Doc
FAA
AM
83
07

JOB ATTITUDES TOWARD THE NEW MAINTENANCE CONCEPT OF THE AIRWAY FACILITIES SERVICE

David J. Schroeder and Julia R. Deloney
Civil Aeromedical Institute
Federal Aviation Administration
Oklahoma City, Oklahoma 73125

AD A133282

RECEIVED
MAR 21 1984
LIBRARY

February 1983

Document is available to the public through the
National Technical Information Service
Springfield, Virginia 22161

Prepared for
U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Office of Aviation Medicine
Washington, D.C. 20591

DTIC
ELECTE
OCT 0 4 1983
S D
E

83 10 04 095

This document is dis[illegible] the sponsorship of the Department of Tran[illegible] interest of information exchange. The [illegible] assumes no liability for its contents or [illegible]

JACK R. HUNT MEMORIAL LIBRARY
DAYTONA BEACH, FLORIDA 904-226-6595

ACKNOWLEDGMENTS

This study was initiated by Dr. Roger C. Smith. Responsibility for the study was assumed by the authors several months after Dr. Smith's untimely death in an automobile accident. The authors wish to thank personnel of the Aviation Psychology Laboratory who assisted in the conduct of this project during the interim and transitional periods.

Technical Report Documentation Page

1. Report No. FAA-AM-83-7	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle JOB ATTITUDES TOWARD THE NEW MAINTENANCE CONCEPT OF THE AIRWAY FACILITIES SERVICE		5. Report Date FEBRUARY 1983
		6. Performing Organization Code
7. Author(s) David J. Schroeder and Julia R. Deloney		8. Performing Organization Report No.
9. Performing Organization Name and Address FAA Civil Aeromedical Institute P.O. Box 25082 Oklahoma City, Oklahoma 73125		10. Work Unit No. (TRAIS)
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591		13. Type of Report and Period Covered
		14. Sponsoring Agency Code

15. Supplementary Notes

Work was performed under task AM-C-80/81/82/83-PSY-72.

16. Abstract At the request of the (then) Airway Facilities Service (AAF), AF personnel were asked to respond to questions concerning their attitudes toward a proposed New Maintenance Concept (NMC). Questionnaires were sent to all (11,569) AF personnel; a return rate of 61.7 percent was obtained. Overall, employee awareness of the proposed changes was limited; only 18 percent indicated that they possessed "considerable" to "a great deal" of information concerning the changes. As a general reaction to the NMC, 43 percent expressed some degree of acceptance, 31 percent were undecided and 26 percent expressed some degree of rejection. Aspects of the proposal that involved a shift to solid state equipment along with associated changes in specialization and knowledge, a proposed reduction in routine maintenance, automated recordkeeping, and a reduction in watchstanding produced highly positive responses (67 to 85 percent). Least favorable responses were for plans to reduce the number of remote facilities and relocate personnel in more centralized work hubs. Analyses suggest several variables of utility in predicting overall response to the NMC. A major factor was the employee's position in the work force. Relatively more negative attitudes were expressed by nonsupervisory personnel and by those (i) who expressed general dissatisfaction with their jobs, supervision, and management; (ii) who had been in their positions for longer periods of time; and (iii) who reported greater anxiety and stress on the job. Management should be aware that its attitudes toward proposed changes are not necessarily shared by individuals at the lower levels. The role of communication in promoting change within the organization is discussed. This report serves as technical documentation of the survey; however, from the onset of data analyses, periodic reports and consultations were provided to AAF.

17. Key Words Job attitudes Communication Personnel	18. Distribution Statement Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	79	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

JOB ATTITUDES TOWARD THE NEW MAINTENANCE CONCEPT OF THE AIRWAY FACILITIES SERVICE

PART I. OVERVIEW

To determine the attitudes of Airway Facilities (AF) personnel to the proposed New Maintenance Concept (NMC), an extensive questionnaire was mailed to all employees. Of 11,569 questionnaires distributed, 6,976 were completed and returned. Responses to the NMC questions were analyzed with respect to employee characteristics, job satisfaction measures, shift work, and general health variables.

This report summarizes the findings from the NMC questionnaire and provides a technical documentation of the completed study. However, regular consultation with Airway Facilities Service (AAF) officials was conducted throughout the data analyses period for use in management decisions regarding this developing concept. Also, although the functions of AAF were formally assumed by the Systems Engineering Service (AES) and Program Engineering and Maintenance Service (APM) in a reorganization effective October 4, 1982, the older designation (AAF) will be used throughout this report.

A majority of the respondents reported receiving only a limited amount of information concerning the proposal, with 22.6 percent indicating "very little knowledge" of the proposal. Only 3.3 percent indicated that they possessed a "great deal of knowledge" of the proposed changes. As could be expected, certain segments of the work force indicated that they had received less information than others concerning the overall proposal. One of the more obvious differences was between supervisors and nonsupervisors. While 7.3 percent of the supervisors reported a "great deal of knowledge" and only 12.8 percent indicated a limited degree of knowledge, in the nonsupervisor segment of the work force the percentages for the same responses were, respectively, 2.0 and 25.7 percent. Degree of knowledge concerning the proposed changes was also different for the different work locations. In regional offices, 8.8 percent of the personnel indicated that they had "a great deal of knowledge" compared to .1 to 4.4 percent of the personnel at other sites. This suggests that the flow of communication was not equally effective at all levels of the work force. The three primary sources for information were: the videotape presentation (33.1 percent), word of mouth (22.4 percent), and management channels (19.0 percent). The remaining 25 percent of the responses were spread out between the FAA Order 6000.27 (12.2 percent), an article in FAA WORLD (7.3 percent), union communications (2.3 percent) and "other" (3.6 percent).

The overall reaction to the proposed changes (Q27) was mixed, with nearly half of the respondents (42.8 percent) indicating "generally positive" to "very positive" responses and 30.8 percent indicating that they were undecided. In response to this question (Q27), there were segments of the work force that expressed differential levels of overall acceptance.

For example, while 20.3 percent of the respondents in regional offices expressed "very positive" reactions, only 4.0 to 9.6 percent of the respondents at other facilities expressed this degree of acceptance. At the supervisor level, only 12.8 percent expressed a "generally negative" to "negative" reaction, compared to 30.5 percent of the nonsupervisors. However, there were specific aspects of the proposal that generated fairly high levels of overall acceptance. Between 67 and 75 percent of the personnel expressed general acceptance to strong support for: diagnostics, corrective maintenance, and problem solving (Q34); automated record keeping (Q32); an increased need for electro-mechanical technicians (Q38); greater specialization, multiple specialization, and greater knowledge of system interfaces (Q39); a reduction in watchstanding (Q41); and an emphasis on solid state electronics, digital logics, systematic trouble shooting skills, and computer programing capabilities (Q37). Lower levels of support were expressed for the goal to centralize maintenance work at sector field offices (Q33) and the proposal to establish centralized maintenance hubs with fewer sector field offices and virtually no manned remote facilities (Q35).

Concern about the proposed changes did not appear to be related to the need to develop additional work skills since nearly one-half of the respondents indicated that they currently possessed the necessary skills in their present position. A very small percentage, 2.5 percent, indicated that they would prefer to work with their present skills.

The aspect of the proposed changes that appeared to generate the greatest amount of concern in respondents was the proposal to relocate personnel to more centralized work hubs. When questioned about their reactions to the proposed reorganization (Q42), 20 percent indicated that the plan would most likely require an undesirable relocation to a maintenance hub. Once again there were marked differences in the percentages of individuals in different segments of the work force that responded to this alternative. Different types of subgroups that had relatively high percentages selecting this alternative were: nonsupervisors (23 percent), electronics and environmental technicians (23.5 and 23.0 percent), personnel located at the smaller and more remote facilities (intermediate tower, 31.3 percent; small tower, 38.5 percent; and remote nontower, 36.7 percent). Responses to questions 33 and 35, which dealt with the movement toward centralized work hubs, further support the above indications, that within certain subgroups of the work force there is a significant number of workers who feel considerable dissatisfaction with the proposal to move some workers from the more remote sites to more centralized work hubs. Issues raised in the "comments" section also lend support to the idea that the specific aspect of the NMC that generated the least support was the proposal to move personnel from the smaller, more remote sites, to more centralized work hubs. This concern in the work force appears to be related to the potential need to relocate families, associated economic concerns, and concern about being able to meet individual needs in a new job setting.

Since a large number of variables was found to impact on the individual's response to the NMC, analyses were conducted to select the variables that would serve as the best predictors. The supervisor-nonsupervisor distinction and occupation identification were most influential in determining an employee's response to the NMC. As indicated above, environmental technicians and electronics technicians in nonsupervisory positions were more likely to express dissatisfaction with aspects of the proposed changes, particularly concerning the potential requirement of relocation. Higher levels of dissatisfaction were also found for individuals who expressed dissatisfaction with their working conditions, their supervision, and with various levels of FAA management. Furthermore, personnel who perceived their jobs as being more difficult, who felt they were under greater stress at work, and who were dissatisfied with their salary, were also more likely to express dissatisfaction concerning the proposed changes. The overall profile of the individual who was most likely to express a strong degree of dissatisfaction with the proposed changes is that of a lower GS-level nonsupervisory technician who has worked at his position for several years; who is dissatisfied with his job, the working conditions, and/or management, and who perceives his work environment as being stressful.

These analyses must be interpreted within the context of how people tend to view change. Resistance to change is apparent at all levels of our society; it is commonly encountered in individuals, within groups, and within organizations. If this common resistance is taken into account, the responses of the AF personnel appear in a more positive perspective.

SUGGESTIONS

Suggestions are primarily related to improving communications within the organization. It is generally accepted that communication flows more effectively within levels than between levels. This was apparent in the AF work force. Even though AAF management used a variety of forms to communicate the proposal to workers (magazine article, videotape, and an FAA Order) it was apparent that certain segments of the AF work force felt that they had received little information concerning the proposed changes. There is a need to communicate more effectively proposed changes to all segments of the work force, especially to individuals at the nonsupervisory level. Since 31 percent of the employees who returned the survey were undecided about their general reaction to the overall proposal, this presents an excellent opportunity for AAF to present them with additional information that could be effective in generating a more positive overall reaction. Such communication should be as specific as possible and should include statements concerning the potential positive impact of the changes on the individual; for example, the challenge of working with new equipment, potential for enhancing work skills, and increased opportunities for job promotion. This could include the development of a followup videotape, followup articles in the FAA WORLD, or the development of a temporary

question and answer section in the magazine where workers could request more specific responses concerning aspects of the proposed changes.

PART II. TECHNICAL DOCUMENTATION

I. Introduction.

The Maintenance Philosophy Steering Group was commissioned in 1976 by the Airway Facilities Service (AAF) to resolve problems associated with the current AF system (equipment age, lack of standardization of equipment, geographic dispersion) in order to meet the demands of increasing activity in a more efficient manner. This steering group consisted of the division and assistant division chiefs at both regional and headquarters levels. Their task was to:

i. assess the changes that could be expected in the national airspace system over the period 1980-1990;
ii. assess the applicability of the current national airspace system maintenance philosophy to that system; and
iii. develop a new maintenance concept suitable for the system expected to be in operation during this period (2).

The steering group's conclusions and recommendations appear in a report presented in November 1978. The steering group recommended the immediate development of plans to implement a "New Maintenance Concept (NMC)." The schedule called for an initial proposal to be submitted to the Director (AAF) early in 1980, with a final plan completed several months later. Even though the schedule called for initial implementation of the plan in mid-1981, implementation would not be complete until 1990.

The plan proposed several changes in both AF organizational structure and in AF equipment. The plan emphasized:

i. implementation of a solid state replacement program for existing equipment;
ii. implementation of a remote maintenance monitoring program;
iii. a significant reduction in the number of field duty stations;
iv. enhancement of the present sector office concept by providing a shop for module repair and alignment;
v. implementation of a national field support group;
vi. the enhancement of training methods to meet new skill requirements; and
vii. the individual technician as the most important link in ensuring system integrity (2).

According to the report, implementation of this program would decrease the number of employees over the 10-year period while increasing the number of operating facilities. The result would be an overall savings of 1.2 billion dollars.

While implementation of the NMC would not result in an immediate loss of employees, other than through attrition, there are several areas in which implementation would directly affect the current workforce. The impact of the change would be greatest for those employees required to

relocate from more remote sites to centralized sector field offices. In addition, introduction of solid state equipment would create a need for greater specialization and an overall higher skill level in the work force, there would be a need to retrain some employees, retraining would require the development of new training methods (computer based instruction), and less shift work would be required. Since the AAF administration recognized that the acceptance of this change by employees is critical to optimal system functioning, AAF management provided employees with information concerning the proposed changes. The information was presented in a number of different ways: a video tape ("The Maintenance Concept of the 80's") was developed and shown at numerous facilities, an article appeared in the December 1979 issue of the FAA WORLD ("Better Service at Less Cost"), a Federal Aviation Administration (FAA) Order was issued in June 1979 (2) and less formal channels of communication were also used.

Following presentation of the information, the AAF administration was interested in knowing how the proposal was viewed by employees. Since a research task by the Civil Aeromedical Institute had already been approved to survey AF employees concerning the influence of shift work on their health, morale, efficiency and productivity, it was decided that extra items would be added to assess employees' attitudes toward the NMC. In addition to determining the general response of employees to the proposed changes, the current study was designed to assess which of the demographic and job related factors were most predictive of employees' general reactions.

Questionnaires were sent to all AF personnel in mid-1980. Feedback concerning employees' reactions to aspects of the proposed changes, as indicated by responses to the questionnaire, has been provided to AAF-160 on a continuing basis since the start of these analyses in December 1980. This report documents those extensive findings.

II. Method.

Subjects. A list of all AF personnel and their addresses was generated for each FAA region. A 21-page questionnaire, along with an answer sheet and return envelope, was sent to the 11,569 personnel on the list. Of this number, 6,976 questionnaires were completed and returned. An additional 274 questionaires were returned due to incorrect addresses. Characteristics of the respondents are presented in Table 1.

Questionnaire. The questionnaire used in this survey was designed to provide measures in several major informational categories (Appendix A). The first two pages described the purpose of the study and included instructions on the completion of the questionnaire. This was followed by a section requesting demographic information and type of work or job setting. The main body of the questionnaire comprised questions dealing with basic job information, job satisfaction ratings, shift work information, general self evaluation questions (16), and questions

TABLE 1

Demographic Characteristics of Respondents

Variable	Percentage
AGE	
24 and under	1.3
25-29	6.2
30-34	10.1
35-39	10.8
40-44	19.7
45-49	26.6
50-54	15.8
55-59	7.0
60 or over	2.5
Ethnic Background	
Oriental	2.2
Black	4.9
White (Caucasian)	82.1
Hispanic	7.0
American Indian	1.4
Other	2.3
Degrees	
High School Diploma	50.6
Associate Degree	15.3
Bachelor's Degree	12.8
Master's Degree	1.3
Doctoral Degree	.2
Trade School-1 Year	3.8
Trade School-2 Years	8.9
Trade School-3 Years	7.1
Pay Schedule	
GS	91.1
WG	8.2
WL	.1
WS	.5
Grade Level	
Grade 5 or Lower	3.1
Grade 6	.3
Grade 7	2.8
Grade 8	1.4
Grade 9	5.9
Grade 10	1.5
Grade 11	25.8
Grade 12	39.9
Grade 13	12.7
Grade 14 or Higher	6.7

Variable	Percentage
Years Worked-FAA	
Less then 1 year	2.3
1 year	1.9
2 Years	3.3
3 Years	3.8
4 Years	5.2
5 Years	5.9
6 to 10 Years	18.7
11 to 20 Years	30.1
21 Years or More	28.4
Years in Present Position	
Less than 1 Year	10.5
1 Year	8.8
2 Years	10.8
3 Years	9.4
4 Years	7.5
5 Years	7.5
6 to 10 Years	25.1
11 to 20 Years	16.4
21 Years or More	4.0
Sex	
Male	96.0
Female	4.0
Grade or Education	
8 or Below	.9
9	.4
10	.6
11	1.2
12	35.5
13	12.5
14	27.9
15	7.4
16 or above	13.8

concerning general health. Nineteen questions were included to assess the employee's attitudes toward the NMC.

