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PERFORMANCE STANDARDS FOR PASS-FAIL DETERMINATIONS IN THE NATIONAL AIR TRAFFIC FLIGHT SERVICE STATION TRAINING PROGRAM

Evan W. Pickrel, Ph.D.
FAA Office of Aviation Medicine
800 Independence Avenue, S.W.
Washington, D. C. 20591

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16. Abstract This report describes and documents Pass-Fail procedures for the new FSS Training Program. New types of measures and sets of norms are used to create standards of performance that students must meet to become eligible for acceptance into the operational facility work force. One type is newly developed FSS Skills Tests, paper-and-pencil simulations of laboratory problems, that were administered to personnel at operational Flight Service Stations across the country for validation, relation to on-the-job performance, and standardization purposes. Other types are the new academic block tests and graded laboratory problems created for each of the FSS positions. A student who fails both the graded laboratory problems and skills tests in the Pilot Briefing, Inflight, or Emergency Services positions is subject to failure. A student who fails to achieve a passing score on a final Phase Grade also is subject to failure. The Phase Grade is a weighted average of performances on the academic block tests, graded laboratory problems (all positions), and the Pilot Briefing, Inflight and Emergency Services Skills Tests. Norms for each Pass-Fail measure were established on a student population, and scores of the bottom 5% of that normative population on each measure were judged to be unsatisfactory. These were used to establish cutoff scores for future student populations, which is considered a defensible procedure for Pass-Fail application. The procedure was applied experimentally on the first eight classes, 118 students, completing the new FSS training program. Seven students, six percent of the group, had a combination of unsatisfactory performances in both skills tests and graded laboratory problems or on the final Phase Grade that would place them in the Fail category.

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THE NEW FSS TRAINING PROGRAM
PERFORMANCE STANDARDS FOR PASS-FAIL DETERMINATIONS

E. W. PICKREL, PH.D.
OFFICE OF AVIATION MEDICINE

INTRODUCTION

This report describes and documents Pass-Fail procedures for the new FSS Training Program. It describes the derivation of performance standards and presents an example problem to demonstrate their application.

The report has the following major sections

- Introduction
- Overview
- Performance Standards
- Appendices
- Tables

The appendices provide rationale and technical information for the reader interested in details of the new program. The report can be read without reference to the appendices.

Background

In 1977 a Congressional Committee, the House Government Affairs Committee, released a report recommending that the FAA improve its selection and training procedures for air traffic controller specialists and reduce the $13.8 millions lost annually because of the unacceptably high number of Air Traffic Control Specialists who drop out of the program after several years of training.

The report suggested that the FAA review the criteria and selection devices used by the Civil Service Commission and develop a test battery that will more accurately reveal whether a candidate will succeed as a controller. The committee further recommended that criteria for screening and eliminating unsuccessful students be established and used at the ATC Academy as well as later in the training program to ensure that potentially unsuccessful controllers are eliminated early in the training process.

The FAA is responding to these recommendations. As an initial step, the Office of Aviation Medicine has created new selection tests for the Civil Service Commission to use after a person first applies for a position. These include the ATC Occupational Knowledge Test and the Multiplex Controller Aptitude Test. These tests have been validated against such criteria as ATC Academy training, supervisory ratings on the job, career progression, and attrition. The available data show that, with application of these tests, most of the applicants entering the Flight Service Station program should succeed as air traffic controller specialists. The failure rate at the Academy should be relatively low for those who enter through Civil Service Commission competitive testing channels.

The House Government Affairs Committee report had further stated that the present training system appears to impede the elimination of unqualified students, forcing a decision to terminate the individual into the later stages of training, and recommended that criteria for screening and eliminating unsuccessful students be established and used at the ATC Academy as well as later in the training program to ensure that potentially unsuccessful controllers are eliminated early in the training process.

The new FSS Training Program is responsive to that recommendation. Training itself is a feature of an improved screening system that will extend beyond the initial selection testing by incorporating measures of the candidates' performance during initial training. Parts of the FSS training program will be included in the applicant screening process.

This effort was requested and coordinated by the Office of Personnel and Training, Headquarters FAA. Office of Aviation Medicine personnel, consultants, and members of the ATC Academy Flight Service Station Sections' Development Unit cooperatively developed new FSS skills tests, paper and pencil simulations of laboratory problems. Personnel at operational Flight Service Stations across the country were most cooperative in taking these tests for validation, relation to on-the-job performance, and standardization purposes. The Chief of the Flight Service Station Section assigned many of the instructional staff to the Development Unit, to assist in such tasks as designing the new classroom and laboratory facilities, developing the new instructional materials, laboratory problems and procedures. Section meetings were held to keep all personnel informed regarding this team effort, the role of such materials as the new measurement devices and procedures being developed to assure heightened validity, reliability and general effectiveness within the new Pass-Fail structure, and to prepare all FSS Section members for that moment when the new training program would become operational. As the first class began, the FSS Section Chief's observation was that the new students, including transfers from the Terminal and Enroute options, seemed to be very receptive and well motivated in the new facility, stimulated to perform well in the new program.

OVERVIEW

General

The new FSS program is aimed at providing previously screened candidates with a training and evaluation curriculum that should ensure that the great majority of them will be ready for journeyman assignments, yet eliminate the few whose performance in training indicates a high probability of failure on-the-job. As such, it is responsive to the House Government Affairs Committee recommendation.

The program features Pass-Fail evaluation keyed to the phases of training. Phase II training is identified as the initial ATC Academy Pass-Fail point, with Pass-Fail determinations to be made at the end of Phase II and Phase III. When there is no information to indicate that the student has not completed a phase of training in a satisfactory manner, the student will be advanced to the next phase. Scores earned in Phase II will be used to determine advancement to Phase III, but not be used as part of the composite for Phase III.

Phase III is designed to qualify the developmental to perform the duties of each position of operation. These include the duties of Weather Observer, Broadcast, Teletype, Flight Data, Preflight and Inflight positions of operation plus Emergency Services to Aircraft. The latter three include functions which, if not fulfilled, could have potentially catastrophic results, and impact the safety of the air traffic system. These also are the more complex operational activities, requiring some performance of most of the duties of the other positions, and thus are at the top of the FSS positions hierarchy.

Phase III Evaluation Measures

The new Phase III student evaluation procedure is designed to be both an integral part of the Phase III training and a component of the screening process. This requires that it be composed of measurement instruments that are representative of the job areas found in Flight Service Stations and that it include enough measures to permit reliable Pass-Fail assessment. Further, it must assess both job knowledge and readiness for job performance. Thus, it must include measures of academic classroom achievement and ability to perform job-like tasks in a laboratory environment.

Table I, page 21, lists the activities and measurement instruments included in Phase III evaluation. The number of measures available to assure valid and reliable assessment is displayed also.

