protective helmet is used as an example. Loss of the helmet before and during seat-ejection escape resulted in some fatalities. Poor fitting of the helmet prevented proper functioning of the oxygen masks. Some helmets employed were too weak and flexible to withstand wind-blast forces. These and other conditions were considered to result from ignorance of the available instructions concerning installation of visor mechanisms and P-3 helmets. Corrective action for achieving the maximum protection from the equipment is outlined.

1,332

Simons, A. K. 1951 TRACTOR RIDE RESEARCH
Paper; Society of Auto. Engineers National Tractor Meeting, 10-13 Sept. 1951. S.A.E. Prepringt 653.
See also Society of Automobile Engineers Transactions, April 1952, Pp. 357-364.

ABSTRACT: It cannot be over emphasized that the job the tractor must do, the position of the seat on the tractor, and the posture of the body in the seat will all affect tractor seat suspension design. One scientific approach to the problem is to (1) record the absolute tractor motion in all 3 directions simultaneously while the firld operation is in progress, (2) subsequently analyze those records in the light of human tolerances and (3) design the seat suspension

to isolate against the objectionable part of this motion. The use of such electronic equipment opens up new fields of investigation to the suspension engineer and the medical profession to determine physical and human responses to all conditions of motion. The challenge is to the seating engineer to try to devise a seat suspension that will do as good a job in isolating vibration and supporting his body as do his own legs without that unfortunate adjunct of becoming fatigued.

1,333

Simons, A. K. 1955 HEALTH HAZARDS OF ROUGH RIDING VEHICLES.
(Report to Commission on Accidental Trauma, Armed Forces Epidemiological Board, Dept. of Defense. 8 July 1955)
NOTE: CARI P&S 30.1
See also; Brostrom Research Laboratories Rept. No. 113.

ABSTRACT: In spite of mounting evidence that truck and tractor riding conditions are undesirable, investigations studying human reactions in the vibration range above the so-called "intolerable limits" have not been made. The designers of military and commercial vehicles need to know the consequences and safe limits of operation of "rough riding" on man before they will improve vehicle suspension and driver seat design. To satisfy this need, it is essential that medical and engineering research be alerted and focused to study the effects on health, safety, and human efficiency of exceeding the subjective "intolerable" limits of shock and vibration in rough riding vehicles. This frequency range is between 1 - 8 cps. with intensities up to accelerations of 10 G's on the driver. As a preliminary and constructive step, it is suggested that an objective group conduct a scientific inquiry into the overall economic, health and safety aspect of the problem and publish its results.

1,334

Simons, A.K., A.O. Radke & W.C. Oswald 1956 A STUDY OF "TRUCK RIDE" CHARACTERISTICS OF STANDARD CUSHION VS. SUSPENSION TYPE SEATS IN MILITARY VEHICLES
Detroit Arsenal and Aberdeen Proving Ground Contract No. DA-11-022-ORD-1999; ORD Project TT1-696; DA Project 5T7201001; Sub-Directive 60405330-11-80802. Rept. No. 118, 16 March 1956

ABSTRACT: The purpose of this study was to electronically record and compare the "truck ride" (1-8 cps) felt by the truck driver in a standard seat cushion assembly and suspension seats installed in a rubber-tired military truck and driven over permanent test courses at the Aberdeen Proving Ground.

Truck acceleration levels in the vertical, transverse and longitudinal directions were found to exceed the "intolerable" and "uncomfortable" limits suggested by vibration table studies in Europe and the U.S.A. The standard driver's cushion seat amplified vertical basic truck motions (1½-6 cps), transmitting an average of 124% of the vehicle vibration intensity to the driver's belt on the Belgian block and staggered bump courses. The assistant driver's seat averaged 139% transmission. The suspension seats attenuated the basic truck motions (1½-6 cps) to the extent of transmitting an average of 80% of the truck vibration intensity to the driver's belt for suspension A (69% for suspension B), over the same test courses. These field test results correlate with performances determined in laboratory vibration table studies of man on the standard and suspension type seats. This correlation is important because laboratory vibration table studies are easier to make and are subject to greater experimental controls.

Laboratory vibration studies on man in a rigid seat were made (0-6 cps) which show the different responses of man's head, neck and belt and the gross effects of variation in muscle tension.

Some theories are presented on man's expenditure of energy in holding onto steering wheel and pushing into back cushion to reduce the amplifying effect of conventional cushions. The serious lack of data throughout the world on man's short and long term reaction to vibrations in the 1-8 cps range is emphasized.

1,335

Simons, D. G. 1954 METHODS AND RESULTS OF ONE YEAR OF BALLOON FLIGHTS WITH BIOLOGICAL SPECIMENS. J. Avia. Med. 25:380-387

1,336

Sinnamon, Edwin G. & W.S. Wray 1962 BIBLIOGRAPHY OF AVIATION MEDICAL ACCELERATION LABORATORY PUBLICATIONS, 1950-1960
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-6211 Sept. 27, 1962

ABSTRACT: A bibliography with abstracts and indices is presented which covers all of the published work of the Aviation Medical Acceleration Laboratory during its first decade, 1950-1960. The primary facility at this laboratory is the 50-foot radius human centrifuge with its gimbal-mounted gondola. This device is capable of producing acceleration levels up to 40 G and with computer control can realistically simulate flight profiles of air and space vehicles. Ths subject matter covered by the publications includes aviation and space medicine, the effects of acceleration on the animal and human organism, human performance under acceleration stress, dynamic stimulation of aircraft and space vehicles, biochemistry, physiology, psychology, and engineering. Included are formal reports, progress reports and articles which appeared in the open literature. The material is coded and grouped under subject headings and indexed by author, title and report number or journal citation. ASTIA numbers are given for all reports available under that system.