The section of 19 items that was devoted to the NMC was developed to measure employee attitudes toward various aspects of the NMC. In addition to determining how much each employee knew about the proposed changes and the source of the information, the questionnaire contained an item designed to assess overall reaction to the NMC proposal. Additional questions assessed attitudes toward the centralization of functions with remote monitoring, increased usage of solid state equipment and required retraining, use of computer assisted instruction, changes in travel, increased automation in record keeping and a reduction in shift work.

Procedure. The returned response sheets were machine scored and placed on a data tape for computer analyses. A VAX 11/780 version of the Statistical Package for the Social Sciences (SPSS) was used in the data analyses (13). Analyses included cross frequencies and chi-square statistics where appropriate. Correlation coefficients were also computed on the appropriate variables. Multiple regression equations were calculated to determine the variables that best predicted the individual's reaction to the NMC. The underlying relationships between the various predictor variables were determined through use of factor analysis. In order to include some of the variables in the regression equations and factor analysis, the responses were reordered to make them more ordinal in nature (type of facility, AF specialty, occupational identification and region). Question 27, which covers general reaction to the NMC, was used as the criterion variable in the multiple regression analyses. A probability level of $p < .01$ was used as the minimum level for statistical significance. It was recognized a priori that the large sample size would lead to a large number of statistically significant differences that would have varying degrees of practical significance. Thus, while statistical significance is indicated, the emphasis is on the differences that appear to have some practical significance. Written comments concerning the NMC were content analyzed and sorted into categories for analysis. The analyses presented in this report focus on the relationship between various demographic and job related variables and responses to the 19 items related to the NMC.

III. Results.

QUESTIONNAIRE RESPONSES

Return Rate. The overall return rate of 61.7 percent (6,976 out of 11,295 questionnaires), is somewhat higher than the 49.3 percent return rate obtained in a previous AF survey by Smith and Hutto (15). Of those returned, 92 questionnaires were eliminated because they had questionable responses or contained a large number of omitted items; thus resulting in a final sample of 6,894.

Overall Responses to the New Maintenance Concept. The frequency and percentage of respondents who selected various alternatives on each of the NMC questions appear in Table 2. A sizable majority (81.9 percent) of these individuals reported receiving "very little" to "some" information about the NMC. This information was most often obtained from the videotaped presentation (33.1 percent), by word of mouth (22.4 percent), or through management channels (19 percent). Smaller percentages of individuals reported receiving most of their information from either the FAA Order 6000.27 (12.2 percent) or from FAA WORLD (7.3 percent).

When questioned about their overall reactions to the proposed changes, 42.8 percent of the respondents expressed "positive" to "very positive" reactions. However, there was still a sizable group of respondents (26.2 percent) who reported "negative" to "very negative" reactions.

In response to the proposal to have two levels of facilities, the largest proportion of the respondents (45.7 percent) indicated acceptance with some reservations. Only 14.5 percent strongly supported the idea while 21.2 percent were either not in favor of the idea or totally rejected it.

The percentages for the question dealing with facility and periodic certification (Q29) were similar to those noted above for the two levels of the facility question. However, there was a slightly larger percentage of individuals who reported strong support (18 percent in this case).

Considerable acceptance was expressed for the proposal to establish four levels of system repair (Q30), with 60.2 percent of the respondents indicating general acceptance to strong support.

The next question, concerning the establishment of a remote maintenance monitoring system for solid state equipment, also produced a fairly high level of overall support (61.7 percent). As was true for the question concerning levels of system repair, a fair number of respondents indicated that they were generally not in favor of the proposal or would actively reject the idea (18.3 percent - Q33 and 16.6 percent - Q35).

Automation of the record keeping system (Q32) was viewed in very favorable terms, with 73.5 percent reporting they strongly accepted the notion or accepted it with some reservations. This question also resulted in one of the lowest percentage of respondents expressing some dissatisfaction (11.5 percent).

The two questions (Q33 and Q35) concerning the movement of maintenance personnel to centralized maintenance hubs, with fewer personnel at remote sites, received only limited support. Only 16.9 and 13.1 percent of the respondents were strongly in favor of this goal. A total of 27.0 and 31.7 percent, respectively, selected one of the last two (negative) categories on these questions.

TABLE 2

Summary Percentages For Responses to the New Maintenance Concept Questions

Question Number		Alternatives 1	2	3	4	5	6	7
25	Information	22.6	59.3	14.7	3.3			
26	Source of I	12.2	7.3	33.1	2.3	19.0	22.4	3.6
27	General Rea	7.9	34.9	30.8	19.5	6.7		
28	Facility Lev	14.5	14.8	6.6	24.3	18.6	15.1	6.1
29	Certification	18.0	15.9	3.4	25.6	19.5	12.6	4.9
30	System Repair	19.0	41.2	21.1	13.0	5.3		
31	Rem Maint Mon	21.2	40.5	21.5	11.8	4.8		
32	Recordkeeping	42.5	31.0	14.9	7.7	3.8		
33	Centralizat	16.9	36.4	19.7	19.5	7.5		
34	Diagnostics	30.1	36.9	14.0	14.1	4.9		
35	Central Hubs	13.1	35.2	19.9	23.1	8.6		
36	Travel	12.4	35.5	22.0	24.0	6.0		
37	Work Skills	49.7	35.4	10.9	2.9	1.2		
38	Technicians	37.0	32.2	20.4	6.9	3.4		
39	Specializa	31.7	39.5	17.8	7.5	3.4		
40	Comp Ass Ins	31.9	31.3	16.1	13.1	7.6		
41	Watchstanding	44.1	27.7	15.8	8.5	3.8		
42	Reorganizat	34.5	23.3	5.0	6.2	20.1	7.3	3.6
43	Work Situat	47.9	12.4	15.3	17.9	2.5	2.9	1.2

Responses to the question (Q34) dealing with movement away from routine preventive maintenance toward diagnostic and corrective maintenance were generally favorable. Some degree of support for the concept was indicated by 67 percent of the respondents, with 14 percent being uncertain and 19 percent expressing some degree of disfavor.

The proposed alteration in travel (Q36) received limited support. Only 47.9 percent expressed some degree of support for this idea, with 30 percent expressing some degree of disfavor.

The aspect of the NMC that generated the highest level of overall support was the emphasis on solid state electronics, digital logic, systematic troubleshooting skills and computer programing capabilities (Q37). Nearly one-half (49.7 percent) of the respondents said they strongly supported this idea, another 35.4 percent expressed support with some reservations, and a very small percentage of the group expressed some degree of disfavor (4.1 percent).

Even though there was a high degree of acceptance for the use of solid state electronics, the percentage of respondents who accepted the idea that this would require a greater knowledge of electronics (Q38) and increasing specialization (Q39) in the work force was slightly smaller. However, more than two-thirds of the respondents still expressed some degree of acceptance for these changes (69.2 and 71.2 percent). Only 10 percent expressed some degree of disfavor.

The movement toward computer assisted instruction at the home sector was also viewed favorably, with nearly two-thirds of the respondents marking one of the two favorable categories. The percentage expressing some degree of disfavor was slightly higher than for the two preceding questions (20.7 percent).

General approval was also evident in the responses to the proposal to reduce watchstanding (Q41), with 71.8 percent expressing general acceptance to strong support. A total of 12.3 percent were in the two nonfavorable categories.

Next (Q42), respondents were asked to indicate which of several responses best described what they saw for themselves during the time of the reorganization (e.g., little or no effect, retirement, relocation or resignation). About one-third of the workers (34.5 percent) indicated that it would have little effect on them, since most were at a location in which there would be little change. Another 23.3 percent indicated they would be retired by the time the plan was implemented. A similar percentage responded negatively (20.1 percent), indicating that the proposed changes would require them to relocate, which they would not like.

Consequences of the move toward solid state equipment presented little concern for most respondents. Nearly one-half (47.9 percent) said the change would have little effect on them since they were already utilizing the necessary skills in their current job. Another 33.2 percent said they would either continue using their current skills or they would look forward to acquiring new skills. Only 12.4 percent indicated they would probably retire when those skills were needed.

NMC Item Correlations. Pearson Product-Moment correlation coefficients for the 19 items comprising the NMC portion of the questionnaire are presented in Table 3. Responses to the first question (Q25), dealing with the respondents knowledge of the NMC, were negatively correlated with every question in the NMC section, except questions 40 and 42. Individuals who reported receiving more information concerning the NMC expressed more favorable attitudes toward the proposed changes. While most of these correlations were statistically significant, they were quite low, ranging from .009 to -.257. The second question (Q26), dealing with the major source of the respondents' information, exhibited even smaller correlations with the other items (ranging from .004 to .091). Even though several of the correlations were statistically significant, the practical significance is slight and there is little indication that the source for the information played any significant role in determining the individual's response to the various aspects of the proposal.

With the exception of the last two questions (Q42 and Q43), responses to the rest of the NMC questions exhibited moderate to high intercorrelations (range of .315 to .781). This suggests that the individual's responses to the various aspects of the NMC were reasonably consistent. This consistency was most evident in the correlation between the individuals' responses to question 27, which assesed their general reaction to the NMC, and their responses to the remaining items. These correlations ranged from .323 to .724 and were all statistically significant ($p < .01$).

Correlations between the general reaction to the NMC and various demographic, job related and self evaluation variables. Correlation coefficients between the criterion variable (Q27) and the various predictor variables used in this study appear in Table 4. While the correlations were relatively low, ranging from -.011 to .276, a majority were statistically significant due to the large sample size. Responses to questions concerning various aspects of job satisfaction produced the highest correlations with the criterion variable. Of these responses, satisfaction with national FAA management (Q24), satisfaction with regional management (Q23), and satisfaction with working conditions (Q18) produced the highest correlations (.276, .278 and .275). Additional questions dealing with satisfaction with salary (Q19), adequacy of the salary (Q20), and satisfaction with local management (Q22) produced similar correlations (.249, .262 and .245). There were five other variables that had correlations above .200 with the criterion variable, they were: supervisor-nonsupervisor, ratings of percentage of difficult

TABLE 3

NEW MAINTENANCE CONCEPT QUESTIONNAIRE RESPONSES: INTERCORRELATIONS

Question																		
25																		
26	-.257																	
27	-.124	.067																
28	-.143	.055	.724															
29	-.169	.071	.665	.768														
30	-.064	.056	.585	.619	.624													
31	-.117	.044	.684	.708	.713	.661												
32	-.103	.044	.495	.494	.513	.491	.614											
33	-.062	.028	.638	.664	.620	.597	.684	.537										
34	-.075	.050	.558	.563	.560	.525	.629	.515	.607									
35	-.058	.020	.630	.660	.615	.559	.660	.484	.781	.646								
36	-.058	.020	.561	.586	.557	.527	.595	.455	.673	.572	.726							
37	-.149	.091	.366	.392	.414	.374	.438	.417	.384	.436	.392	.397						
38	-.052	.054	.323	.336	.336	.348	.371	.334	.376	.340	.391	.374	.429					
39	-.078	.050	.460	.461	.463	.468	.524	.440	.491	.497	.498	.508	.508	.492				
40	.014	.011	.342	.357	.324	.355	.381	.343	.383	.347	.373	.372	.324	.315	.416			
41	-.088	.034	.463	.460	.460	.434	.512	.435	.472	.511	.484	.444	.351	.316	.422	.353		
42	.009	.004	.206	.227	.198	.187	.209	.133	.282	.195	.323	.267	.163	.164	.203	.162	.172	
43	-.035	.062	.073	.084	.088	.079	.088	.089	.105	.120	.120	.120	.240	.100	.142	.100	.086	.371

TABLE 4

CORRELATIONS (r) BETWEEN Q27 RESPONSES (GENERAL REACTION TO THE NMC) AND VARIOUS PREDICTOR VARIABLES

Predictor Variables	r	Predictor Variables	r
Age	-.055	Q24-Sat. with Nat. Management	.276
GS-Level	-.095	Q44-Present Work Schedule	.202
Years in Present Position	.104	Q45-Time on Present Work Sched.	-.033
Education	-.069	Q46-Ever Worked Rotating Sched.	-.014
Facility	-.137	Q47-Time on Rotating Sched.	.086
Occupational Identification	-.199	Q48-Productivity on Eve-Shifts	-.018
AF Program	.026	Q49-Productivity on Mid-Shifts	-.011
Region	-.118	Q53-Diff. Keep Awake in Eve.	-.026
Supervisor/Nonsupervisor	.236	Q55-Most Efficient Work Time	.121
Q7-Difficulty of Job	-.184	Q60-Trouble Sleep Aft. Day-Shift	.038
Q9-Percent Difficult Workdays	.217	Q62-Trouble Sleep Aft. Mid-Shift	-.044
Q12-Work Physically Straining	-.268	Q63-Stay Asleep Aft. Day-Shift	.088
Q13-Work Mentally Straining	-.148	Q67-Amt. of Sleep Aft. Day-Shift	-.012
Q14-Work Stressful	-.165	Q68-Amt. of Sleep Aft. Eve-Shift	-.147
Q15-Sat. with Employment	.241	A-State Anxiety	.198
Q18-Sat. With Working Cond.	.275	A-Trait Anxiety	.142
Q19-Sat. With Salary	.249	Q110-General Health	.114
Q20-Rate Current Salary	.262	Q112-Currently Rec. Treatment	-.043
Q21-Sat. With Imm. Superv.	.124	Q116-Treatment for Lung Prob.	.039
Q22-Sat. With Local Manage.	.245	Q118-Treat. for Ten. or Nerves	.054
Q23-Sat. With Reg. Management	.278	Q119-Treat. for Stomach Prob.	.019

work days (Q9), ratings of the physically staining nature of the job (Q12), a global job satisfaction measure (Q15), and type of shift worked (Q44). Other variables that produced significant correlations (.100 to .200) were: occupational identification, region, AF specialty, AF type of facility, years in current position, job difficulty (Q7), A-state anxiety, A-trait anxiety, ratings of the stressful nature of the job (Q14), ratings of the mentally straining nature of the job (Q13), satisfaction with immediate supervisor (Q21), general health (Q110), most efficient work time (Q55), and amount of sleep after an evening shift (Q68).