Academic classroom performance is measured by block tests and achievement tests. These are expert prepared multiple-choice tests. The fact that average scores for current classes are at the high 80 or 90 percent level indicates that training continues until high student performance is achieved. Consequently all students completing Phase II successfully enter Phase III with a similar academic foundation in the FSS subject matter irregardless of considerations such as sex. For the academic area, this practice conforms with the House Government Affairs Committee recommendations.

Ability to perform job tasks is assessed by laboratory problems for each of the job activity areas and by FSS skills tests for the critical areas of Flight Data, Preflight, Inflight and Emergency Services. A student will accomplish 7 block tests, 10 achievement tests, 28 graded laboratory problems and 4 FSS skills tests for a total of 49 independent measures.

Procedural Changes

For the new FSS Training Program to operate, significant changes were required in facilities and procedures for the laboratory phase. The new training program provides expanded laboratory space and an increase in number of graded problems for each of the critical Preflight, Inflight and Emergency Services activities.

A different instructor scores the student on each graded laboratory problem, and without awareness of other instructors' ratings of the student's earlier performances. Use of multiple raters, each one independently grading each student, adds objectivity to the grading process. It is fair to the student, yet protects instructors from student complaints of bias directed against them. Additional desirable procedural actions are presented under Recommendations.

Appendix 1, page 9, is a statement about laboratory training that expands upon changes in laboratory procedures.

FSS Skills Tests

FSS skills tests have been developed to help support the evaluations given in the laboratory. These are paper-and-pencil tests that simulate the laboratory problems. The scoring is accomplished by objective keys, a procedure that serves to minimize the impact of instructor biases. These new tests have been administered to a considerable sample of developmentals and journeymen at operational Flight Service Station facilities and to a comparable size group of FSS students at the ATC Academy for validation, relation to on-the-job performance, and for standardization purposes. Since norms have been developed to describe performance of these groups, a new student's scores on the skills tests can be compared to those of FSS field personnel as well as to those of other FSS students at the Academy.

Thus Pass-Fail evaluations are based on actual job performance data. Unacceptable student performances resulting in failure scores will be determined by reference to the normative data.

Appendix 2, page 11, contains a detailed description of the process by which the normative data was acquired and the norms established.

PERFORMANCE STANDARDS

The establishment of standards for applying Pass-Fail criteria to Phase III student performance has been based on detailed analysis of data obtained on 253 active FSS air traffic control specialists, the last eight ATC Academy classes (78-1 through 78-8) in the old training program, and the first eight classes (78-01 through 9006) in the new training program. The technical analysis that supports the standards and procedures described herein is provided in Appendix 3, page 15. The objective, in line with the House Government Affairs Committee recommendations, has been to provide an initial rationale and procedure that will minimize failures, yet eliminate students most unlikely to succeed on the job. A basic assumption underlying the standards is that the ATC Occupational Knowledge Test and the Multiplex Controller Aptitude Test will be used in the selection of candidates for the FSS air traffic controller specialist positions.

Briefly, with this cutoff procedure, a student who fails both the laboratory problems and skills test in the Pilot Briefing or Inflight or Emergency Services positions is subject to failure. These include functions which, if not fulfilled, could have potentially catastrophic results and impact the safety of the air traffic system. A student who fails to achieve a passing score on the final Phase Grade also is subject to failure. This Phase composite is a weighted average of all phase scores including academic block tests, the Pilot Briefing, Inflight, and

Emergency Services skills tests, and the graded laboratory problems for all positions. This is the procedure as established thus far.

This procedure is recommended to identify those whose performance is unacceptable. A reviewer then should determine the degree of consistency among the student's scores, to assure that sub-par performance is not resulting from chance variations in measurement. Since a student's ATC career is at stake and judgments made during this review have a high level of personal consequence, a recommendation is that the review be carried out by the FSS Section Chief or his designated delegate. Office of Aviation Medicine and FSS Academy personnel will continue research and development work to further refine and strengthen the cut-off standards.

APPENDIX I

LABORATORY PROCEDURES

The laboratory is an attempt to create, at the ATC Academy, something similar to the operational environment. It provides the opportunity for each student to practice what has been learned in the classroom, and is the best available phase of ATC Academy training for measurement of the ability to perform the duties of the various FSS positions of operation. Most graded laboratory problem scores are derived from over-the-shoulder observations, using checklists that were derived from analysis of the tasks involved during operational work performance. The observer indicates whether each step has been successfully achieved. Through checking of task elements (steps), these checklists minimize subjectivity in the assessment process. Such assessments are more reliable than descriptive or numerical rating scales.

Evaluation forms in the old training program did not incorporate instructor's comments into the grading process. Instructor comments were available on the back of the forms, but were not reduced to numerical scores. Instructor evaluations were being used as part of student aggregate scores in the terminal and enroute ATC Academy courses, adding a new element to the aggregate scores and increasing the stability of the Pass-Fail assessment on each problem. An incorporation of the instructor's numerical assessment of each student's performance on a problem, and predicted potential performance on future problems, was added to the checklists to be used in the new FSS Training Program.

A weakness of the old training program's laboratory phase was the shortage of work space for positions, which resulted in a student receiving only two practice problems and one graded problem in the primary positions. Laboratory problems are individual testing situations that provide opportunity

for attention to much detail, but the process is time-consuming, and the use of single problem scores permitted too much opportunity for chance elements to enter into Pass-Fail judgments. The new FSS Training Program provides for expanded laboratory space and an increase in the number of graded problems per position. For example, there are four graded problems for each of the primary Preflight, Inflight, and Emergency Services activities. A different instructor scores the student on each problem, and without awareness of other instructors' ratings of the student's earlier performance. A procedure of using multiple raters, each one independently grading each student, adds objectivity to the grading process. It also provides an excellent defense against the student who receives a failure in the course and sends out letters of complaint, saying one instructor was responsible for this and did it out of spite because of the student's race, religion, or sex.

APPENDIX 2

EVALUATION OF THE FSS SKILLS TESTS

Information concerning the suitability and the operational usefulness of the new FSS skills tests was obtained empirically by carefully selecting an Operational Facility sample of practicing Air Traffic Controllers and a sample, comparable in size, of ATC Academy students. Demographic data, test performance scores and intercorrelations for the two samples are presented in the tables of this report.