1,337

Sisakyan, N.M. 1961 BIOLOGIIA I KOSMICHESKIE POLETY (BIOLOGY AND SPACE FLIGHT) Priroda (1): 7-16, 1961
See also: "Soviet Literature on Life Support Systems", Air Information Division, Wright-Patterson AFB, Ohio. AID Report 61-59 April 28, 1961 ASTIA AD 256 235

ABSTRACT: Soviet experiments with animal-bearing rockets show that at heights of 78-85 km and speeds of 2,000 km/hr or at 39-46 and 4,100 km/hr catapulting is the reliable emergency escape method and causes no great functional disturbances in the animal. It has also been found that 3-10 minutes of weightlessness causes no great functional lesions to the animals cardiovascular or respiratory system. Experiments indicate that the body can more easily withstand the transition from acceleration to weightlessness than the reverse. No changes, genetic or otherwise, have so far been noted in the bacteria and phages contained in the second Soviet space ship. (CARI)

1,338

Skogland, H. 1958 T33 AIRCRAFT EJECTION SEAT TRIALS STATIC EJECTIONS-MODIFIED SEAT
(Royal Canadian Air Force) CEPE Report No. 1354 September, 1958
ASTIA AD 201397

ABSTRACT: Findings to date concerning catapult tube bending and tail clearance during ejections from a T33 aircraft are summarized.

A standard and a modified T33 Aircraft Ejection Seat were compared for rate of tumbling, tail clearance and tube bending. The results of the static test indicate that: (a) the maximum tube bending, 1 g ejection, may occur at aircraft attitudes of 0^{o} to 10^{o} nose down, and (b) the modified seat attained trajectory heights 11% to 35% higher than the standard seat with approximately 30% reduction in tumbling.

Recommendations are submitted to modify all T33 and Sabre aircraft ejection seats.

1,339

Skopp, G. H., & A. E. White 1961 DESIGN, DEVELOPMENT, AND QUALIFICATION TESTING OF THRUSTER, CARTRIDGE ACTUATED, T31. (Pitman-Dunn Labs. Group, Frankford Arsenal, Philadelphia, Pa.) FA Rept. No. R-1598; Proj. 1362; ASD TR 61-444; ASTIA AD-270 737; Oct. 1961

ABSTRACT: A summary and an evaluation are given of the ballistic and mechanical development of Thruster, Cartridge-Actuated, T31. The thruster, weighing 5.7 lb, was developed to unlock the canopy of the F105E aircraft during emergency escape, and to provide sufficient bypass pressure to initiate the action of the canopy remover. In operation, the thruster piston retracts and displaces a mass of

310 lb in. the horizontal plane for a min distance of 2.0 in. over a temperature range of -65 to 200 F. The thruster movement is horizontally opposed by a resistive force of 6200 lb. The thruster piston locks in position upon completion of its stroke, and bypasses a min of 1000 psi at the end of 42 in. of MS 28741-4 hose assembly. The final lock keys are capable of withstanding a 26,000-lb push or pull. It is pointed out that the development program for this item was curtailed after cancellation of the F105E airplane, and the thruster did not undergo a complete qualification test program. (AUTHOR)

1,340

Slater, E.T.O., A.E. Slater & H.E. Ross 1950 SYMPOSIUM OF MEDICAL PROBLEMS ASSOCIATED WITH SPACE FLIGHT
Brit. Interplanetary Soc. J. 9(1): 14-37 Jan. 1950

ABSTRACT: Three papers are presented: "Psychological Problems of Space-Flight" by E.T.O. Slater; "Balancing Mechanisms of Inner Ear" by A.E. Slater; and "Lunar Spacesuit" by H.E. Ross.

1,341

Slechta, R. F., E. A. Wade, W. K. Carter, & J. Forrest 1957 COMPARATIVE EVALUATION OF AIRCRAFT SEATING ACCOMMODATION. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 57-136; Apr. 1957; ASTIA AD-118 097
NOTE: CARI P&S 4.23aa

ABSTRACT: Three inter-related purposes were accomplished: (1) A series of seats currently in use in operational aircraft were comparatively tested for adequacy in limiting pilot and crew fatigue and discomfort. (2) Several subjective methods of comfort testing were devised and evaluated to determine efficient and economical means of seat evaluation. (3) The test data were analyzed for basic information about the nature and progression of seating discomfort. The approach was experimental, using techniques and orientations of an inter-disciplinary research team. Eighteen subjects, selected to represent a wide range of body sizes in the Air Force population, were seated in each of six seats for tests up to 7 hours in duration. Six by six Latin Squares were utilized for purposes of counterbalancing Summaries of data and discussions of statistical techniques are presented in appendices. Results are summarized in an introductory overview and in the conclusions section. Results of several comfort testing techniques were found consistent one with the others. Statistical separation of the seats was demonstrated in analyses of data from voluntary sitting time and other techniques.