General Reaction to the NMC, Stratified by Demographic Variables, Job Related Variables, and Self Evaluation. This section examines the general reaction to the NMC (Q27) to determine the degree of acceptance relative to various subgroups in the AF work force. Since the response to question 27 is highly correlated with the response to more specific questions, the presentation of the results will be focused on the responses to question 27. The discussion of job rating, job satisfaction, shift information, and general state of health, as they relate to question 27, will be limited to the global question from each section since there would be considerable overlap if subitems were also discussed. The global question in each category referred to the one question that was most general; e.g., in general, how difficult is your job? (Q7), how satisfied are you with being employed in AF? (Q15), what is your present work schedule? (Q44), and how would you describe your general state of health? (Q110). Each category included several more specific questions (subitems) that provided further information. These additional questions in each of the four categories were used in the regression analysis and factor analysis.

Sex. Categorized responses of men and women appear in Table 5. Due to size limitations and similarity of responses to the various questions, this table, as well as suceeding tables, includes the responses for questions 25, 27, 33, 35, 37, 42, and 43. (Note: Percentages on this and succeeding tables may not add up to 100, due to a few responses beyond the scoreable range). Chi-square comparisons for the 19 NMC questions were significant ($p < .01$) except for questions 32, 36, and 41. Compared to men, a higher percentage of women reported they had received very little information concerning the NMC (35.4 percent versus 21.6 percent). The greatest percentage of men reported they had received most of their information by videotape, while women had received their information primarily by word of mouth.

The percentages of women and men who reported very positive and generally positive reactions to the NMC (Q27) were nearly identical. A much larger percentage of women, as compared with men, reported they were uncertain about the NMC (43.6 to 30.0 percent). The tendency for women employees to express more uncertainty about the NMC was evident throughout most of the remaining questions. This greater uncertainty concerning the proposal is most likely related to occupational type. A majority of the women were involved in staff support areas (possibly secretarial and filing duties), with a relatively small percentage in technical positions.

TABLE 5

Percentages of Men and Women Responding
to Selected New Maintenance Concept Questions

Question Number	Response Alternatives	Men	Women
25	1	21.6	35.4
	2	59.0	56.5
	3	15.9	6.3
	4	3.4	.8
27	1	8.0	8.8
	2	35.0	35.7
	3	30.0	43.6
	4	20.2	6.2
	5	6.7	4.8
33	1	17.0	24.2
	2	36.5	28.7
	3	19.2	29.1
	4	19.8	12.6
	5	7.5	5.4
35	1	13.4	16.7
	2	35.1	33.0
	3	19.6	28.5
	4	23.3	16.7
	5	8.6	5.0
37	1	50.2	43.6
	2	35.6	31.2
	3	10.2	21.6
	4	2.8	1.8
	5	1.2	1.8
42	1	34.0	46.7
	2	23.6	11.4
	3	4.9	8.1
	4	6.2	8.6
	5	20.5	16.2
	6	7.4	1.4
	7	3.3	7.6
43	1	48.3	29.1
	2	12.6	8.9
	3	15.2	21.2
	4	17.6	31.5
	5	2.5	3.0
	6	2.9	1.5
	7	.9	4.9

Thus, the observed higher rate of uncertainty by women employees could be due to their job setting, a setting in which they would have little need to develop an attitude toward the various proposals, or a setting in which they received a limited amount of information concerning the proposed changes. The only questions on which the two sexes did not exhibit statistically significant differences involved automation in record keeping (Q32), less travel (Q36), and a reduction in watch standing (Q41).

Age. Table 6 presents the categorized responses from various age groups. While differences in the percentages of respondents in different age groups who selected the various alternatives were relatively small, chi-square comparisons revealed that the differences were all statistically significant except for question 39.

A comparison of the percentages of respondents checking the two favorable categories for question 27 gives an indication of differences among age groups. The percentages for the five younger age groups ranged from 27.7 to 42.3 percent. Values for the older age groups, except those 60 and older, were all higher, ranging from 44.5 to 46.3 percent. There were corresponding changes in the percentage of respondents expressing negative attitudes toward the proposal. Within the four older age groups (45 to 60+), 19.7 to 23.9 percent expressed a negative reaction, compared to 26.2 to 31.6 percent of those in the younger age groups. The most obvious age differences in responses occurred for questions 42 and 43. Beginning at age category 45 to 49 through 60+, there was a consistent increase in the percentage of the respondents who said they would be retired when the NMC was implemented (29.0 to 67.7 percent on Q42 and 12.2 percent to 59.6 percent on Q43). There was a significantly greater tendency for younger respondents (ages 24 and younger through 44) to indicate that the proposal would lead to their being relocated, which they would dislike. For all age groups, this response to question 42 was chosen most frequently by respondents in the 25 to 29 age group (35.6 percent).

Ethnic Background. Categorized responses from individuals with different ethnic backgrounds appear in Table 7. Even though the differences in percentages are relatively small, chi-square comparisons indicate that most of the differences were statistically significant ($p < .01$).

In response to the question concerning their general reaction to the NMC (Q27), a higher percentage of individuals in the "other" (i.e., individuals who selected this alternative rather than one of the five available ethnic backgrounds) category expressed negative reactions to the proposal. Blacks also tended to show a slightly lower percentage who favored the proposed changes, along with a slightly higher percentage of negative reactions. For the remainder of the NMC questions the Orientals, Blacks, Whites, Hispanics, and American Indians tended to be relatively similar. There was little indication that any one group was consistently more or less favorably disposed to the proposal. However, those who

TABLE 6

Responses to the New Maintenance Concept Based on Age of Respondents

Quest. Number	Response Alt.	Age 24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
25	1	45.9	23.5	22.3	22.7	19.3	19.3	23.2	29.3	32.9
	2	45.9	58.7	61.6	59.3	61.4	60.8	60.1	55.3	47.6
	3	5.9	16.1	13.2	16.1	15.7	16.1	12.8	10.8	15.2
	4	2.4	1.7	2.8	1.8	3.5	3.6	3.8	4.6	4.3
27	1	8.4	8.6	7.2	7.0	7.7	7.5	10.0	8.1	6.8
	2	19.3	32.5	31.4	31.5	34.6	38.8	34.5	36.6	34.0
	3	45.8	32.5	31.1	29.8	28.7	29.7	31.7	33.6	38.9
	4	21.7	19.5	20.7	24.0	22.2	17.7	17.3	19.6	16.0
	5	4.8	6.7	9.6	7.6	6.7	6.0	6.6	5.2	3.7
33	1	25.9	13.6	14.9	14.3	15.2	17.7	19.7	22.4	18.0
	2	21.2	32.5	35.4	31.8	38.6	38.3	36.1	38.3	37.9
	3	22.4	20.3	20.8	19.7	17.9	18.7	20.0	18.5	28.0
	4	22.4	27.0	18.5	22.5	21.2	19.1	17.5	15.0	13.7
	5	8.2	6.2	10.3	11.7	7.1	6.1	6.7	5.7	2.5
35	1	10.6	10.4	11.4	12.3	11.1	14.2	15.2	17.5	11.7
	2	28.2	31.1	35.5	30.5	36.1	35.3	36.7	38.8	40.5
	3	24.7	22.9	19.8	20.2	18.3	20.1	20.7	16.9	22.7
	4	24.7	27.9	23.5	24.3	24.6	23.1	19.8	20.8	21.5
	5	11.8	7.5	9.8	12.7	9.9	7.3	7.6	5.9	3.7
37	1	45.9	58.1	56.3	53.2	51.0	48.1	46.9	44.1	36.2
	2	29.4	27.7	31.9	30.8	35.7	37.6	37.1	37.5	46.6
	3	16.5	11.5	8.2	10.5	9.8	10.4	11.6	14.3	12.9
	4	4.7	2.2	2.0	3.0	2.7	2.8	3.1	3.1	3.7
	5	3.5	0.5	1.5	2.4	0.8	1.0	1.3	1.1	0.6
42	1	37.3	32.1	38.4	45.6	44.8	34.1	23.5	20.1	13.3
	2	3.6	1.0	1.1	1.6	4.6	29.0	50.8	62.3	67.7
	3	9.6	10.4	8.8	6.7	5.0	3.2	3.7	1.8	1.9
	4	9.6	14.8	11.6	6.4	7.3	4.4	2.6	1.8	3.8
	5	28.9	35.6	32.8	31.5	26.3	15.5	8.2	6.0	2.5
	6	1.2	0.3	0.3	1.3	8.2	12.0	10.0	6.0	9.5
	7	9.6	5.6	6.9	6.7	3.8	1.7	1.3	2.0	1.3
43	1	28.6	36.4	44.4	57.3	56.1	51.8	43.9	34.8	23.7
	2	1.2	0.3	0.8	0.1	1.3	12.2	26.9	41.5	59.6
	3	38.1	34.4	27.2	19.3	14.7	10.8	8.6	8.3	1.9
	4	19.0	24.4	23.5	18.1	21.6	16.6	14.2	10.7	8.3
	5	7.1	2.8	1.7	2.2	2.9	3.2	1.8	1.1	1.9
	6	3.6	0.0	0.2	0.4	2.5	4.8	4.2	2.7	3.8
	7	2.4	1.5	2.3	2.4	1.0	0.6	0.5	0.9	0.6

TABLE 7

Responses to the New Maintenance Concept Based on Ethnic Identification

Quest. Number	Response Alt.	Ethnic Background Ortl.	Black	White	Hisp.	AmInd.	Other
25	1	34.7	27.3	21.3	23.2	25.3	29.1
	2	49.7	58.4	60.2	61.2	56.0	49.7
	3	15.0	10.6	15.1	12.8	14.3	16.6
	4	0.7	3.7	3.3	2.8	4.4	4.6
27	1	8.3	6.6	8.1	7.9	7.9	6.7
	2	25.5	33.3	36.0	31.7	32.6	24.0
	3	43.4	32.6	30.1	33.4	37.1	28.7
	4	15.2	16.7	19.6	21.8	13.5	24.7
	5	7.6	10.7	6.2	5.2	9.0	16.0
33	1	22.2	16.9	16.9	17.6	20.2	13.3
	2	34.0	37.9	36.8	36.8	33.7	28.0
	3	23.6	23.2	18.9	20.5	24.7	21.3
	4	14.6	15.7	19.9	20.7	13.5	20.7
	5	5.6	6.3	7.4	4.4	7.9	16.7
35	1	17.2	13.1	13.1	13.3	18.0	10.6
	2	36.6	36.9	35.4	35.4	36.0	25.2
	3	23.4	22.2	19.6	20.2	22.5	20.5
	4	15.9	18.8	23.6	23.7	12.4	23.8
	5	6.9	9.1	8.4	7.4	11.2	19.2
37	1	49.7	53.8	49.8	50.2	42.7	43.0
	2	37.2	33.3	35.4	36.1	40.4	31.8
	3	10.3	9.1	11.0	8.9	13.5	11.9
	4	1.4	2.2	2.7	3.9	3.4	4.6
	5	1.4	1.6	1.0	0.9	0.0	8.6
42	1	33.1	39.2	34.8	28.6	32.2	33.1
	2	33.8	11.8	23.8	23.5	16.1	20.3
	3	4.9	7.6	4.6	7.0	12.6	3.4
	4	5.6	12.7	5.5	9.0	14.9	2.7
	5	19.7	20.1	20.6	19.6	14.9	17.6
	6	2.1	4.5	7.4	9.2	6.9	8.1
	7	0.7	4.1	3.2	3.1	2.3	14.9
43	1	40.0	52.4	48.7	43.1	33.7	43.0
	2	22.8	4.8	12.5	12.9	8.1	10.7
	3	19.3	21.9	14.2	17.7	33.7	16.8
	4	15.9	15.9	18.1	19.5	19.8	14.8
	5	2.1	2.5	2.6	1.8	0.0	2.0
	6	0.0	1.3	2.9	4.4	2.3	4.0
	7	0.0	1.3	1.0	0.7	2.3	8.7

listed their ethnic identity as "other" were consistent in exhibiting a slightly higher percentage of negative responses and a slightly lower percentage of favorable responses. Since these differences in reaction to the NMC proposal tend to be relatively small, they appear to be primarily determined by the number (percentage) of individuals in each of the ethnic groups who were supervisors (or nonsupervisors). For the Hispanic, Indian, Oriental, and White employees, between 22.3 and 25.1 percent were supervisors, compared to 15.9 and 15.3 percent of the Blacks and "Others." Since these latter two groups had a larger percentage of nonsupervisors in the overall sample, and employees who were nonsupervisors tended to respond more negatively, this would explain why there were some slight differences in general reaction to the NMC.

Education. Respondents were placed in one of six groups on the basis of their formal education: 11 years or less, 12 years, 13 years, 14 years, 15 years, and 16 years or more. This does not take into account the on-the-job educational experiences that many workers have completed. Categorized responses for individuals stratified by years of education appear in Table 8. Chi-square comparisons for each of the NMC questions were significant ($p < .01$).

As years of formal education increased, there was a corresponding increase in the percentage of individuals reporting "considerable" to "a great deal" of knowledge concerning the NMC (12.3 percent for 11 years or less to 25.2 percent for 16 plus years).

Individuals with 11 or fewer years of education had the highest percentage reporting uncertainty about their general reaction to the NMC (36.8 percent) relative to the other education groups (33.5 to 22.6 percent). This same group also had the smallest percentage (39.2 percent) indicating some degree of positive reaction to the general proposal. The group with college degrees clearly had the highest percentage expressing some degree of approval (58.7 percent versus 39.2 to 43.5 percent) and the lowest percentage expressing some degree of disapproval (18.5 percent versus 24 to 32.1 percent). This tendency for a higher percentage of the college educated group to express positive feelings concerning the NMC was evident throughout the remaining questions.

Differences between groups were apparent for questions 42 and 43. In response to the reorganization (Q42), higher percentages of individuals with higher educational levels reported that they were at facilities that would evidence little change. The percentage of individuals who reported that the reorganization would not affect them since they would probably be retired was greatest for the group with the least education, 38 percent of those with less than a high school education and 18.5 percent of the college educated group. While only 13 percent of the college educated group indicated that the proposed changes would likely result in their relocation, a move that they would dislike, 23 percent of those in the groups with 13, 14, and 15 years of education responded similarly.