Operational Facility Sample

Some characteristics of the operational facility sample are described in Table 2, page 22. Almost 90% were males and over 30 years of age. Approximately 75% were of grade GS-11 or higher. Seventy-two percent had attended college, and 17% of this sample held a bachelors or masters degree. Eighty-one percent had 36 months or more experience in the FSS activity, and 70% were full performance level personnel. Forty-two percent held some kind of pilot certificate, with 25% holding a commercial or instructor's rating. Relationships between skills test performances and various kinds of experience are described in Table 3-6, page 23-36. There is improvement in skills test mean performance scores with increased job experience, i.e. between performances of those with less than two years of FSS experience and those with 2 to 3 years experience, but generally little or no gain after that time. Personnel in that larger group, the older people, include several kinds of administrators and staff personnel whose other duties can cause them to lose touch with technical details relating to day-to-day servicing of aircraft. Increases in GS-grade

level show a similar relation to mean skills test performance scores. Most of the improvement in performance peaks at the GS-11 level, and generally there is little or no gain for grades GS-12 and up. Those holding commerical and instructor pilot certificates perform better on the skills tests than those who are less experienced. Those with Enroute Flight Advisory Service (EFAS) training consistently perform somewhat better than those lacking that additional training. Those receiving ATC Academy training more than a year ago score better than those who never received such training, but the relatively inexperienced personnel who received their ATC Academy training within the last year did not perform as well as more experienced personnel who never received such training. Those in facilities having a full time Evaluation Professional Development Specialist (EPDS) scored somewhat higher on the Preflight, Inflight, and Emergency Service Skills Tests than those at facilities without the services of a full time specialist. Differences in skills test performances between sexes can be accounted for by chance; there is no significant difference from this sample on these tests. Intercorrelations of past experience and performance on the skills tests are presented in Table 7, page 27 and show a significant relation between skills test performance and success in the FSS option.

ATC Academy Sample

Some characteristics of the ATC Academy student sample are described in Table 8, page 28. Approximately 43 percent were over thirty years of age, and 20% were females. Seventy-seven percent claimed some college education, and 27% claimed a bachelors or masters degree. Seventy-seven percent claimed prior ATC experience and 42% held some type of pilot certificate.

Table 9, page 29, presents summary statistics and intercorrelations of performance on FSS skills tests and graded laboratory problems for the student population in the old training program. The FSS skills tests correlate well with Fundamentals of Air Traffic Control, a multiple-choice measure of general information in air traffic control, as well as with the laboratory average grade and with each other. The Preflight Briefing Skills Test is scored Rights Only, and correlates .384 with the lab average score. This test presents in written form the kind of dialogue that takes place when a pilot communicates by radio or telephone for a briefing. The student is supplied with weather data sheets for which to supply this kind of information, plus multiple choice questions regarding the appropriate responses to the pilot's questions. The Inflight Skills Test presents in written form the kind of dialogue that takes place between those working this position and pilots who are airborne. The student is provided Weather Data Sheets from which to provide this type of information and an Action List of nineteen possible actions from which to select responses for the questions. As multiple actions should be taken in most situations, the student may erroneously omit some actions that should be identified, and include actions that would be inappropriate or wrong. These omission and commission errors seem to be quite independent negative scores or error measurement. The data suggest that a combining of the two scores to form a new "omit plus wrongs" score would provide an excellent measure of the student's performance on the Inflight Skills Test.

Emergency Services Skills Test is a VOR orientation problem, utilizing a branching technique to present the student with optional paths to follow in locating a lost aircraft. If the student makes a poor decision, opportunities are provided in the form of Minor Error paths, for a return to the better "Major Decision" path. Phraseology questions also are provided in the test.

The Phraseology and Major Decisions subscores seem to be parallel measures of the same skill. A combining of these should provide a more reliable single measurement. The Minor Error path provides much logical appeal to specialists in air traffic control and is needed to maintain the simulation. A total score which combines these sub-scores, is recommended for use in determining Pass-Fail for the Emergency Skills Test.

APPENDIX 3

EVOLVING PERFORMANCE STANDARDS

Scores of operational personnel and those of past students may be used to create standards of performance that new students must meet to become eligible for acceptance into the operational facility work force. For example, the total work force's capabilities will gradually improve if an entrance eligibility requirement for new personnel is that their test performance must be better than that of the bottom 5% of the current work force. Students nearing completion of ATC Academy training might then be required to meet this standard to demonstrate their readiness for an operational assignment. The operational FSS facility sample, Table 2, and the ATC Academy FSS student sample, Table 8, had remarkably similar demographic characteristics. Performances of students in the first eight classes 78-01 through 9006, in the new training program should provide a stable statistical base for derivation of Pass-Fail cutoffs.

Laboratory Grades

The development of improved laboratory procedures for the new training program have been described in Appendix 1. The number of graded problems was increased fourfold, instructor evaluations were incorporated into the grading process, and stricter, more objective quantitative grading procedures were introduced to provide an improved scoring base for identifying the weak students. Table 10-12 (pages 30-32) present distributions of laboratory averages in Pre-Flight, Inflight, and Emergency Services for samples of students in the old and the new training programs. The Preflight Lab Problem mean dropped from 95.72 in the old program to 80.12 in the new program. The distribution of scores in the old program ranged from 80 to 100, but in the new program the range is from a 52 to a 91, which will be more useful for identification of weak students. The Inflight Lab Problem mean dropped from

94.40 to an 84.36. The distribution of scores in the old program ranged from 65 to 100 and with only three students scoring below 84. In the new program it ranges from 69 thru 98, with a half dozen students scoring below 72. The Emergency Services Lab Problem scores were a binary pass-fail in the old training program, and scores in the new program range from 67 through 98 with a mean of 87.69. The cutoff scores for each distribution in the new training program below which approximately five percent of the students scored is given in Table 18, page 39. The cutoffs for passing Preflight, Inflight, and Emergency Services are laboratory problem score averages (four problems) of 70, 72, and 76, respectively, representing 6.8%, 5.1%, and 5.8% of the students from these classes.

Skills Tests

Evaluation of the FSS skills tests has been presented in Appendix 2. The distributions of the Preflight, Inflight, and Emergency Services Skills Test scores for the Operational Facility, old training course, and new training course samples are presented in Tables 13-17, (pages 33-38). As shown in Table 13, page 33 , performance of students in the new training program on the Preflight Briefing Skills Test was slightly better than that of students in the old training program, and persons from operational facilities scored somewhat higher than either student group. Tables 15-17 present distributions of totals scores on the Inflight and Emergency Services skills tests. The Inflight totals score is negative, a sum of wrongs and omissions. The Emergency Services total score is a weighted composite, with major decisions assigned a weight of 5, minor errors a weight of 3, and phraseology a weight of 1. The improved performance of the students in the new training program is striking. Those in the new training program averaged 17 fewer mistakes on the Inflight skills test, and averaged ten points better on the Emergency Services test

than those in the old training program.

Table 18 contains the cutoff score for each Skills Test for classes 78-01 to 9006. These cutoffs for Preflight, Inflight, and Emergency Services are 11, 32, and 15, respectively, representing 10.2%, 6.8%, and 5.9% of the students in these classes.

Since the Skills Tests are to be incorporated into the calculation of the final phase grade for future classes, it was desired to transform the raw score for these tests to a 0-100 scale where the cutoff score would be given a value of 70. Table 19 gives the converted grades for each of the Skills Tests. The raw scores above the cutoff score were scaled in equal intervals from 70 to 100, while the scores below the cutoff score were scaled in equal intervals to 0.