TABLE 8

Responses to the New Maintenance Concept Based on Years of Education

Quest. Number	Response Alt.	Number of Years of Education 11	12	13	14	15	16+
25	1	29.2	24.4	20.8	22.3	22.0	16.5
	2	58.5	60.9	62.0	58.7	56.6	58.3
	3	9.4	12.6	14.6	15.1	17.9	18.1
	4	2.9	1.9	2.5	3.7	3.6	7.1
27	1	11.7	5.7	6.8	7.2	6.8	16.3
	2	27.5	33.5	36.7	32.9	34.5	42.4
	3	36.8	33.5	31.1	31.4	26.3	22.6
	4	17.0	20.5	20.7	20.8	25.3	12.3
	5	7.0	6.7	4.7	7.6	6.8	6.2
33	1	14.8	14.6	15.4	15.2	16.7	30.7
	2	38.5	35.7	37.2	37.1	32.7	37.3
	3	22.5	22.2	19.7	18.3	17.2	13.7
	4	15.4	20.8	20.5	21.1	23.7	10.6
	5	8.3	6.8	7.3	8.3	9.7	7.4
35	1	16.6	11.2	10.7	12.5	12.4	23.6
	2	31.4	33.7	36.2	34.4	32.6	40.7
	3	21.3	21.2	22.6	19.5	16.3	15.6
	4	21.9	25.5	23.9	23.5	28.2	12.8
	5	8.3	8.4	6.6	10.1	10.5	7.3
37	1	35.9	45.1	48.5	50.8	56.4	63.2
	2	44.3	37.5	37.8	35.5	30.9	28.8
	3	12.6	12.7	9.4	9.8	9.0	5.3
	4	3.6	3.7	2.7	2.5	2.9	1.3
	5	3.6	1.1	1.6	1.3	0.7	1.4
42	1	25.2	29.8	35.9	33.5	37.0	49.5
	2	38.0	28.5	19.0	20.3	17.6	18.5
	3	6.1	4.3	5.6	5.0	5.9	5.9
	4	4.9	6.0	6.3	7.4	5.4	5.8
	5	17.2	19.1	23.1	23.0	23.0	13.0
	6	4.9	9.2	7.1	6.3	7.6	3.7
	7	3.1	3.0	3.0	4.3	3.4	3.7
43	1	35.9	45.1	46.1	50.4	53.3	52.9
	2	26.3	14.7	8.5	10.6	10.9	10.7
	3	10.8	14.7	15.6	16.2	18.7	14.8
	4	17.4	18.0	22.5	17.1	12.4	17.4
	5	5.4	2.7	3.6	2.3	1.5	0.9
	6	2.4	3.7	2.6	2.2	2.7	1.6
	7	1.2	1.0	1.0	1.0	0.5	1.8

Higher percentages of individuals in the upper three educational level groups, compared to those with less education, indicated the potential alteration in work skills (Q43) would have little or no effect since these skills were already required (50 to 53 percent versus 36 to 46 percent). The group with the least amount of formal education had the highest percentage of individuals indicating that the change would have little effect since they would be retired at the time of implementation (26.3 percent versus 8.5 to 14.7 percent), and that they would prefer to work with their current work skills (5.4 percent versus 0.9 to 3.6 percent).

Pay Schedule. Categorized responses of individuals with different pay schedules appear in Table 9. It should be noted that the wage leader (WL) and wage schedule (WS) groups involved an extremely small proportion of the overall sample (.1 and .5 percent). Differences in general schedule (GS), wage grade (WG), wage leader (WL), and wage supervisor (WS) percentages, based on the chi-square comparisons, were significant for all of the NMC questions.

A higher percentage of the GS employees reported "considerable" to "a great deal" of knowledge concerning the NMC, than did those in the other groups (18.8 percent versus 8.6 to 12.5 percent). Differences were also noted in terms of the source of the information. For GS employees, approximately one-third reported that the videotape was their major source, with 21.4 percent obtaining their information via word of mouth. In comparison, 38 percent of the WS personnel received the majority of their information from management, with 20.6 percent indicating the videotape as their major source.

While GS employees exhibited the highest percentage of favorable responses to the NMC (43.5 percent versus 33.5 to 41.2 percent), they also exhibited the highest percentage of negative responses (26.9 percent versus 8.8 to 21 percent). In comparison to WG employees, the percentages of GS employees who expressed favorable responses to more specific questions concerning the NMC were also consistently higher. However, for the same two groups, GS employees also tended consistently to have higher percentages of respondents expressing negative reactions to the more specific questions. A higher percentage of the WG employees indicated that they were undecided concerning many of the proposals.

Grade Level. Categorized responses of individuals with different grade levels appear in Table 10. Chi-square comparisons for the NMC questions revealed that there were statistically significant differences on all of the questions.

Individuals at the higher grade levels, especially those at the GS-13 and GS-14 levels, reported having more information about the NMC. It is possible that this difference is due to their management level positions since their responses to question 26 indicate that the major source of the information for the GS-13 and 14 level respondents was via management

TABLE 9

Responses to the New Maintenance Concept Based on Pay Schedule

Quest. Number	Response Alt.	Pay Schedule GS	WG	WL	WS
25	1	20.8	38.6	37.5	28.6
	2	60.3	52.2	50.0	62.9
	3	15.3	8.1	12.5	8.6
	4	3.5	0.9	0.0	0.0
27	1	8.1	5.6	0.0	8.8
	2	35.4	27.9	37.5	32.4
	3	29.4	45.1	50.0	50.0
	4	20.1	15.4	12.5	5.9
	5	6.8	5.6	0.0	2.9
33	1	17.2	13.2	14.3	25.7
	2	36.8	31.6	57.1	40.0
	3	18.6	29.6	14.3	22.9
	4	19.9	18.6	0.0	5.7
	5	7.5	7.0	14.3	5.7
35	1	13.3	10.0	12.5	31.4
	2	35.6	30.3	25.0	37.1
	3	19.0	29.2	25.0	20.0
	4	23.2	24.3	12.5	8.6
	5	8.9	6.2	25.0	2.9
37	1	51.7	28.8	37.5	37.1
	2	35.1	39.0	12.5	42.9
	3	9.5	23.9	37.5	20.0
	4	2.5	6.4	0.0	0.0
	5	1.2	1.9	12.5	0.0
42	1	35.4	25.6	14.3	27.3
	2	23.6	18.3	28.6	48.5
	3	4.9	5.9	14.3	12.1
	4	5.5	12.6	28.6	3.0
	5	19.7	28.2	14.3	9.1
	6	7.6	4.0	0.0	0.0
	7	3.4	5.2	0.0	0.0
43	1	51.4	13.5	12.5	14.7
	2	12.1	14.8	25.0	23.5
	3	13.7	30.8	25.0	44.1
	4	16.9	28.1	37.5	17.6
	5	2.2	7.0	0.0	0.0
	6	2.8	3.4	0.0	0.0

TABLE 10

Responses to the New Maintenance Concept Based on GS-Level of Respondents

Quest. Number	Response Alt.	GS-Grade Levels <5	6	7	8	9	10	11	12	13	14+
25	1	49.0	60.0	32.6	36.7	36.2	44.3	23.0	21.2	10.8	9.6
	2	42.0	40.0	60.3	52.2	55.3	48.5	62.8	62.6	60.8	44.3
	3	7.0	0.0	7.1	10.0	7.5	6.2	12.2	13.7	23.4	29.6
	4	2.0	0.0	0.0	0.0	0.8	0.0	1.9	2.4	4.8	16.5
27	1	11.5	5.9	6.7	9.1	6.8	7.4	5.7	5.2	13.9	21.1
	2	26.0	17.6	31.8	29.5	26.1	33.0	30.3	31.2	52.9	53.3
	3	46.4	64.7	39.7	47.7	41.1	41.5	32.8	30.8	20.8	16.2
	4	9.4	5.9	15.6	11.4	18.4	10.6	24.1	24.0	9.9	6.7
	5	6.8	5.9	6.1	2.3	6.8	7.4	7.1	8.7	2.4	2.4
33	1	25.3	11.8	15.8	23.5	11.6	8.7	11.6	13.4	28.5	38.8
	2	27.8	41.2	33.3	36.5	33.9	31.5	34.5	35.7	43.8	42.3
	3	30.9	35.3	24.9	27.1	24.7	32.6	20.2	19.4	14.5	10.7
	4	10.3	5.9	20.9	8.2	22.9	16.3	24.9	22.6	10.0	5.1
	5	5.7	5.9	5.1	3.5	6.8	10.9	8.9	8.9	3.3	3.1
35	1	18.1	18.8	13.0	13.1	10.0	12.0	8.1	10.8	20.8	32.7
	2	29.5	25.0	30.5	29.8	32.0	28.3	30.6	34.1	47.8	45.2
	3	26.4	43.8	26.6	32.1	23.6	27.2	21.7	19.7	14.6	10.5
	4	21.2	12.5	23.2	21.4	24.1	20.7	29.0	25.5	12.5	8.2
	5	4.7	0.0	6.8	2.4	10.2	12.0	10.7	9.9	4.4	3.3
37	1	42.7	31.3	55.7	45.8	43.3	35.6	42.2	48.4	65.7	66.4
	2	29.7	37.5	27.3	26.5	37.5	34.4	39.8	37.1	29.1	27.2
	3	20.8	25.0	15.9	21.7	14.0	23.3	13.3	9.8	3.8	5.3
	4	2.6	6.3	1.1	4.8	4.0	2.2	3.4	3.4	0.6	0.9
	5	4.2	0.0	0.0	1.2	1.3	4.4	1.3	1.2	0.8	0.2
42	1	36.6	70.6	38.6	35.8	37.7	30.8	17.8	37.2	49.6	47.9
	2	10.4	11.8	8.8	25.9	8.5	15.4	22.6	24.3	28.5	35.2
	3	13.7	5.9	5.8	4.9	6.6	6.6	5.7	4.1	4.5	3.7
	4	10.4	0.0	11.1	11.1	11.4	17.6	7.0	4.8	3.7	3.9
	5	17.5	5.9	28.7	14.8	30.2	24.2	33.1	16.8	7.9	5.1
	6	1.6	0.0	1.8	2.5	2.1	1.1	8.6	9.8	4.9	3.0
	7	9.8	5.9	5.3	3.7	3.4	4.4	5.1	3.0	0.8	1.2
43	1	21.4	26.7	31.3	15.8	38.7	12.1	33.8	60.5	59.5	45.2
	2	8.6	6.7	7.8	15.8	5.3	11.0	12.6	11.3	14.0	24.0
	3	32.6	13.3	27.1	28.9	29.1	27.5	21.6	9.4	9.0	9.0
	4	28.3	40.0	25.9	30.3	21.9	41.8	22.9	12.6	13.7	19.6
	5	1.6	13.3	4.2	2.6	2.7	6.6	4.2	2.0	1.2	0.2
	6	1.1	0.0	1.8	2.6	0.8	1.1	3.5	3.4	2.0	1.4
	7	6.4	0.0	1.8	2.6	1.6	0.0	1.4	0.8	0.6	0.7

(41.1 and 24.7 percent). The percentage checking this response in the lower GS-level groups was between 12.3 and 16.7 percent. The videotape was the major source of information for individuals at the lower GS levels. A larger percentage of the respondents at the higher GS levels also reported that a majority of their information came from the FAA Order.

Overall reactions to the NMC were related to individuals' GS levels. When compared to individuals in the four highest GS levels, larger percentages of individuals in the lower grade levels reported that they were uncertain about their reactions to the NMC (39.7 to 64.7 percent versus 16.2 to 32.8 percent). Individuals in grades GS-13 and 14 also expressed the greatest degree of acceptance for the NMC, with 66.8 and 74.4 percent expressing generally positive to very positive reactions. This tendency for the higher GS-level respondents to exhibit greater support and less rejection of the proposed changes was apparent throughout the remaining questions.

Years Worked for FAA/CAA. Table 11 includes categorized responses in terms of job tenure. The chi-square comparisons for questions 36 through 40 failed to reach statistical significance. Even though differences across groups for the remaining questions were statistically significant, there was little indication that any group was remarkably or consistently different from the others.

There was a tendency for individuals who had worked for the FAA for less than a year to use the "strongly support" category more often than individuals in the other groups. Out of this group, 17.2 percent said that they felt very positive about the proposed NMC. The tenure group with the next highest percentage in selection of the very positive category had the most experience, 21 plus years (9.7 percent); percentages for the other groups ranged from 5.8 to 7.5 percent. These same two groups also had the highest percentage of respondents indicating some degree of positive reaction to the overall proposal (Q27). As could be expected, the largest difference between groups occurred in response to question 42, where a much higher percentage of individuals in the 11 to 20 and 21 years or more groups (22.4 and 46.7 percent) indicated that the proposed changes would have little effect on them since they would be retired at the time of implementation. A higher percentage of individuals in both of these groups also reported that the proposal would lead to their retirement (9.5 to 11.7 percent compared to 0.4 to 3.5 percent). The response alternative "that the proposal would result in their relocation to a maintenance hub, which they would probably dislike," received the highest rate of endorsement from respondents who had worked for the FAA for 1 to 5 years (34.4 to 40.2 percent).

Years in Present Position. Categorized responses in terms of tenure in present position appear in Table 12. Chi-square comparisons indicate that the differences on questions 25, 30, 36, 40, 41, and 42 were not statistically significant.

TABLE 11

Responses to the New Maintenance Concept
Based on Years Worked for the FAA/CAA

Quest. Number	Response Alt.	Years Worked for the FAA/CAA <1	1	2	3	4	5	6-10	11-20	21+
25	1	39.6	39.2	23.6	25.1	24.7	23.2	23.8	21.5	18.7
	2	53.9	48.8	65.9	60.0	61.5	61.4	60.5	59.6	58.5
	3	5.2	10.4	9.5	12.9	11.5	13.4	13.7	15.9	16.9
	4	1.3	1.6	0.9	2.0	2.3	1.8	1.9	2.8	5.9
27	1	17.2	6.4	7.4	6.8	5.8	6.9	5.9	7.5	9.7
	2	26.5	32.0	27.8	33.5	35.9	33.3	31.3	34.5	39.1
	3	39.1	39.2	42.1	31.9	29.3	35.4	31.5	29.8	28.2
	4	13.9	20.0	18.1	19.9	21.2	18.3	22.1	21.3	16.8
	5	3.3	2.4	4.6	7.6	7.8	5.6	9.0	6.7	6.0
33	1	21.7	13.7	11.2	15.5	13.1	14.8	15.5	16.5	20.2
	2	32.9	39.5	34.9	33.9	37.5	36.9	32.8	37.6	37.7
	3	25.0	18.5	22.3	21.5	21.2	17.0	21.1	19.6	17.9
	4	17.8	22.6	24.7	21.1	21.2	24.7	21.2	19.0	17.0
	5	2.6	5.6	7.0	8.0	7.0	6.6	9.5	7.2	7.1
35	1	13.8	9.7	10.3	10.4	8.1	12.2	11.7	13.3	15.9
	2	40.8	27.4	31.3	32.3	37.4	32.2	31.9	36.3	37.3
	3	21.1	26.6	23.4	23.5	22.3	20.6	21.8	18.6	17.7
	4	20.4	28.2	28.5	26.3	24.6	25.1	23.6	23.2	21.0
	5	3.9	8.1	6.5	7.6	7.5	9.9	10.9	8.6	8.1
37	1	58.7	49.2	53.0	53.4	47.5	53.7	47.7	49.2	49.8
	2	24.7	31.1	31.6	29.1	37.1	33.6	34.4	37.0	36.8
	3	12.0	15.6	13.0	12.7	11.9	9.7	12.8	9.7	9.6
	4	4.0	1.6	1.4	3.6	2.0	2.3	3.2	3.3	2.5
	5	0.7	2.5	0.9	1.2	1.4	0.8	1.9	0.9	1.3
42	1	32.0	26.2	25.4	33.2	31.7	34.8	42.4	40.8	25.2
	2	4.8	4.1	4.2	4.5	6.2	6.2	9.9	22.4	46.7
	3	12.2	13.9	7.0	8.5	9.7	7.7	5.7	3.6	2.8
	4	17.7	9.8	17.8	12.1	11.1	8.5	7.2	4.2	2.8
	5	29.9	40.2	37.6	34.4	35.5	35.3	25.7	16.5	9.0
	6	0.7	1.6	1.9	0.4	0.6	3.4	3.5	9.5	11.7
	7	2.7	4.1	6.1	6.9	5.3	3.9	5.4	2.9	1.7
43	1	35.4	26.0	37.4	36.4	41.1	43.7	51.8	55.3	45.1
	2	2.7	1.6	1.4	2.8	2.3	3.1	5.0	10.7	26.5
	3	36.1	36 6	35.0	30.0	27.0	23.0	18.4	10.1	7.6
	4	22.4	26.8	22.9	24.7	25.8	23.5	19.4	16.8	13.0
	5	2.7	4.9	1.4	3.6	2.1	3.6	2.6	2.6	2.2
	6	0.0	0.8	0.5	0.0	0.0	1.3	1.2	3.5	5.1
	7	0.7	3.3	1.4	2.4	1.8	1.8	1.6	1.0	0.6

TABLE 12

Responses to the New Maintenance Concept Based on Years in Position

Quest. Number	Response Alt.	Years in Position <1	1	2	3	4	5	6-10	11-20	21+
25	1	24.1	21.0	20.7	23.3	18.7	20.4	23.5	23.4	23.7
	2	57.1	60.0	59.2	59.6	61.2	59.6	59.4	60.7	60.4
	3	15.2	15.3	16.6	14.6	16.3	17.2	13.8	12.9	10.7
	4	3.4	3.8	3.5	2.4	3.8	2.8	3.1	2.9	4.8
27	1	11.4	10.0	8.4	8.8	7.9	10.1	6.0	5.3	8.6
	2	37.0	39.2	39.6	33.5	39.8	34.5	34.5	29.2	25.3
	3	30.1	29.7	28.9	31.6	26.4	28.8	31.6	33.6	34.9
	4	16.6	17.3	17.1	17.0	19.9	20.0	20.9	23.2	21.6
	5	4.8	3.8	6.0	8.6	5.9	6.7	6.8	8.6	9.3
33	1	21.3	18.7	17.6	20.0	18.9	17.4	16.1	11.6	15.2
	2	38.6	35.7	37.6	35.1	38.1	36.6	36.3	36.6	29.3
	3	19.0	19.4	20.0	18.5	17.0	17.6	20.1	20.9	21.9
	4	16.4	21.5	17.3	18.5	17.8	20.4	20.0	21.8	22.6
	5	4.8	4.6	7.5	7.8	7.5	7.9	7.5	9.1	11.1
35	1	14.9	14.5	14.6	14.0	13.5	13.8	13.4	9.2	12.6
	2	37.0	35.1	36.8	37.7	38.4	33.0	35.1	33.1	28.5
	3	21.2	20.1	19.5	20.1	18.4	18.6	19.7	20.6	20.0
	4	20.3	25.0	20.9	20.0	20.8	24.1	22.9	26.6	29.3
	5	6.7	5.3	8.2	8.3	8.7	10.5	9.0	10.5	9.6
37	1	57.0	59.1	51.9	51.5	54.5	50.0	47.1	41.4	41.9
	2	31.1	28.8	35.1	33.1	32.9	33.8	37.3	41.6	38.1
	3	9.3	8.3	9.3	10.9	10.8	10.7	11.4	12.1	14.1
	4	1.9	2.4	2.3	3.4	1.2	4.3	2.9	3.1	5.2
	5	0.7	1.4	1.4	1.1	0.6	1.2	1.3	1.7	0.7
42	1	39.5	34.7	32.6	39.8	41.4	35.5	39.0	24.8	12.4
	2	11.4	12.0	13.6	17.7	12.3	19.3	27.8	38.3	53.2
	3	7.6	9.2	7.9	7.2	5.8	5.1	2.7	1.8	2.2
	4	11.2	9.8	9.2	6.4	7.9	5.5	3.1	3.9	2.6
	5	25.6	26.5	28.1	19.5	22.5	24.0	15.8	15.5	10.5
	6	2.4	3.7	3.9	4.4	4.8	6.6	8.5	13.3	16.5
	7	2.4	3.8	4.6	5.1	5.2	3.7	3.0	2.3	2.6
43	1	45.0	42.4	45.5	46.3	49.5	48.8	53.1	48.4	42.2
	2	6.8	5.7	6.4	6.8	7.4	10.3	16.2	19.7	28.4
	3	24.6	25.2	21.3	18.7	14.6	17.4	9.3	8.1	7.5
	4	21.2	20.8	21.1	21.6	24.1	17.6	15.1	13.1	11.6
	5	1.6	2.1	1.8	3.2	0.8	3.5	2.9	3.6	1.5
	6	0.4	1.9	1.6	1.8	1.9	1.4	2.7	6.0	8.2
	7	0.3	1.7	2.3	1.7	1.4	1.0	0.7	1.1	0.7

While tenure in a given position did not result in any significant differences in knowledge of the NMC, there were differences regarding the source from which individuals received the majority of their information. This difference was primarily due to the percentage of individuals reporting they had received their information from the union. Of individuals who had been in their position for 5 or more years, 2.7 to 3.4 percent indicated the union was the major source, compared to 1.7 percent or less of those with less time in position.

Individuals who had 11 or more years experience in their position comprised the highest percentage indicating that they felt generally to very negative about the proposal. There was also a smaller percentage of individuals in these groups reporting positive reactions. Those reporting that they had been in their position for 2 years or less had the highest percentage of positive responses and the lowest percentage of negative responses on question 27. This trend was consistent throughout the rest of the questions on the NMC. With increasing years in position, individuals reported greater rejection and less acceptance of the proposed changes.

Type of Facility. Categorized responses in Table 13 reflect type of facility in which the individual worked. Chi-square values were statistically significant for all of the questions. The most obvious difference was between personnel located in the Regional Office (RO) and those working in other facilities. Individuals who categorized themselves as "other" tended to respond much like individuals in the RO.

In terms of their general reaction to the NMC (Q27), 20.3 percent of RO personnel and 9.6 percent of "other" personnel indicated they felt very positive about the proposal. The percentages of individuals in other facilities who responded in like fashion ranged from 4.4 to 6.8 percent. This difference was also apparent in the percentages of individuals who expressed negative reactions to the NMC. Only 1.1 percent of the RO respondents expressed very negative reactions concerning the proposal while 5.4 to 10.9 percent of the individuals in other facilities felt the same way. This tendency for RO personnel and to a lesser degree "other" personnel to feel significantly more positive about the NMC was evident throughout the remaining NMC questions.

Responses to questions 33 and 35, concerning the move to centralized maintenance hubs, appear to have been influenced by type of facility in which the respondent worked. While 40.8 percent (Q33) and 32.1 percent (Q35) of the RO personnel offered strong support for the centralization concept, only 8.3 to 19.6 percent of the personnel at the remaining facilities expressed strong support. The least amount of support and the highest level of nonfavorable responses concerning the proposal occurred for individuals in remote nontowers, small towers or stations, and intermediate towers.

TABLE 13

Responses to the New Maintenance Concept Based on Type of Facility

Quest. Number	Response Alt.	Facility Type ARTCC	MajTo	IntTo	SmaTo	ReNTo	RegOf	Other
25	1	30.2	22.7	16.6	15.4	19.4	23.7	23.9
	2	54.2	58.2	67.0	67.5	65.1	50.3	56.1
	3	12.3	16.0	2.8	15.7	13.7	18.1	15.3
	4	3.2	3.1	0.1	1.3	1.8	8.0	4.4
27	1	6.1	6.3	4.4	6.8	5.5	20.3	9.6
	2	30.1	31.2	31.9	36.6	33.4	47.4	37.9
	3	34.9	29.1	30.0	28.5	32.4	24.6	31.0
	4	20.0	22.4	24.6	22.7	23.0	6.6	15.7
	5	8.4	10.9	9.1	5.4	5.6	1.1	5.4
33	1	14.4	15.8	11.7	13.4	10.0	40.8	19.6
	2	37.3	33.8	35.1	35.8	35.0	39.6	37.5
	3	22.3	20.7	19.4	16.8	20.4	12.6	21.2
	4	17.2	22.0	22.8	25.8	26.2	5.7	15.7
	5	8.6	7.7	11.1	8.1	8.5	1.3	5.8
35	1	13.0	12.3	8.3	8.5	7.1	32.1	15.4
	2	36.4	37.1	33.9	30.1	31.2	45.4	35.6
	3	21.6	19.7	18.0	20.0	19.0	14.1	22.3
	4	20.4	22.7	27.0	31.6	32.1	7.1	19.1
	5	8.6	8.1	12.8	9.8	10.8	1.3	7.5
37	1	49.4	53.9	46.3	48.5	43.9	62.2	49.2
	2	35.6	30.8	38.8	37.4	41.1	29.5	33.2
	3	10.0	10.8	9.2	11.0	12.2	7.5	13.1
	4	3.1	3.4	4.5	1.6	1.9	0.4	3.5
	5	1.7	1.1	1.1	1.5	0.9	0.4	1.0
42	1	73.5	59.3	20.3	6.8	3.8	55.8	19.7
	2	17.5	21.3	22.7	19.8	25.4	26.8	30.3
	3	1.1	2.0	5.0	8.8	7.3	6.4	6.5
	4	1.1	2.1	8.1	10.1	8.0	3.7	8.7
	5	1.8	7.8	31.3	38.5	36.7	5.0	22.0
	6	2.5	5.7	7.6	9.9	15.0	1.5	8.8
	7	2.4	1.7	5.0	6.2	3.9	0.6	3.8
43	1	70.3	60.0	49.6	31.6	40.7	41.2	36.8
	2	9.5	9.5	10.5	10.8	12.4	17.4	16.8
	3	7.0	12.3	15.1	24.1	16.2	15.7	17.8
	4	9.1	13.6	17.5	24.2	21.4	23.2	20.9
	5	1.5	2.1	2.8	3.8	3.7	1.3	2.4
	6	1.5	2.0	2.9	3.8	4.6	0.8	3.7
	7	1.1	0.4	1.5	1.6	1.0	0.2	1.5

On question 35, the percentages of small tower and remote nontower individuals who expressed some degree of disfavor with the proposed change (41.4 and 42.9 percent) were slightly greater than the percentages expressing some degree of support (38.6 and 38.3 percent). The concern that these individuals felt about the centralization issue was also evident in their responses to question 42. When questioned about what they would see for themselves during the time of reorganization, the largest percentage of individuals in intermediate towers, small towers, and remote nontowers indicated they felt they would be required to relocate in a maintenance hub and they would probably dislike it (from 31.3 to 38.5 percent). Compared to the other groups, the percentages of individuals at these facilities who indicated that they would retire at the time of implementation were also higher (7.6 to 15 percent versus 1.5 to 8.8 percent).

AF Specialty. Categorized responses from individuals in different AF specialties appear in Table 14. Chi-square comparisons were significant for all of the questions.

In comparison with individuals whose specialty was in communications, radar, navaids, automation, environmental support, and engineering areas, higher percentages in the staff support and "other" groups (23.0 and 27.4 percent versus 12.1 to 18.5 percent) reported receiving "considerable" to "a great deal" of information concerning the NMC. These two groups also had the highest percentage of individuals reporting that they had received their information via management.

While 14.4 and 15.6 percent of the individuals in staff support and "other" groups reported very positive general reactions to the NMC (Q27), only 5.8 to 7.7 percent of the individuals in the remaining groups were positive. These two groups also differed from the other groups in terms of the percentages indicating a negative to very negative reaction to the proposal (10.3 and 14.1 percent compared to 20.4 and 32.1 percent). The generally more favorable opinions that were expressed by individuals in these two groups on question 27 were also evident for the more specific questions concerning the NMC. While the percentages of individuals in the remaining specialties (communications, radar, navaids, automation, and environmental systems) who responded to the various alternatives were quite similar, there was a tendency for slightly higher percentages of the radar and automation personnel to express negative reactions.

A high percentage of the automation personnel (73.3 percent) reported that the implementation of the NMC (Q42) would have little effect on them since they were at facilities that would experience little change. There was a smaller percentage of individuals in the automation, staff support, and "other" groups (1.2 to 9.4 percent) than in the other four specialty groups (18.8 to 29.5 percent) who indicated they would dislike the relocation requirement of the plan.

TABLE 14

Responses to the New Maintenance Concept Based on AF Specialty

Quest. Number	Response Alt.	AF Specialty Comm	Radar	Navai	Auto	EnSys	StSup	Other
25	1	26.7	18.8	15.0	24.4	34.6	21.2	31.1
	2	58.7	63.9	66.5	58.9	53.1	55.8	41.2
	3	12.0	14.5	16.1	14.3	10.3	17.5	18.2
	4	2.7	2.8	2.4	2.2	1.8	5.5	9.2
27	1	7.5	5.8	7.7	5.8	7.2	14.4	15.6
	2	32.3	31.5	38.5	32.1	31.9	47.0	41.4
	3	30.8	30.6	29.6	30.4	40.5	28.2	28.4
	4	20.7	24.6	19.8	23.4	14.0	7.4	10.1
	5	8.5	7.5	4.4	7.9	6.4	2.9	4.0
33	1	18.3	12.9	14.5	14.2	16.6	33.3	29.2
	2	36.1	34.8	39.6	36.7	36.2	38.5	34.8
	3	19.5	18.9	17.5	20.8	25.5	18.9	20.1
	4	19.7	24.5	21.6	20.3	14.7	6.2	11.4
	5	6.4	8.9	6.8	8.1	7.0	3.2	4.2
35	1	14.3	10.0	10.7	12.5	13.6	26.1	22.8
	2	35.6	32.5	35.5	35.9	34.8	42.0	38.6
	3	18.5	18.6	19.8	20.9	23.6	19.0	21.4
	4	23.8	27.1	25.8	22.0	21.1	10.3	12.7
	5	7.8	11.8	8.2	8.6	7.0	2.5	4.2
37	1	50.7	50.1	49.9	56.2	31.2	61.8	55.1
	2	36.0	35.9	38.1	31.3	41.2	25.3	30.5
	3	9.6	9.5	9.2	8.9	20.3	10.3	11.6
	4	2.3	3.6	2.3	2.4	5.2	2.1	1.3
	5	1.4	0.8	0.5	1.2	2.1	0.5	1.3
42	1	36.1	22.3	16.6	73.3	37.3	52.5	43.0
	2	22.7	23.9	25.3	17.3	20.8	27.8	29.9
	3	6.4	5.5	6.9	1.2	5.4	4.1	3.4
	4	8.1	6.1	7.5	1.2	8.6	3.4	5.6
	5	18.8	28.7	29.5	1.2	21.1	6.2	9.4
	6	4.6	10.6	10.5	3.5	2.9	3.4	4.9
	7	3.3	2.9	3.7	2.3	3.7	2.6	3.2
43	1	43.5	60.7	32.3	82.0	22.7	39.8	38.2
	2	12.7	10.3	12.8	7.2	14.8	19.5	20.3
	3	21.7	10.1	21.4	3.2	28.2	8.3	14.9
	4	17.7	13.2	24.4	4.4	25.7	26.8	18.6
	5	2.1	1.9	3.4	0.7	4.8	1.7	2.1
	6	1.7	2.8	4.6	1.6	2.1	2.0	3.8
	7	0.6	1.0	1.0	0.9	1.8	2.0	1.7