Phase Grades

The final phase grade is derived from a weighted composite of all phase grades, with 5% allocated to academic block tests, 15% to secondary position graded laboratory problems, 40% allocated to primary position graded laboratory problems and 40% allocated to primary position skills tests. The sum of these scores, a weighted composite, is then converted to a phase grade. The weighted composites are calculated according to the following linear combination:

5% Academic Average (average of all block tests);

15% Graded laboratory problem averages for Weather Observer, Teletype, Broadcast, and Flight Data;

15% Preflight Laboratory Average (four graded problems);

15% Preflight Skills Test Converted Score (Table 19);

12.5% Inflight Laboratory Average (four graded problems);

12.5% Inflight Skills Test Converted Score (Table 19);

12.5% Emergency Services Laboratory Average (four problems); and

12.5% Emergency Services Skills Test Converted Score (Table 19).

Each of the above scales is based on a grading metric from 0 to 100.

In order to provide some normative data for future classes, all weighted composite scores were computed for classes 78-01 to 9006 according to the above linear combination. These were standardized using the mean (82.84) and standard deviation (4.54) of the weighted composite scores (see Table 20). Then they were re-scaled for development of the new table for converting weighted composite scores to final Phase Grade (Table 21). The desired transformation is:

$$Y = 5.44 \frac{(X-82.84)}{(4.54)} + 79.44,$$

where X is the weighted composite score and Y is the final phase grade. This transformation identifies5.1% of the students from the classes 78-01 to 9006 as scoring below 70, and thus labeled as failures. The scaled scores in Table 21 are intended to be used with future Academy classes.

Failure Criteria

Two ways to fail Phase 3 are a Position failure and a Phase Grade failure.

Position failure: A student who fails both the skills test and the laboratory problems in the Preflight position or Inflight position or Emergency Services position fails the phase. The Phase Grade entry for that student will be the word FAIL, with no numerical score.

Phase Grade failure: A student with a final Phase Grade below 70 fails the course. That final grade is derived from a weighted composite of all phase grades.

These are listed in Table 18.

Table 22 lists all the students from classes 78-01 to 9006 who failed at least one of the primary position Skills Tests, or Laboratory problem averages or Phase Grade. In all, 38 students or 32.2% of the students failed at least one of these. Of these 38 students, six students were Phase Grade

failures. One of these students (9006-5) also was a position failure in Preflight. One student (9004-10) was also identified as a Preflight Position failure. Thus, a total of seven students (5.9%) in classes 78-01 to 9006 would have failed the program using the above criteria.

Summary of Data, All Variables

Table 23, page 44, presents summary statistics and intercorrelations of performance on block tests, graded laboratory problems, and the FSS skills tests for the student population in the new training program. Scores on the graded laboratory problems for the several positions correlate well with each other, and generally higher than the laboratory problems in the old training program. The measures of student performance in the training program correlate well with the final Phase Grade. This Phase Grade is the best measure present here for use in pass-fail determinations. The classroom block test, laboratory, and skills test performances by position correlate fairly well with each other to support their use as a composite, but not as well as the final Phase Grade.

The Multiplex Controller Aptitude Test, MCAT, a newly created measure for use in initial screening of applicants, correlates .49 with the Phase Grade. This test was designed to measure aptitude for the type of work being taught in the new training course, and a correlation of this magnitude is a mutually supportive indicator. The final Phase Grade is demonstrating a desirably high relation to a student's aptitude for this work. Also, those who counsel stumbling students during training might use their MCAT scores to see if the source of difficulty lies in lack of aptitude for the work.

Comment

Instructors generally try to provide a fair and just evaluation of a student's performance during the grading of laboratory problems. Fair grading practices are expected to continue after the introduction of Pass-Fail in the

new training program. The new training program introduces new graded problems, but the same instructors must still compare each student's performances against a standard of expected performances for evaluation purposes. There is no reason to expect any dramatic upsurge in the number of students receiving failing grades, or to anticipate a failure rate greatly different from that described in the example problem presented here. A good instructor should be able to get the subject matter across to most students. There may be a few exceptions within specific classes, as some may have a greater-than-normal number of weak students and have a higher failure rate. The background information on the students in the example problem shows that they were a high quality group.

As the training course is changed and new laboratory problems introduced, instructors and evaluators go through a period of learning and adjustment with the new materials. Since the FSS Skills Tests have not been changed and their norms are based on a group from operational facilities, it is recommended that these tests carry a weight equal to that of the graded laboratory problems for making Pass-Fail judgements during this adjustment period. The laboratory problem 5% cutoff per position may be obtained by first averaging each student's graded laboratory problem results per position, then ranking all the available scores and identifying the bottom 5% cutoff. After this is done, following the procedure outlined in the above example problem will identify those students whose performance is unacceptable. The 5% cutoff for averaged laboratory grades will be based on a very small sample at the start, and should be re-computed as the available student sample increases with each new class, so that a more stable cutoff may be realized.

TABLE 1

MEASUREMENTS AVAILABLE IN PHASE III
FOR
PASS-FAIL EVALUATIONS

Activity	Block Tests	Achievement Tests	Graded Laboratory Problems	FSS Skills Tests
Broadcast	1		6	
Teletype	1		4	
Weather Observer	1	3	4	
Flight Data	1		2	1
Preflight	1	3	4	1
Inflight	1		4	1
Emergency Services	1		4	1

TABLE 2

POPULATION CHARACTERISTICS
FIELD SAMPLE, OPERATIONAL FACILITIES

Testing Dates
July-August 1977

FAA FLIGHT SERVICE STATIONS

253 Persons

AGE IN YEARS

Interval	Number of Persons
36 & over	164
31-35	47
26-30	25
20-25	5
No Answer	12

SEX

Type	Number of Persons
Male	221
Female	27
No Answer	5

Education (Highest Attained)

Level	Number of Persons
Masters Degree	3
Bachelor Degree	40
College 3-4 years	47
2 years	48
1 year	43
High School Diploma	69
No Diploma	3

Current GS Grade

Level	Number of Persons
12 & up	20
11	169
10	40
9	8
5-7	10
No Answer	6

ATCS EXPERIENCE (Months)

Option	None	1-11	12-23	24-25	36 & up	No Answers
FAA FSS FPL	20	9	21	24	176	3
GS-2152 FSS Option	5	8	11	23	205	1
Enroute Option	128	17	40	32	30	6
Terminal Option	207	19	12	5	6	4
Before joining FAA	145	15	5	14	73	1

Pilot Certificate

Type	Number of Persons
Instructor	18
Commercial	44
Private	27
Student	16
None	145
No Answer	3

FAA ATC Academy Training

When	Number of Persons
Graduated 1976-77	31
1975 or before	93
Did not attend	124
No Answer	5