TABLE 15

Response to the New Maintenance Concept Based on Occupational Identification

Quest. Number	Response Alt.	Occupational Identification: Elec. Tech.	Env. Tech.	Eng.	Sta. Sup.	Other
25	1	20.6	36.0	14.0	22.8	37.8
	2	62.9	53.0	54.9	59.2	38.5
	3	14.1	9.9	22.3	14.6	15.0
	4	2.3	0.8	8.8	3.4	8.1
27	1	5.4	6.0	20.3	13.3	14.3
	2	32.6	28.4	51.6	43.5	36.3
	3	30.2	44.1	19.0	33.4	36.3
	4	23.7	14.5	6.9	7.5	9.4
	5	8.0	6.9	2.2	2.3	3.0
33	1	12.1	13.8	40.6	29.8	27.9
	2	35.8	37.0	41.4	39.8	31.9
	3	19.5	26.2	10.5	19.6	25.5
	4	23.8	15.7	4.8	8.2	10.1
	5	8.8	7.3	2.5	2.6	4.4
35	1	9.4	11.4	31.9	22.4	19.4
	2	33.3	34.2	47.0	40.1	35.7
	3	19.7	25.5	11.1	22.1	26.2
	4	27.2	21.9	7.2	11.2	13.6
	5	10.4	7.0	2.8	4.1	4.9
37	1	49.8	31.1	68.1	52.1	44.2
	2	36.6	41.3	27.0	29.9	31.8
	3	9.6	20.3	4.2	15.1	19.1
	4	2.9	5.3	0.3	2.7	2.8
	5	1.2	2.0	0.5	0.3	2.1
42	1	29.4	35.1	59.3	45.4	44.6
	2	23.0	19.9	24.4	27.8	26.9
	3	5.1	5.0	5.3	6.2	4.6
	4	6.2	9.6	3.2	5.2	6.2
	5	23.5	23.0	5.0	8.3	10.6
	6	9.2	2.7	1.1	3.4	5.3
	7	3.8	4.5	1.8	3.7	1.7
43	1	52.7	21.7	55.9	34.7	29.1
	2	10.8	14.2	13.4	18.3	21.1
	3	14.1	29.4	12.9	12.6	15.3
	4	15.7	25.1	16.2	26.8	26.5
	5	2.3	5.8	0.6	2.5	3.2
	6	3.3	1.9	0.5	2.5	3.6
	7	1.1	1.9	0.5	2.5	1.0

Occupational Identification. Categorized responses from individuals with different occupational identifications appear in Table 15. Chi-square comparisons indicate that the differences in percentages of individuals responding to the various categories was significant for all of the questions.

Engineers tended to differ from other groups in their responses to most of the questions. They reported more knowledge of the proposal and were significantly more in favor of the overall concept, with 71.9 percent expressing generally positive to very positive feelings. While not expressing as much support, 56.8 percent of station support personnel and 50.6 percent of those categorized as "others" also expressed positive feelings in terms of their general reaction to the NMC. The lowest levels of support for the various proposed changes generally came from electronics technicians and environmental support technicians. The questions dealing with the centralization issue (Q33 and Q35) generated the lowest levels of support in these latter groups, where 32.6 and 37.6 percent of the electonic technicians and 23.0 and 28.9 percent of the environmental support technicians indicated they were not in favor of or rejected the concept.

AF Program. Categorized responses from personnel in each of the three AF Program areas appear in Table 16. Chi-square comparisons indicate significant differences for responses to all 19 of the NMC questions.

When compared to the other two groups (maintenance and other), a smaller percentage of individuals in the facilities and equipment (F and E) area reported having "considerable" to "a great deal" of knowledge concerning the NMC. For this group and the "other" group, the "word of mouth" category was cited most frequently as the major source for their information. For those in maintenance, more than one-third indicated that the videotape was their major source of information.

A higher percentage of F and E personnel indicated that they felt "generally positive" to "very positive" about the proposal than did personnel in the other groups. The smallest percentage of positive responses was by maintenance personnel. As has been true for the previous categorizations, this difference in responses between groups on Q27 was also consistently evident throughout the remaining questions.

Region. Table 17 includes the categorized responses from individuals working in each of the 10 regions. Chi-square comparisons revealed that the differences were significant for all questions except questions 37, 38 and 40.

There were slight differences between regions in reported awareness of the NMC, with higher percentages of individuals in the Central (CE), (then) Western (WE), and (then) Northwest (NW) reporting "considerable" to "a great deal" of information about the proposal. The Southern (SO)

TABLE 16

Response to the New Maintenance Concept Based on AF Program

Quest. Number	Response Alt.	AF Program F and E	Maint	Other
25	1	39.7	20.6	39.7
	2	46.4	61.2	38.5
	3	11.5	14.9	13.9
	4	2.5	3.1	7.6
27	1	15.6	7.2	11.7
	2	37.8	34.7	36.8
	3	32.7	30.5	34.2
	4	9.7	20.6	10.4
	5	4.3	6.9	6.2
33	1	36.9	15.3	24.5
	2	34.7	36.7	34.0
	3	17.6	19.6	23.2
	4	7.7	20.7	10.5
	5	2.8	7.7	7.8
35	1	26.4	11.8	21.7
	2	40.1	35.1	33.6
	3	19.9	19.7	24.0
	4	10.5	24.3	14.5
	5	2.8	9.1	6.3
37	1	56.4	49.2	50.0
	2	31.1	35.9	32.1
	3	10.3	10.8	13.6
	4	0.9	3.0	2.3
	5	1.4	1.1	2.0
42	1	54.6	32.4	53.8
	2	21.5	23.4	23.1
	3	6.0	5.0	6.3
	4	4.2	6.2	6.3
	5	8.7	21.5	4.9
	6	3.0	7.8	1.4
	7	1.2	3.6	4.2
43	1	46.3	48.5	40.0
	2	12.9	12.3	13.8
	3	18.8	15.0	15.9
	4	18.8	17.5	24.1
	5	1.5	2.6	1.7
	6	1.2	3.1	0.3
	7	0.0	1.1	4.1

TABLE 17

Responses to the New Maintenance Concept Based on Region of Employment

Quest. Number	Response Alt.	Region NE	EA	SO	GL	CE	SW	RM	WE	NW	EU
25	1	20.5	19.2	30.3	24.0	19.3	24.3	20.6	17.6	17.5	28.4
	2	61.3	65.9	57.8	57.9	57.5	58.3	65.8	57.0	57.6	50.3
	3	14.7	12.6	9.3	15.6	18.1	14.0	10.4	20.3	20.0	19.5
	4	3.4	2.2	2.4	2.4	5.1	3.4	3.0	4.7	4.9	1.8
27	1	3.8	5.8	5.2	7.2	7.9	8.9	10.3	10.7	10.5	8.9
	2	27.3	30.2	31.6	34.1	40.6	32.6	40.7	37.1	43.6	32.1
	3	32.9	32.7	31.9	31.3	31.5	32.6	31.1	28.6	23.6	33.3
	4	27.3	22.2	22.7	19.2	16.6	19.9	14.1	17.4	17.1	16.7
	5	8.7	9.0	8.3	8.0	3.5	5.7	3.7	5.9	5.2	8.9
33	1	10.7	15.3	14.1	15.0	16.7	19.4	17.6	20.3	21.0	17.3
	2	30.7	33.9	36.4	35.0	40.4	34.7	42.6	35.8	38.1	38.1
	3	21.7	21.1	18.8	20.2	19.5	21.1	16.1	19.6	19.1	23.2
	4	28.3	21.0	22.0	20.4	18.6	18.4	17.6	16.2	18.0	12.5
	5	8.6	8.7	8.7	9.4	4.9	6.4	5.8	7.8	3.8	8.9
35	1	8.3	10.2	11.3	10.8	14.5	15.5	13.8	16.8	16.3	10.7
	2	29.1	32.1	31.6	36.1	39.4	36.0	39.3	35.3	39.0	39.9
	3	23.5	19.7	20.4	19.1	23.5	18.9	19.8	19.0	18.9	22.0
	4	28.7	27.9	25.4	24.7	17.5	21.7	19.2	21.5	20.1	19.0
	5	10.4	10.2	11.3	9.3	5.1	8.0	7.7	7.4	5.8	8.3
37	1	50.9	51.9	45.9	48.9	47.3	48.5	52.3	53.6	50.6	47.6
	2	30.9	34.2	38.1	35.2	37.3	35.2	35.5	33.0	36.1	36.9
	3	13.4	10.3	11.0	11.7	11.2	10.8	9.5	10.3	10.3	12.5
	4	3.1	2.5	3.5	2.5	4.0	4.3	1.8	2.2	2.1	1.2
	5	1.7	1.2	1.5	1.7	0.2	1.2	0.7	0.9	0.9	1.8
42	1	38.8	34.2	35.3	38.6	31.8	32.7	32.1	32.7	36.1	27.3
	2	18.2	21.5	20.0	22.7	25.4	27.7	21.6	25.1	23.8	36.4
	3	3.1	2.9	4.7	3.4	7.1	8.1	5.7	5.2	5.7	4.8
	4	4.5	6.0	6.6	5.4	6.4	4.8	6.9	6.5	7.3	7.3
	5	23.1	24.5	21.5	18.2	18.1	15.6	24.0	20.7	17.4	15.8
	6	8.7	7.2	8.5	7.7	7.8	8.7	6.3	6.8	3.9	3.0
	7	3.5	3.7	3.4	3.9	3.5	2.5	3.4	2.9	5.5	4.8
43	1	53.3	52.1	51.9	49.1	46.0	49.9	40.1	44.2	43.0	38.3
	2	8.2	9.8	11.3	11.6	12.7	14.4	11.7	15.0	12.9	21.6
	3	12.4	15.4	13.8	14.0	16.0	13.9	20.3	15.6	16.6	19.8
	4	20.3	16.4	16.0	17.7	17.5	16.2	20.3	19.9	20.9	16.8
	5	2.7	2.7	3.2	2.3	3.1	1.6	3.0	2.1	2.3	0.6
	6	2.1	3.0	2.6	3.6	3.3	3.5	2.7	2.5	2.1	1.2
	7	1.0	0.7	1.2	1.6	1.4	0.5	1.9	0.7	1.9	1.8

region had the highest percentage (30.3 percent) of individuals reporting that they had little information concerning the NMC. This region also differed from most of the other regions in terms of the source of information. Compared to the other groups, higher percentages of individuals in this group reported gaining most of their information concerning the NMC from the article in FAA WORLD (9), a smaller percentage reported gaining their information via management channels.

The percentages of individuals who indicated that their general reaction to the proposal was "positive" to "very positive" in the New England (NE) (31.1 percent), Eastern (EA) (36.0 percent) and SO (36.8 percent) regions were somewhat lower than those reported in the other regions (41.0 to 54.1 percent). Correspondingly, these same regions had the highest percentages of respondents expressing generally negative to very negative reactions. Percentages for individuals in the Great Lakes (GL) region were similar, though somewhat more positive than those in the NE, EA, and SO regions. The greater amount of "disfavor" to "rejection" of the general aspects of the proposal that was expressed by individuals in the NE, EA, SO, and to a lesser extent the GL region, was also evident in their responses to a majority of the remaining NMC questions.

These regional differences were most pronounced in response to the questions concerning centralization. For question 35, the percentage of individuals in the NE, EA, SO, and GL regions who reported either general acceptance or strong support ranged from 37.4 to 46.9 percent. This compared to a range of 50.6 to 55.3 percent in the other regions. The generally negative attitude toward the centralization issue was also evident for question 42, where nearly one-fourth of the respondents in each of the NE, EA, and SO regions indicated that the proposal would most likely require their relocation to a maintenance hub, which they would dislike; relatively high percentages of individuals in the Rocky Mountain (RM) and WE regions responded similarly (24.0 and 20.7 percent, respectively).

Supervisor-Nonsupervisor. Categorized responses from supervisors and nonsupervisors appear in Table 18. Chi-square comparisons were significant for all 19 of the NMC questions.

As could be expected on the basis of some of the previous results, a higher percentage of supervisors than nonsupervisors reported receiving their information from management channels, as well as receiving more information.

Differences in how individuals in these two groups responded to the proposed NMC were greater than for any of the other categories. In response to the general question concerning the NMC (Q27), a much larger percentage of supervisors expressed very positive reactions (13.6 percent versus 6.1 percent) and more generally positive reactions (51.6 percent versus 29.6 percent). This tendency for supervisors to view the proposed changes in a more positive fashion was consistent for responses to the

TABLE 18

Responses to the New Maintenance Concept Based on Position

Quest. Number	Response Alt.	Position: Supervisor	Position: Nonsupervisor
25	1	12.8	25.7
	2	55.4	60.5
	3	24.3	11.6
	4	7.3	2.0
27	1	13.6	6.1
	2	51.6	29.6
	3	21.9	33.7
	4	10.2	22.4
	5	2.6	8.1
33	1	28.3	13.3
	2	42.7	34.3
	3	15.3	21.2
	4	10.1	22.5
	5	3.6	8.7
35	1	22.0	10.2
	2	44.1	32.4
	3	15.8	21.3
	4	13.8	26.1
	5	4.3	10.0
37	1	60.7	46.2
	2	31.4	36.7
	3	6.2	12.4
	4	1.0	3.4
	5	0.7	1.3
42	1	40.8	32.5
	2	30.4	21.0
	3	4.7	5.2
	4	4.8	6.6
	5	11.2	23.0
	6	6.9	7.4
	7	1.2	4.2
43	1	49.0	47.6
	2	17.2	10.9
	3	11.3	16.5
	4	17.6	18.0
	5	1.7	2.7
	6	2.7	2.9
	7	0.4	1.4

remaining questions. Thus, nonsupervisors consistently expressed greater disfavor and more rejection of not only the general proposal but also the more specific aspects of the proposal.

Job Difficulty. Respondents made ratings of the difficulty of their job on a five-point scale from "very difficult" to "very easy." Categorized responses from individuals with different ratings of job difficulty appear in Table 19. Chi-square comparisons of these values indicate that the differences between groups were significant for all questions.

There are indications that perceived job difficulty was related to knowledge of the NMC. Individuals who reported knowing either very little or a great deal about the NMC were more likely to come from the groups which had perceived their jobs as being either very difficult or very easy. Comparisons of the different job rating categories, from "very difficult" to "very easy," indicate a significant increase in the percentage (5.5 to 32.7 percent) of the respondents reporting that they strongly support the general proposal (Q27). A large difference was also apparent in terms of the percentages of individuals reporting negative reactions, with 18.2 and 17.3 percent of the individuals with "easy" and "very easy" jobs expressing generally "negative" to "very negative" reactions as compared to 25.8 and 44.8 percent with "difficult" and "very difficult" jobs. Once again, this difference between groups in response to the general question (Q27) was consistently apparent for the remaining NMC responses.

Of the respondents with "very easy" and "easy" jobs, 62.7 and 63.3 percent, respectively, indicated acceptance to strong support for the proposal to centralize maintenance work (Q33), while 39.1 and 54.1 percent of their colleagues who had rated their jobs as "difficult" to "very difficult" felt the same way. On this question and question 35, higher percentages of individuals with "very difficult" jobs expressed disfavor or rejection of the proposal than expressed some degree of acceptance or support (42.3 and 45.4 percent to 39.1 and 35.5 percent).