EFAS Training

	Number of Persons
Yes	45
No	206
No Answer	2

TABLE 3

TEST PERFORMANCES
FIELD SAMPLE, OPERATIONAL FACILITIES

Testing Dates
July-August 1977

FAA FLIGHT SERVICE STATIONS

253 Persons

Tests	N	Mean	Standard Deviation
ATC Fundamentals- Rights			
100 items	218	74.03	9.96
Preflight Briefing- Rights			
25 items	243	15.22	2.92
Inflight-Negative Scores			
Wrongs- 172 items	229	18.59	8.00
Omissions- 60 items	229	23.08	7.48
Wrongs + Omissions	229	41.58	11.93
Emergency Skills II- Rights weighted			
Major Decisions- 10 items	253	12.55	7.85
Minor Decisions- 7 items	253	.24	.81
Phraseology- 12 items	253	4.64	2.54
TOTAL	253	17.43	9.97

TABLE 4

RELATING TEST PERFORMANCE
TO
POPULATION CHARACTERISTICS
FIELD SAMPLE, OPERATIONAL FACILITIES

Test Performance Mean Scores

versus

Testing Dates
July-August 1977

253 Persons

Tests	Months Experience, FSS Option		
	0-23	14-35	36 & up
	N= 25	N= 23	N= 205
ATC Fundamentals- Rights 100 items	71.84	79.17	77.34
Preflight Briefing- Rights 25 items	14.16	15.26	15.85
Inflight-Negative scores			
Wrongs	20.31	18.70	18.31
Omissions	31.79	26.65	26.05
Wrongs + Omissions	47.69	40.20	41.09
Emergency Skills II- Rights weighted			
Major Decisions	11.76	13.10	13.13
Phraseology	4.83	5.14	5.03
Total	16.28	18.38	19.13

Tests	Pilot Experience Levels				
	None	Student	Private	Commercial	Instructor
	N= 145	N= 16	N= 27	N= 44	N= 18
ATC Fundamentals- Rights	75.28	76.69	75.37	82.30	82.11
Preflight Briefing- Rights	15.57	14.50	15.07	16.11	17.11
Inflight- Negative Scores					
Wrongs plus Omissions	42.33	42.87	43.04	39.93	35.13
Emergency Skills II- Rights weighted					
Total	16.79	16.25	15.81	23.13	20.17

TABLE 5

RELATING TEST PERFORMANCE
TO
POPULATION CHARACTERISITCS
FIELD SAMPLE, OPERATIONAL FACILITIES

Testing Dates
July-August 1977

FAA FLIGHT SERVICE STATIONS

253 Persons

Tests	Present GS Grade Levels				
	5 - 7	9	10	11	12 & up
	N= 10	N= 8	N= 40	N= 169	N= 20
ATC Fundamentals- Rights	74.60	82.88	75.8	84.5	75.35
Preflight Briefing- Rights	14.7	14.63	14.43	15.97	16.60
Inflight-Negative Scores Wrongs + Omissions	52.0	52.8	42.13	40.91	41.33
Emergency Skills II- Total Rights Weighted	17.5	19.86	18.95	19.29	16.41

Tests	HAD EFAS Training	
	No	Yes
	N= 206	N= 45
ATC Fundamentals- Rights	76.76	78.53
Preflight Briefing- Rights	15.60	15.84
Inflight-Negative Scores Wrongs + Omissions	41.69	40.54
Emergency Skills II- Total Rights Weighted	18.49	20.88

TABLE 6

RELATING TEST PERFORMANCE
TO
POPULATION CHARACTERISTICS
FIELD SAMPLE, OPERATIONAL FACILITIES

Testing Dates
July-August 1977

253 Persons

Tests	Received Academy Training		
	Within last year	Never	More than year ago
	N= 31	N= 93	N= 124
ATC Fundamentals-Rights	73.77	75.80	79.06
Preflight Briefing-Rights	14.19	15.88	15.90
Inflight-Negative Scores Wrongs + Omissions	45.93	42.25	39.39
Emergency Skills II- Total Rights Weighted	17.27	17.67	20.41

Tests	Does facility have full time EPDS?	
	No	Yes
	N= 93	N= 158
ATC Fundamentals-Rights	77.26	77.05
Preflight Briefing-Rights	15.24	15.91
Inflight-Negative Scores Wrongs + Omissions	42.37	41.10
Emergency Skills II- Total Rights Weighted	18.46	19.17

Tests	Sex of Specialist	
	Male	Female
	N= 221	N= 27
ATC Fundamentals-Rights	77.43	76.19
Preflight Briefing-Rights	15.62	16.30
Inflight-Negative Scores Wrongs + Omissions	41.61	41.90
Emergency Skills II- Total Rights Weighted	19.26	18.00

TABLE 7

INTERCORRELATION OF PAST EXPERIENCE AND PERFORMANCE ON FSS SKILLS TESTS
FIELD SAMPLE, OPERATIONAL FACILITIES

Testing Dates
July-August 1977

Decimals Omitted

253 Persons

Variables		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Flight Service Station Experience	1		09	44	-08	01	03	-04	-02	56	15	-01	01	06	05	18	-11	-04
Pilot Experience	2			20	-03	10	-06	-05	-01	11	35	07	01	13	12	14	-13	-09
Age	3				-20	-06	-11	-01	-14	42	15	-06	08	-05	-05	12	00	-00
Sex	4					-06	-04	08	07	-19	-11	-03	-01	00	-01	-06	-06	-02
Education-Grades 1-15	5						-14	02	15	09	07	-03	-03	01	-00	02	-02	03
BA, MA	6							08	03	-06	00	-08	04	12	12	07	-08	09
Had EFAS Training?	7								03	-07	-07	-06	-05	-07	-08	-06	-04	12
When Academy Trained?	8									-05	15	11	-12	12	11	03	-15	-10
GS Grade	9										09	-07	03	01	-01	21	-03	-11
Fundamentals of ATC	10											30	-13	32	32	32	-39	-22
Emergency Skills-Phraseology	11												03	79	88	23	-16	-14
Minor Errors	12													-09	02	-03	-08	14
Major Decisions	13														98	31	-17	-13
Total Score	14															30	-18	-13
Preflight Briefing	15																-38	-13
Inflight Omissions	16																	-25
Wrongs	17																	

TABLE 8

POPULATION CHARACTERISTICS
ATC ACADEMY SAMPLE

Testing Dates
September 1977-February 1978

273 STUDENTS

Age in Years	
Interval	No. of Persons
36 & over	46
31 - 35	70
26 - 30	116
20 - 25	37
No answer	4

Sex	
Type	No. of Persons
Male	216
Female	55
No answer	2

Education (Highest Attained)	
Level	No. of Persons
Masters Degree	8
Bachelor's Degree	67
College 3-4 years	30
2 years	63
1 year	44
High School Diploma	60
No diploma	
No answer	1

	ATC Experiences (Months)					
Option	None	1-11	12-23	24-25	36 & up	No answer
FAA GS 2152 FSS FPL			3		1	
FSS Options			6	1	1	
Enroute Option			46	39	18	
Terminal Option			3	6	6	
Before joining FAA			3	21	57	

Pilot Certificate	
Type	No. of Persons
Instructor	34
Commercial	35
Private	30
Student	14
None	

TABLE 9

INTERCORRELATIONS OF PAST EXPERIENCE, PERFORMANCES ON FSS SKILLS TESTS, AND LABORATORY GRADES
ATC ACADEMY FLIGHT SERVICE STATION STUDENTS, COURSE 50202
OLD TRAINING PROGRAM, CLASSES 78-1 THRU 78-8

Testing Dates
September 1977-February 1978

Decimals Omitted

17-273 Persons

		Skills Tests								Laboratory Grades					Lab Grades				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	N	Mn	SD
Biographical Data-Past Experience	1		40	19	02	14	15	05	-07	-05	08	00	16	05	20	-03	-11	19	273	4.758	2.682
Fundamentals of ATC	2			38	-19	37	37	37	-41	-15	27	19	29	28	32	-14	-13	51	272	72.960	10.756
Emergency Skills-Phraseology	3				-04	87	92	25	-38	-18	66	19	21	31	16	-03	01	39	273	6.828	2.570
Minor Errors	4					-05	-00	-24	14	-02	00	-58	-11	-30	-26	16	20	-37	273	.099	.537
Major Decisions	5						99	28	-35	-19	58	12	22	24	17	-03	03	35	273	14.212	9.106
Total Score	6							27	-36	-20	60	12	22	25	16	-02	03	35	273	21.139	11.404
Preflight Briefing	7								-42	-08	-02	29	21	20	22	-02	-05	38	272	13.055	2.934
Inflight Omissions	8									-08	-43	-11	-17	-16	-16	-04	-09	-32	272	21.746	6.401
Wrongs	9										-08	-13	-30	-13	-33	33	31	-38	272	16.978	7.917
Laboratory Grade Weather Observor	10											66	66	73	73	-54	00	85	17	96.316	2.341
Teletype	11												34	30	37	-14	-18	63	142	96.601	5.297
Flight Data	12													21	31	-14	-19	60	142	96.819	3.333
Preflight	13														15	02	01	54	142	95.716	4.181
Inflight	14															-45	-47	51	142	94.395	5.160
VOR	15																84	-17	142	1.049	.217
DF	16																	-17	142	1.035	.185
Laboratory Grade Average	17																		142	94.019	3.220

TABLE 10

PREFLIGHT LAB PROBLEM AVERAGES
ATC ACADEMY STUDENT SAMPLES
OLD TRAINING COURSE, CLASSES 78-1 thru 78-8
NEW TRAINING COURSE, CLASSES 78-01 THRU 9006

	Training Course	
	Old	New
100	24	
99		
98	22	
97	25	
96	21	
95	8	
94	7	
93	5	
92	8	
91	4	1
90	3	3
89	2	4
88	1	3
87	2	6
86	2	6
85	6	4
84		8
83	1	5
82		13
81		9
80	1	5
79		7
78		9
77		4
76		4
75		4
74		3
73		5
72		1
71		4
70		2
69		2
68		1
67		3
66		
65		
64		
63		
62		
61		
60		
59		
58		
57		
56		1
55		
54		
53		
52		1
N	142	118
Mean	95.72	80.12
SD	4.18	6.66

TABLE 11

INFLIGHT LAB PROBLEM AVERAGES
ATC ACADEMY STUDENT SAMPLES
OLD TRAINING COURSE, CLASSES 78-1 THRU 78-8
NEW TRAINING COURSE, CLASSES 78-01 THRU 9006

	Training Course	
	Old	New
100	10	
99	7	
98	17	1
97	17	
96	12	2
95	14	
94	14	1
93	13	1
92	5	2
91	5	8
90	5	7
89	5	8
88	6	7
87	2	5
86	4	7
85	2	12
84	1	11
83		3
82		10
81		1
80		8
79		4
78		2
77		3
76	1	2
75		1
74		3
73		2
72	1	1
71		3
70		2
69		1
68		
67		
66		
65	1	
64		
63		
62		
61		
N	142	118
Mean	94.40	84.36
SD	5.16	6.12

TABLE 12

EMERGENCY SERVICES LAB PROBLEM AVERAGES
ATC ACADEMY STUDENT SAMPLES
OLD TRAINING COURSE, CLASSES 78-01 THRU 9006

	Training Course	
	Old	New
100		
99		
98		1
97		3
96		4
95		5
94		5
93		6
92		7
91		10
90		6
89		11
88		5
87		9
86		9
85		6
84		6
83		3
82		2
81		5
80		2
79		
78		1
77		4
76		1
75		2
74		1
73		
72		
71		2
70		1
69		
68		
67		1
Fail (2.0)	7	
Pass (1.0)	135	
N	142	118
Mean	1.049	87.69
SD	.217	6.30

TABLE 13

DISTRIBUTIONS OF TEST SCORES
PREFLIGHT BRIEFING SKILLS TEST
OPERATIONAL FACILITY AND STUDENT SAMPLES
OLD TRAINING COURSES SAMPLES 78-01 THRU 78-8
NEW TRAINING COURSE SAMPLES 78-01 THRU 9006

PREFLIGHT TEST SCORES	OPERATIONAL FACILITY SAMPLE	STUDENT SAMPLES TRAINING COURSE Old	New
22	2		2
21	3	1	1
20	6	1	2
19	20	2	6
18	24	7	10
17	30	15	13
16	34	29	12
15	35	41	18
14	27	32	16
13	17	38	8
12	17	35	10
11	12	19	7
10	7	16	7
9	6	12	2
8	1	14	1
7	1	2	1
6	1	7	1
5		1	
4			
3			
2			
1			
0			
No Response	10	1	
Total N	253	273	118
Mean	15.22	13.055	14.64
SD	9.97	2.934	3.08

TABLE 14
DISTRIBUTION OF TEST SCORES
INFLIGHT SKILLS TEST
OPERATIONAL FACILITY AND STUDENT SAMPLES
ATC ACADEMY CLASSES 78-1 THRU 78-8

Inflight Scores	Operational Facility Sample			ATC Academy Students		
	Wrongs	Omissions	Wrongs+Omissions	Wrongs	Omissions	Wrongs+Omissions
73						1
70						1
69			1			1
68						
67						
66			1			1
65			1			
64			1			3
63						1
62			3	1		2
61			1			2
60			5			
59			4			2
58			2			
57			1			3
56			1			2
55			5			2
54			2			3
53			4			3
52			6			1
51			4			2
50			4			2
49			5			5
48	1		11		1	4
47			5	1		5
46			7			7
45			6			12
44		1	6		1	8
43	2	1	8	2	1	14
42			7		1	4
41	1		7			14
40	3	4	9		1	9
39	1	1	10			11
38	2	4	14	1		8
37		2	6	3	5	13
36	1	4	9	1	1	16
35	1	1	14	1	1	8
34		9	15		1	14
33	3	2	7	1	5	14
32	2	2	9	1	2	9
31	3	8	8	4	5	9
30	2	6	3	1	7	9
29	4	11	7	3	7	14
28	3	3	2	4	9	8
27	4	11	2	5	7	8
26	1	10	3	5	11	4