Job Satisfaction. Question 15 asked respondents to rate their satisfaction with being employed in AF, using a five-point scale from "very satisfied" to "very dissatisfied." Categorized responses from individuals with different degrees of job satisfaction appear in Table 20. Chi-square comparisons indicate the differences in percentages were significant for all of the NMC questions.

Of the five job satisfaction categories, the highest percentage of individuals who reported knowing very little about the NMC came from the very dissatisfied group. While 11 percent of the respondents who were very dissatisfied with their job said that they had received a "great deal" of information, nearly one-third (32.9 percent) indicated that they had received very little information about the NMC. These percentages are higher than comparable values for individuals in any of the other job

TABLE 19

Responses to the New Maintenance Concept Based on Ratings of Job Difficulty

Quest. Number	Response Alt.	Rating of Job Difficulty: Very Diff.	Diff.	Neither	Easy	Very Easy
25	1	23.9	20.2	24.6	22.5	34.0
	2	51.2	61.7	60.4	60.8	37.7
	3	17.7	15.2	12.6	14.9	18.9
	4	6.9	2.9	2.3	1.8	9.4
27	1	5.5	6.9	8.8	17.7	32.7
	2	23.4	36.3	38.2	38.2	19.2
	3	26.1	30.8	33.0	25.9	30.8
	4	26.4	20.2	16.3	16.4	7.7
	5	18.4	5.6	3.6	1.8	9.6
33	1	12.0	16.1	18.3	30.3	43.1
	2	27.1	38.1	39.0	33.0	19.6
	3	18.3	18.9	21.6	15.8	19.6
	4	24.6	20.1	17.0	16.3	3.9
	5	17.7	6.8	4.1	4.5	13.7
35	1	9.2	12.4	14.1	23.2	39.2
	2	26.3	35.9	38.4	36.4	23.5
	3	19.1	19.3	21.5	14.5	17.6
	4	26.3	24.3	20.8	21.4	2.0
	5	19.1	8.0	5.2	4.5	17.6
37	1	46.1	49.8	49.8	60.0	60.8
	2	32.1	37.0	35.8	30.9	21.6
	3	12.9	9.8	11.6	6.4	9.8
	4	5.0	2.8	2.2	2.3	0.0
	5	4.0	0.6	0.7	0.5	7.8
42	1	39.2	36.4	30.8	30.6	22.4
	2	20.9	22.6	25.6	16.9	26.5
	3	2.2	4.6	6.1	10.5	12.2
	4	3.7	5.3	7.7	10.5	8.2
	5	15.8	20.9	21.5	17.8	10.2
	6	10.6	7.3	5.8	9.6	6.1
	7	7.5	2.8	2.4	4.1	14.3
43	1	60.3	49.5	41.2	42.1	49.0
	2	8.7	12.5	13.9	10.2	16.3
	3	8.4	14.7	18.5	20.4	14.3
	4	12.8	17.5	20.4	21.3	8.2
	5	2.9	2.6	2.4	0.5	4.1
	6	3.9	2.6	2.8	3.2	0.0
	7	2.9	0.6	0.8	2.3	8.2

TABLE 20

Responses to the New Maintenance Concept Based on Ratings of Job Satisfaction

Quest. Number	Response Alt.	Job Satisfaction Rating: Very Sat.	Sat.	Ind.	Dis.	Very Dis.
25	1	21.9	20.3	25.1	25.1	32.9
	2	51.7	62.5	60.1	57.4	44.2
	3	19.5	14.7	12.8	14.1	11.6
	4	6.7	2.4	2.0	3.4	11.0
27	1	16.6	8.2	5.6	5.2	5.2
	2	43.4	40.6	28.1	24.5	15.5
	3	25.5	31.4	35.6	29.7	22.7
	4	12.4	16.0	23.1	28.3	26.8
	5	1.8	3.6	7.7	12.3	29.2
33	1	27.8	18.2	11.8	13.3	11.0
	2	37.7	40.6	34.1	29.7	17.6
	3	19.6	18.9	25.0	18.7	16.6
	4	11.4	17.6	21.8	26.2	23.1
	5	3.5	4.7	7.3	12.1	31.0
35	1	23.3	13.5	10.1	9.9	10.0
	2	38.8	39.7	30.6	29.0	16.6
	3	18.5	20.5	22.3	18.3	14.2
	4	15.2	20.8	28.7	28.3	26.0
	5	4.3	5.5	8.3	14.4	33.2
37	1	62.6	50.1	44.1	47.9	42.7
	2	27.4	37.6	37.6	33.8	26.7
	3	8.8	9.7	13.9	11.8	14.9
	4	1.1	2.1	3.8	4.4	6.9
	5	0.2	0.6	0.7	2.1	8.7
42	1	36.0	33.7	33.7	37.0	32.4
	2	27.9	24.9	21.0	20.3	14.2
	3	5.6	5.5	4.9	3.9	4.3
	4	6.8	6.8	6.3	4.5	2.8
	5	17.9	20.5	22.4	19.4	16.0
	6	3.9	6.5	8.0	9.2	14.6
	7	2.0	2.1	3.7	5.5	15.7
43	1	44.6	46.7	48.1	51.8	52.1
	2	16.2	13.7	10.0	10.0	7.3
	3	16.1	16.4	14.4	13.2	11.2
	4	19.2	18.2	19.8	16.8	10.8
	5	1.4	2.2	3.8	2.7	3.5
	6	2.0	2.3	3.1	3.8	5.9
	7	0.5	0.6	0.8	1.7	9.1

satisfaction categories. The most frequent source of information for individuals in each of the job satisfaction categories was the videotape. While the next most frequent source of information for individuals who were very satisfied with their jobs was management, individuals who rated themselves in the indifferent, dissatisfied, and very dissatisfied categories reported receiving their information via word of mouth.

Higher percentages of individuals who rated themselves in the satisfied and very satisfied categories reported their general reaction to the NMC was positive (60.0 and 48.8 percent), compared to 20.7 to 33.7 percent in the other three groups. This tendency for the satisfied workers to express generally more favorable reactions to the NMC than those who were dissatisfied was apparent for the remaining questions.

State-Trait Anxiety. Individuals were placed into one of three groups on the basis of their trait scores (summation of items 70 through 89) on the state-trait anxiety inventory (16). The trait anxiety scores provide a measure of the individual's susceptibility or proneness to anxiety across situations. These groups comprised the lower third (low), middle third (middle), and upper third (high) of the distribution. Similar groups were formed for the state anxiety measure (summation of items 90 through 109). State anxiety scores provide a measure of the individual's anxiety at the time he or she is completing the questionnaire. Categorized responses, from individuals in each of the three groups for the state and trait anxiety measures appear in Table 21. Differences in percentages of individuals from the groups representing the three levels of anxiety were significant for all questions except question 26 for the trait anxiety measure.

Individuals with high state and trait anxiety scores reported less knowledge of the NMC than did individuals in either the medium or low groups. The source of information for the various groups was similar, with nearly one-third of each of the groups indicating that the videotape was their major source of information.

In terms of their general reaction to the NMC, the smallest percentage of very positive and generally positive responses, along with the highest percentages of generally negative responses, came from subjects in the high trait and high state groups. The percentages of individuals in both the high trait and high state groups who reported a very negative reaction (11.9 and 14.3 percent) were more than twice as large as the percentages in either of the respective medium or low trait and state groups (4.9 and 5.7 percent; 4.4 and 5.4 percent). Differences between groups that were evident for responses to the general question (Q27) concerning the NMC were also apparent for the more specific questions concerning the NMC. Even on issues where there was considerable overall support (e.g., use of solid state equipment, Q37), a much higher percentage of the low state and trait groups expressed strong support (55.7 and 56.1 percent) compared to those with high state and trait scores (38.9 and 39.4 percent).

TABLE 21

Responses to the New Maintenance Concept Based on State-Trait Anxiety

		Anxiety Measure					
		State			Trait		
Quest. Number	Response Alt.	Low	Mod	High	Low	Mod	High
25	1	21.6	21.0	29.0	20.9	21.4	27.6
	2	57.5	61.3	54.7	56.5	60.6	58.4
	3	16.3	14.8	12.3	17.6	15.0	10.3
	4	4.6	2.9	3.7	5.0	2.9	3.4
27	1	12.0	7.6	5.1	12.1	7.8	5.1
	2	41.1	35.9	23.6	37.9	36.5	25.7
	3	26.9	31.6	33.0	27.3	31.0	34.1
	4	15.6	19.4	23.7	17.8	18.9	22.8
	5	4.4	5.4	14.3	4.9	5.7	11.9
33	1	23.4	16.3	13.1	20.6	17.2	13.1
	2	37.0	38.4	28.3	38.8	37.5	30.2
	3	17.3	19.9	20.8	17.7	19.0	24.1
	4	16.4	19.6	22.7	17.4	19.8	20.2
	5	5.9	5.9	14.7	5.4	6.6	12.1
35	1	19.1	12.6	8.7	16.8	13.2	9.4
	2	36.3	37.4	26.4	37.6	36.8	27.6
	3	18.9	19.9	20.7	19.4	18.9	24.2
	4	19.9	22.7	28.1	21.4	22.9	25.3
	5	5.8	7.4	16.0	4.8	8.2	13.4
37	1	55.7	50.6	38.9	56.1	50.6	39.4
	2	32.0	36.4	35.3	32.4	35.9	36.1
	3	9.8	10.1	16.5	9.7	10.1	16.5
	4	1.6	2.5	5.2	1.5	2.5	5.1
	5	0.8	0.5	4.0	0.4	0.9	2.8
42	1	35.8	35.1	31.6	36.6	35.1	30.3
	2	24.7	23.4	20.4	24.3	23.0	22.5
	3	5.3	5.3	4.3	5.3	5.2	4.6
	4	6.1	6.4	5.8	6.2	6.3	6.1
	5	18.2	20.7	20.0	19.4	20.3	19.8
	6	6.9	6.8	9.7	6.0	7.1	9.8
	7	2.8	2.3	8.2	2.0	2.9	6.5
43	1	49.8	48.3	43.9	50.6	48.7	41.8
	2	13.3	12.1	11.9	13.5	11.7	13.8
	3	14.2	16.0	13.3	14.9	15.7	13.9
	4	17.5	18.2	17.6	17.3	18.2	17.8
	5	1.2	2.2	4.8	0.7	2.1	5.6
	6	2.5	2.6	5.0	2.4	2.6	5.0
	7	1.4	0.5	3.5	0.6	1.0	2.2

General Health. On question 110, individuals were asked to rate their general health on a four point scale from "poor" to "excellent." Categorized responses from individuals in the four different health categories appear in Table 22. According to chi-square comparisons, all of the differences were statistically significant.

The percentage of individuals who rated themselves as being in poor general health and who reported knowing very little about the NMC was considerably higher than for the other three (better health) groups (38.9 percent versus 21.7, 21.5, and 27.5 percent). Differences were also apparent in terms of the sources of information for individuals in these groups.

Relative to the "good" and "excellent" health groups, higher percentages of the individuals in the "fair" and "poor" groups expressed negative general reactions to the NMC and also had lower percentages expressing positive feeling. These differences were observed consistently for responses to the remaining NMC questions and were evident even on questions where there was a high degree of general acceptance (e.g., solid state equipment and watchstanding, Q37 and Q41). While between .9 and 3.9 percent of those in good and excellent health felt that the equipment and watchstanding concepts were unworkable, 9.6 and 13.5 percent of those in poor general health felt the same way. Individuals in the fair and poor health groups also reported that they were more likely to either retire or resign when the plan was implemented.

Type of Shift Worked. Categorized responses from individuals working the 10 different shift schedules appear in Table 23. Chi-square comparisons for each question were statistically significant. The small number of individuals reporting straight evening or night shifts make it impossible to effectively interpret their overall reactions. They will not be referenced in the discussion. Comparisons will be made between the straight day workers and workers on the other shift schedules.

The largest and most significant differences between responses of people in the various shift categories were between individuals who were working straight days and those working alternating shifts. There was less evidence of any consistent difference between workers on the various alternating shift schedules. While 51.5 percent of the straight day workers reported a "positive" to "very positive" general reaction to the NMC, only 25 to 35.8 percent of the individuals working various shifts responded similarly. Once again, this contrast remained apparent for responses to the rest of the NMC questions. This difference between workers on straight days and those on alternating shifts was even evident in responses to the question concerning watchstanding (Q41), where 50.9 percent of the day workers and only 27.8 to 36.2 percent of those on alternating shifts expressed strong support.

TABLE 22

Responses to the New Maintenance Concept Based on General State of Health

Quest. Number	Response Alt.	General State of Health: Excel.	Good	Fair	Poor
25	1	21.7	21.5	27.5	38.9
	2	57.1	62.2	55.6	50.5
	3	16.7	13.7	13.0	7.4
	4	4.4	2.4	4.0	3.2
27	1	10.8	6.6	5.7	5.3
	2	36.9	36.1	23.6	25.3
	3	28.6	31.2	35.7	33.7
	4	17.7	19.7	24.5	16.8
	5	6.0	6.1	10.3	18.9
33	1	20.3	15.3	12.5	25.5
	2	35.4	38.4	31.1	20.2
	3	18.3	19.9	23.7	22.3
	4	18.8	19.5	22.7	17.0
	5	7.2	6.9	9.8	14.9
35	1	15.8	11.9	10.0	16.0
	2	35.4	36.7	29.2	23.4
	3	19.0	19.7	24.3	16.0
	4	22.3	23.2	25.2	24.5
	5	7.4	8.5	11.3	20.2
37	1	55.5	47.9	40.5	42.6
	2	32.2	37.5	37.5	25.5
	3	9.1	11.0	15.1	19.1
	4	2.3	2.7	5.0	3.2
	5	0.9	0.9	1.9	9.6
42	1	36.4	34.1	30.6	28.0
	2	18.3	25.1	30.1	29.0
	3	6.4	4.6	2.8	6.5
	4	7.0	5.9	4.8	2.2
	5	22.9	19.5	15.5	9.7
	6	5.6	7.6	11.2	14.0
	7	3.3	3.1	5.1	10.8
43	1	49.9	47.2	45.9	38.9
	2	9.4	13.4	16.7	18.9
	3	17.8	14.5	11.0	14.7
	4	18.4	18.4	15.4	12.6
	5	1.5	2.5	5.2	4.2
	6	1.8	3.1	4.9	5.3
	7	1.2	1.0	0.9	5.3