TABLE 14 CONTINUED

DISTRIBUTION OF TEST SCORES
INFLIGHT SKILLS TEST
OPERATIONAL FACILITY AND STUDENT SAMPLES
ATC ACADEMY CLASSES 78-1 THRU 78-8

	Operational Facility Samples			ATC Academy Students		
Inflight Scores	Wrongs	Omissions	Wrongs+Omissions	Wrongs	Omissions	Wrongs+ Omissions
25	7	10	1	7	7	4
24	7	8		6	12	3
23	12	10		9	17	1
22	8	11	2	10	14	2
21	13	13		5	23	3
20	6	15		9	16	
19	9	20		11	26	
18	12	6		10	20	
17	14	11		15	18	
16	11	8		20	18	
15	18	11		15	10	
14	15	11		18	10	
13	12	2		18	5	
12	13	3		17	6	
11	12	5		16	4	
10	10	1		21		
9	6	3		7		
8	1			9		
7	3	1		7		
6	3			3		
5	2			3		
4				1		
3				1		
2						
1	1					
0						
No Response	24	24	24	1	1	1
Total N	253	253	253	273	273	273
Mean	18.59	23.08	41.576	16.978	21.746	38.794
SD	8.00	7.48	11.926	7.917	6.401	9.753

TABLE 15

DISTRIBUTION OF TEST SCORES
INFLIGHT SKILLS TEST-WRONGS+ OMISSIONS
OPERATIONAL FACILITY AND STUDENT SAMPLES

	Operational Facility	Training Program Old	Training Program New		Operational Facility	Training Program Old	Training Program New
75				40	9	9	
74				39	10	11	
73		1		38	14	8	
72				37	6	13	
71				36	9	16	
70		1		35	14	8	3
69	1	1		34	15	14	2
68				33	7	14	3
67				32	9	9	
66	1	1		31	8	9	1
65	1			30	3	9	3
64	1	3		29	7	14	2
63		1		28	2	8	6
62	3	2		27	2	8	2
61	1	2		26	3	4	4
60	5			25	1	4	7
59	4	2		24		3	3
58	2			23		1	7
57	1	3		22	2	2	9
56	1	2		21		3	10
55	5	2		20			11
54	2	3		19			5
53	4	3		18			5
52	6	1		17			8
51	4	2		16			1
50	4	2		15			8
49	5	5		14			3
48	11	4		13			7
47	5	5		12			1
46	7	7		11			1
45	6	12		10			2
44	6	8		9			1
43	8	14		8			
42	7	4		7			1
41	7	14		6			
				5			1
				4			
				N	253	273	118
				Mean	41.576	38.794	21.10
				SD	11.926	9.753	6.31

TABLE 16

DISTRIBUTION OF TEST SCORES EMERGENCY SERVICES
SKILLS TEST
OPERATIONAL FACILITY AND STUDENT SAMPLES

Emergency Services Scores	Operational Facility Sample				ATC Academy Students			
	Total	Major Decision	Phraseo-	Minor Error	Totals	Major Decisions	Phraseo-logy	Minor Error
42					11			
41	1				5			
40	1				13			
39	2				2			
38	1				1			
37	2				2			
36	2				4			
35	2				8			
34	1				2			
33	6				2			
32	2				1			
31	8				-			
30	5	9			8	31		
29	4				3			
28	6				31			
27	10				7			
26	8				4			
25	6	18			4	20		
24	3				1			
23	5				9			
22	5				15			
21	13				10			
20	18	39			6	53		
19	11				3			
18	5				-			
17	5				7			
16	6				24			
15	18	63			13	45		
14	8				3			
13	14				1			
12	8		1		1		13	
11	2				9		9	
10	3	52	7		11	48	32	
9	5		7		12		9	
8	4		20		6		43	
7	16		20		3		33	
6	8		40		3		50	
5	1	42	46		11	47	40	
4	1		28		7		22	
3	5		27	20	2		9	9
2	3		29		4		7	
1			8		2		4	
0	19	30	20	233	2	29	2	264
No Response					0			
Total N	253				273			
Mean	17.43	12.55	4.64	.24	21.139	14.212	6.828	.099
SD	9.97	7.85	2.54	.81	11.404	9.106	2.570	.537

TABLE 17

DISTRIBUTION OF TEST SCORES EMERGENCY SERVICES
SKILLS TEST
OPERATIONAL FACILITY AND STUDENT SAMPLES

	Operational Facility	Training Program Old	Training Program New		Operational Facility	Training Program Old	Training Program New
42		11	18	20	18	6	
41	1	5	3	19	11	3	
40	1	13	8	18	5		1
39	2	2	2	17	5	7	
38	1	1	1	16	6	24	
37	2	2	4	15	18	13	
36	2	4	6	14	8	3	1
35	2	8	12	13	14	1	1
34	1	2	4	12	8	1	1
33	6	2	6	11	2	9	
32	2	1		10	3	11	
31	8		2	9	5	12	
30	5	8	6	8	4	6	
29	4	3	3	7	16	3	2
28	6	31	15	6	8	3	1
27	10	7	4	5	1	11	1
26	8	4		4	1	7	
25	6	4	1	3	5	2	
24	3	1	2	2	3	4	
23	5	9	3	1		2	
22	5	15	5	0	19	2	
21	13	10	5				
				N	253	273	118
				Mean	17.43	21.39	31.86
				SD	9.97	11.404	9.28

TABLE 18

CUTOFF SCORES FOR SKILLS TEST AND
LABORATORY GRADES FOR ATC ACADEMY STUDENTS FROM
CLASSES 78-01, 78-02,
9001 to 9006

N = 118

Skills Test	Type of Scores	Cutoff	Students Below Cutoff	
			Number	Percent
Preflight	Rights	Less than 11	12	10.2
Inflight	Negative: Wrongs plus omissions	Greater than 32	8	6.8
Emergency Services	Rights	Less than 15	7	5.9
Laboratory				
Preflight	Average	Less than 70	8	6.8
Inflight	Average	Less than 72	6	5.1
Emergency Services	Average	Less than 76	7	5.8

TABLE 19

TABLE FOR TRANSFORMING SKILLS TEST
RAW SCORES TO CONVERTED SCORES

Raw Scores	Converted Scores		
	Preflight	Inflight (Negative Scores)	Emergency Services
42			100
41		to Zero	99
40			98
39		63	96
38		64	95
37		65	94
36		66	93
35		67	92
34		68	91
33		69	90
32		70	89
31		71	88
30		72	87
29		73	85
28		74	84
27		75	83
26		76	82
25	100	77	81
24	97	78	80
23	94	79	79
22	92	80	78
21	90	81	77
20	88	82	76
19	86	83	74
18	84	84	73
17	82	85	72
16	80	86	71
15	78	87	70
14	76	88	65
13	74	89	61
12	72	90	56
11	70	91	51
10	64	92	46
9	57	93	42
8	51	94	37
7	44	95	32
6	38	96	28
5	32	97	23
4	25	98	19
3	19	98	14
2	12	99	10
1	6	99	5
0	0	100	0

TABLE 20

DISTRIBUTION OF PHASE GRADES FOR CLASSES 78-01 to 9006

Weighted Composite Scores	Frequency
94.01 - 95	0
93.01 - 94	1
92.01 - 93	0
91.01 - 92	3
90.01 - 91	0
89.01 - 90	6
88.01 - 89	4
87.01 - 88	8
86.01 - 87	7
85.01 - 86	13
84.01 - 85	9
83.01 - 84	9
82.01 - 83	11
81.01 - 82	9
80.01 - 81	8
79.01 - 80	6
78.01 - 79	5
77.01 - 78	8
76.01 - 77	1
75.01 - 76	4
74.01 - 75	2
73.01 - 74	2
72.01 - 73	0
71.01 - 72	2
70.01 - 71	0

TABLE 21

TABLE FOR CONVERTING WEIGHTED COMPOSITE SCORES
TO
PHASE GRADES

Weighted Composite Score	Phase Grade	Weighted Composite Score	Phase Grade
100	100		
99.17 - 99.99	99	81.67 - 82.49	78
98.33 - 99.16	98	80.83 - 81.66	77
97.50 - 98.32	97	80.00 - 80.82	76
96.67 - 97.49	96	79.17 - 79.99	75
95.83 - 96.66	95	78.33 - 79.16	74
95.00 - 95.82	94	77.50 - 78.32	73
94.17 - 94.99	93	76.67 - 77.49	72
93.33 - 94.16	92	75.83 - 76.66	71
92.50 - 93.32	91	75.00 - 75.82	70
91.67 - 92.49	90	74.17 - 74.99	69
90.83 - 91.66	89	73.33 - 74.16	68
90.00 - 90.82	88	72.50 - 73.32	67
89.17 - 89.99	87	71.67 - 72.49	66
88.33 - 89.16	86	70.83 - 71.66	65
87.50 - 88.32	85	70.00 - 70.82	64
86.67 - 87.49	84	69.17 - 69.99	63
85.83 - 86.66	83	68.33 - 69.16	62
85.00 - 85.82	82	67.50 - 68.32	61
84.17 - 84.99	81	66.67 - 67.49	60
83.33 - 84.16	80	65.83 - 66.66	59
82.50 - 83.32	79	65.00 - 65.82	58
		Below 65	57

TABLE 22

ATC ACADEMY STUDENTS FROM CLASSES 78-01, 78-02, 9001 to 9006
FAILING PRIMARY POSITION SKILLS TEST OR LABORATORY PROBLEMS
OR
FINAL PHASE GRADE

		Skills Test			Laboratory			New Phase	Type
	Student	PF	IF	ES	PF	IF	ES	Grade	Failure
78-01	1				69				
	9							68	Phase Grade
78-02	1		34						
	8	10	35						
9001	2		35	5				69	Phase Grade
	3		33						
	4	10							
	6		33				67.3		
	8	9							
	11	10							
	12					70			
	13	8	33				70.3	65	Phase Grade
	14	9							
	16				67.2				
9002	1	10							
	11		34						
9003	2			6					
	4					70.25		69	Phase Grade
9004	1				67.75				
	3			7					
	10	10			68.50				Position
	11			13					
9005	6					71.5			
	7						75		
	9						75.5		
	11	7					71.25		
	13				52.75	69		68	Phase Grade
	14			7					
	15	10		14					
9006	1						73.75		
	3		35						
	4	10							
	5	6			67.50	71.00		66	Position & Phase Grade
	7						71.00		
	10				69.50				
	12			12	56.50				
	13								
	14					71.50			
Totals		12	8	7	8	6	7	6	

TABLE 23

INTERCORRELATIONS OF PHASE III TESTS, NEW TRAINING PROGRAM
CLASSES 78-01 to 9006

Variable		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	N	Mean	SD
Weather Obser	1	45	35	20	51	30	36	69	56	17	26	25	39	24	25	31	14	-14	-30	-29	10	25	18	25	37	118	90.87	5.25
Teletype	2		31	24	29	17	28	64	43	39	21	43	53	23	38	29	12	-11	-32	-27	02	22	12	26	41	118	85.61	8.33
Broadcast	3			19	39	25	24	58	28	16	40	16	29	28	15	28	14	-03	-13	-10	-09	03	19	13	23	118	90.10	5.50
Flight Data	4				25	20	19	52	23	18	36	41	38	18	17	33	24	-15	-06	-15	-02	13	24	21	32	118	86.52	7.27
Preflight	5					44	52	77	54	-01	37	24	20	30	28	35	35	-25	-17	-30	16	37	28	40	50	118	88.37	7.10
Inflight	6						24	58	27	05	22	16	18	19	24	25	05	-25	00	-20	14	21	36	34	30	118	84.70	6.92
Emergency Serv	7							66	32	-11	21	25	17	21	33	42	31	-12	-07	-14	25	39	25	38	46	118	86.25	7.48
Academic Ave	8								59	19	43	42	51	37	42	50	31	-24	-24	-33	14	38	38	45	60	118	87.48	4.35
Weather Ob Lab	9									27	37	40	64	27	31	39	27	-36	-29	-46	15	41	26	40	58	118	83.75	8.12
Teletype Lab	10										22	42	77	21	15	04	-03	-02	-11	-08	-12	11	15	16	21	118	83.44	14.01
Broadcast Lab	11											38	55	43	39	35	19	-25	-14	-28	01	41	19	37	47	118	82.96	6.22
Flight Data Lab	12												80	29	33	29	15	-16	-10	-19	-05	37	37	45	46	118	76.82	11.92
Laboratory Ave	13													40	39	33	19	-22	-23	-32	-03	41	34	45	55	118	81.79	7.20
Preflight Lab	14														52	33	23	00	-05	-03	18	29	-02	17	58	118	80.12	6.66
Inflight Lab	15															46	31	01	-18	-10	09	30	08	21	62	118	84.36	6.12
Emer Serv Lab	16																35	-19	-27	-32	18	52	17	40	65	118	87.69	6.30
Preflight Test	17																	-26	-10	-27	08	23	08	19	59	118	14.64	3.08
Omissions	18																		01	81	-07	-22	-22	-27	-35	117	14.43	5.07
Wrongs	19																			60	02	-18	-16	-20	-25	117	6.67	3.72
Inflight Test	20																				-04	-29	-27	-34	-43	117	21.10	6.31
Emer Serv Test	21																					13	-07	04	54	118	31.86	9.28
MCAT	22																						39	84	49	92	76.75	13.54
OKT	23																							82	16	92	45.64	12.55
Total(MCAT-OKT)	24																								40	92	122.39	21.82
Grade	25																									118	82.32	4.76