TABLE 23

Responses to the New Maintenance Concept Based on Present Work Schedule

Quest. Number	Response Alt.	Work Schedule: Straight: Days	Straight: Eve.	Straight: Nits	Rotating: 3-W	3	3-M	3-LM	2-W	2	Other
25	1	20.0	41.2	30.0	30.8	23.6	32.5	31.0	21.8	17.1	24.0
	2	59.3	47.1	40.0	57.0	61.7	51.8	56.0	66.1	66.5	57.9
	3	16.8	5.9	10.0	9.9	11.9	13.3	12.1	9.8	15.9	13.7
	4	3.9	5.9	20.0	2.2	2.6	1.2	0.9	2.3	0.6	4.1
27	1	10.5	25.0	10.0	4.3	3.3	6.2	4.3	4.0	2.5	5.1
	2	41.0	18.8	10.0	23.6	26.9	29.6	20.7	29.3	31.3	27.4
	3	28.5	31.3	40.0	38.1	32.5	33.3	39.7	32.2	27.6	29.1
	4	15.9	12.5	30.0	22.1	26.9	21.0	25.9	23.0	28.2	27.1
	5	4.2	6.3	10.0	11.6	10.0	7.4	9.5	11.5	10.4	11.1
33	1	21.0	23.5	0.0	11.2	9.4	15.9	11.3	12.1	11.0	10.4
	2	38.3	35.3	40.0	32.7	34.5	34.1	39.1	35.1	30.1	32.3
	3	18.4	17.6	40.0	23.1	21.3	23.2	22.6	18.4	17.2	20.9
	4	16.8	11.8	10.0	21.6	25.3	17.1	20.0	26.4	27.0	24.0
	5	5.4	11.8	10.0	11.3	9.6	8.5	7.0	8.0	14.7	11.7
35	1	15.5	23.5	10.0	10.2	7.8	15.9	10.4	7.4	6.1	10.7
	2	37.8	29.4	40.0	33.0	32.9	31.7	27.8	33.1	30.5	27.6
	3	19.2	5.9	20.0	21.4	21.3	17.1	28.7	19.4	17.1	19.9
	4	21.3	29.4	20.0	23.2	26.7	28.0	22.6	26.9	30.5	27.8
	5	6.2	11.8	10.0	12.3	11.3	6.1	10.4	13.1	15.9	13.8
37	1	51.7	52.9	40.0	45.6	47.9	50.0	40.0	46.9	45.4	48.7
	2	34.5	17.6	20.0	36.8	37.4	31.7	39.1	42.3	40.5	32.4
	3	10.7	17.6	30.0	11.6	9.8	9.8	17.4	6.3	11.7	12.7
	4	2.3	5.9	0.0	3.9	3.3	6.1	2.6	4.6	1.8	4.1
	5	0.8	5.9	10.0	2.1	1.7	1.2	0.9	0.0	0.6	2.2
42	1	26.3	35.3	40.0	58.1	51.0	45.1	41.7	28.1	23.9	31.8
	2	24.6	17.6	10.0	20.2	18.6	26.8	30.4	28.1	19.6	22.7
	3	6.9	0.0	20.0	2.5	2.0	3.7	1.7	1.2	3.1	3.0
	4	7.9	5.9	0.0	3.0	3.5	3.7	3.5	4.7	5.5	4.2
	5	23.9	23.5	10.0	8.6	12.4	7.3	13.0	26.3	29.4	22.9
	6	6.8	5.9	10.0	5.7	9.5	9.8	7.8	7.6	10.4	8.6
	7	3.5	11.8	10.0	1.9	3.0	3.7	1.7	4.1	8.0	6.4
43	1	35.8	29.4	33.3	72.2	68.0	65.9	60.0	59.0	62.2	56.7
	2	14.2	17.6	11.1	8.3	8.5	12.2	14.8	12.7	9.1	10.5
	3	20.2	11.8	22.2	5.9	7.4	7.3	8.7	11.0	9.1	11.2
	4	22.6	23.5	22.2	8.4	11.0	11.0	10.4	12.7	12.2	14.8
	5	2.9	11.8	0.0	1.9	1.9	0.0	2.6	2.9	2.4	1.7
	6	3.2	0.0	0.0	2.3	2.1	1.2	3.5	1.2	4.3	2.7
	7	1.1	5.9	11.1	0.9	1.2	2.4	0.0	0.6	0.6	2.2

Predictors. Since a large number of variables demonstrate a statistically significant relationship with an individual's reaction to the NMC (Q27), question 27 was statistically regressed on demographic variables and the key or global item from each section of the questionnaire in order to determine which of the variables best predicted general reaction to the NMC. The results of the stepwise multiple regression equation, along with derived beta weights, are presented in Table 24. The beta weights, while highly significant due to the large size of the sample, are very low. The 10 variables that are most predictive are capable of explaining only 18 percent of the overall variance. In an attempt to improve predictability, a second stepwise multiple regression analysis was performed, using all items in the questionnaire, omitting global items (Q7, Q15, Q44, and Q110). Results of the second analysis, using 32 variables, appear in Table 25; the first 10 variables in the new equation now explain 23 percent of the variance, with all 32 variables explaining 25 percent of the variance. While the supervisor-nonsupervisor distinction was the first variable to enter into the equation in the first analysis, it entered as the third variable in the second analysis; it was replaced as the first variable in the new equation by question 24, satisfaction with national FAA management, followed by question 12, a rating of the physically straining nature of the job. The fourth and sixth variables involved satisfaction with working conditions (Q18) and satisfaction with salary (Q19). Occupational identification entered as the fifth variable. Variables 7 through 11 were as follows: region, type of facility, percentage of difficult workdays (Q9), education level, and state anxiety. This was followed by questions concerning sleep, health problems, and some demographic variables.

TABLE 24

Results of Stepwise Multiple Regression Analysis
Predicting I27, using Global Items and Demographic Indices

Multiple R .42629 F= 99.77573
R Square .18172

Step	Variable	Beta	R Square
1	Supervisor/NonSupervisor	.15391	.06119
2	Job Satisfaction	.14911	.10216
3	Job Difficulty	-.12872	.13130
4	Occuational Identification	-.11558	.14583
5	Work Schedule	.09652	.15819
6	Region	-.08016	.16770
7	Grade Level	-.09033	.17256
8	State Anxiety	.06728	.17535
9	Facility Type	-.05291	.17950
10	Years in Present Position	.04963	.18172

TABLE 25

Results of Stepwise Multiple Regression Analysis
Using all Survey Items Except the Global items

Multiple R .47898 F=68.24054
R Square .22943

Step	Variable	Beta	R Square
1	Item 24-Satis. with Nat. Management	.17545	.07159
2	Item 12-Work Physically Straining	-.13579	.13088
3	Supervisor/Nonsupervisor	.15969	.16854
4	Item 18-Satisfaction WithWorking Cond.	.10697	.18713
5	Occupational Identification	-.10085	.19860
6	Item 19-Satisfaction with Salary	.11438	.21023
7	Region	-.06995	.21845
8	Facility	-.06392	.22318
9	Item 9-Percent of Difficult Workdays	.06129	.22631
10	Education	.05738	.22943.

To obtain a clear understanding of the structure of the interrelationship of the variables, a factor analysis (SPSS program for principal axis analysis with varimax rotation) was performed using the same 32 variables. Results of the factor analysis appear in Table 26. The eigenvalues and percentage of variance explained by the 12 factors are presented in Table 27. Using the traditional measure, an eigenvalue of one or greater, only 5 of the 12 factors were significant. The first three factors account for slightly more than one-half (52.5 percent) of the total variance. A second factor analysis was performed to determine which of the 12 factors received the heaviest loading on the criterion variable (Q27). Even though the eigenvalue was not significant for factor 11, this factor received a heavier loading from question 27 than any other factor. This finding, along with the results of the multiple regression analysis, suggests that this factor has considerable utility in the prediction of the individual's response to the NMC.

TABLE 26

FACTOR LOADINGS FOR THE PREDICTOR VARIABLES

VARIABLES	FACTORS 1	2	3	4	5	6	7	8	9	10	11	12
AGE	-.02	.62	-.12	-.07	.03	-.07	-.02	.05	.23	-.03	-.14	.07
GRADE	-.18	.34	-.14	.01	.04	-.09	-.02	-.00	.23	.56	-.01	-.06
YRS POS	-.04	.77	.01	.09	.02	-.05	.00	.06	.11	-.08	.20	-.07
EDUC	-.01	-.10	.04	.05	.01	-.02	-.02	-.01	-.04	.35	-.02	.10
FACILITY	.07	.01	-.07	-.02	.04	.22	-.01	-.02	-.17	.01	-.11	.54
OCC. ID.	.04	-.02	.00	-.09	.03	.07	.05	.01	-.06	-.01	-.46	.14
PROGRAM	.03	-.03	.04	-.05	-.02	-.04	.01	.07	.14	-.16	-.04	-.16
REGION	.09	-.01	.01	-.07	.01	.00	.01	-.01	.04	.07	-.02	.36
SUP/NONSUP	.12	-.14	.11	.11	-.02	-.03	-.02	.03	-.11	-.40	.49	.11
Q9	-.61	.01	.14	.14	.01	-.04	.03	.04	.02	-.05	-.03	-.07
Q12	.28	-.01	-.14	-.15	.00	.04	-.07	.03	.11	.38	-.05	-.01
Q13	.80	-.04	-.05	-.04	.00	.03	.01	-.09	-.06	-.08	-.03	.07
Q14	.79	-.10	-.05	-.12	-.02	.04	-.03	-.13	-.06	-.06	.00	.09
Q18	-.20	.00	.19	.63	-.02	-.02	.05	.12	-.00	-.02	.06	-.08
Q19	-.10	-.09	.88	.18	-.01	-.01	.04	.04	-.02	-.07	.02	.00
Q20	-.18	-.07	.84	.18	-.01	-.01	.03	.03	-.01	-.11	.01	.05
Q21	-.04	.06	.03	.59	-.02	.00	.03	.03	.02	-.01	-.04	.02
Q22	-.04	.04	.06	.68	-.01	-.03	.05	.04	.01	-.01	.12	-.04
Q24	-.15	-.02	.25	.36	.00	-.03	.03	.11	.05	.15	.09	-.07
Q45	-.03	.64	-.04	.05	.06	.12	.00	.04	.04	.11	-.06	.02
Q46	-.04	.13	-.02	.04	.00	-.09	-.02	.03	.53	.07	.00	.04
Q47	-.08	.29	-.01	.03	-.02	-.17	-.04	.05	.61	-.01	.09	-.12
Q48	-.00	.03	.02	.04	.74	.05	.01	-.01	-.07	-.01	-.04	-.01
Q49	-.04	.02	-.00	.03	.65	.01	-.03	.06	.21	.13	.11	-.08
Q53	.04	-.01	-.02	-.04	-.17	-.02	-.11	-.07	.08	.07	.10	-.02
Q55	-.03	-.05	.03	.11	-.46	-.09	.10	.08	.09	-.03	.09	-.04
Q60	-.01	.00	.04	.06	-.06	.07	.70	.10	-.03	-.00	-.03	.02
Q62	.03	.00	.00	.01	.28	.58	.09	.06	-.15	-.01	-.03	.07
Q63	-.04	.01	.02	.07	-.04	.03	.72	.10	-.01	-.06	-.03	-.00
Q67	.00	-.00	-.02	-.03	.19	.14	-.04	.00	.03	-.02	.04	.07
Q68	.10	-.01	-.02	-.06	.06	.87	.07	-.06	-.19	-.00	-.13	.11
ASTA	-.25	-.06	.08	.29	.06	-.02	.21	.38	-.05	-.06	.01	-.11
Q112	.05	-.16	.01	-.03	-.01	.04	-.08	-.18	.01	.06	.06	.02
Q116	-.00	-.00	.02	.05	-.01	.00	.05	.25	.05	-.01	.01	.04
Q118	-.06	.05	.01	.04	.01	.02	.00	.64	-.00	.01	.01	-.06
Q119	-.05	.05	.01	.01	.02	.01	.01	.48	.01	.01	.00	-.01

TABLE 27

Summary of Factor Analysis

Factor	Eigenvalue	Percent of Variance
1	3.449	23.2
2	2.550	17.1
3	1.809	12.1
4	1.331	9.0
5	1.243	8.4
6	.980	6.6
7	.866	5.8
8	.804	5.4
9	.658	4.4
10	.458	3.1
11	.376	2.5
12	.344	2.3

Factor 11 has heavy loadings from two questions, one dealing with occupational identification (Q23), the other involves the supervisor-nonsupervisor distinction (Q6). As noted earlier, nonsupervisors and the electronic and environmental technicians are more likely to respond negatively to the proposed changes.

Loadings for the criterion variable on the other factors were not very high, ranging from .011 to .261. Factors which received the higher loadings from the criterion variable involved questions that entered early in the multiple regression equations. This included information concerning satisfaction with working conditions and management, time in position, anxiety, and questions concerning the stressful nature of the job.

COMMENTS

A total of 453 (6.57 percent) of the respondents included written comments related to the NMC on the "comment" section of the questionnaire. For analysis, comments were placed individually on 5x7 cards and sorted into categories. A total of 793 separable comments were made by the 453 respondents. A "general critical" category, for responses generally negative toward the NMC, was established, along with seven additional major categories. These major categories and their subdivisions, along with their respective numbers of comments and percentages of the total comments, are presented in Table 28, and are discussed below.

TABLE 28

Response Categories and Number of Comments
Concerning the New Maintenance Concept

Category	N	%	Total N	Total %
Remote Monitoring			225	28.4
General-Critical	126	15.9		
Telco Reliability	49	6.2		
Increased Travel Time	50	6.3		
Effects on Personnel			220	27.7
Loss and Grade Reduction	102	12.9		
Training	60	7.6		
Relocation	47	5.9		
Man-Machine	11	1.4		
Solid-State Equipment			110	13.9
General Critical			70	8.8
Favorable			53	6.7
Lack of Information			51	6.4
Miscellaneous			38	4.8
Management			26	3.3

Remote Monitoring. This general category involved the largest number of responses, 225 (28.4 percent of total). Several subcategories were established to help specify the complaints. These subcategories were concerned with: (a) the negative potential impact of the withdrawal of preventative remote maintenance, (b) the overall reliability (or lack thereof) of the telco (telephone company) lines that would be used to relay information from the remote facility to the centralized monitor, and (c) under the proposal, travel time could be greater since the facility would be farther away. These responses suggest that there are several areas in which the proposal for remote monitoring could have a negative impact.

Effects on Personnel. The overall number of comments (N=220) in this category was similar to that noted in the previous category. These comments tended to emphasize the negative impact of the proposed changes

on personnel, especially technicians. The subcategories were: (a) grade loss and grade reduction, (b) training, (c) relocation, and (d) man-machine. The concern in subcategory (a) was whether the intent of the agency is to "upgrade the integrity of the system or to reduce the manpower." A related concern was the potential impact of the changes on the technician's grade level. A number of respondents felt that when the technician becomes a "module swapper," "chassis changer," or "board changer," management will downgrade the technician. This change in status, according to several respondents, would have a negative impact on the attitude of the average worker. In the next subcategory (b), 60 comments were made concerning the potential impact of the changes on personnel training. The comments ranged from current training to training in the future. While several individuals expressed their satisfaction with the training they had received at the FAA Academy, concerns were expressed about the decline in money for training and the inadequacy of current procedures. The responses suggest that workers tend to favor a classroom, instructor-taught course, over computer based instruction. While it is not entirely a training issue, some respondents expressed concerns about remaining proficient under the NMC. They were concerned that less frequent "hands on" experience with the equipment would lead to lowered proficiency, which in turn would require additional and more frequent training. A total of 47 comments was made concerning the issue of relocation to centralized hubs (c). Comments indicated that the proposed relocation would have a negative impact on the worker, the work environment, and family life. This generally negative attitude toward relocation is reflected in the following comment: "I look forward to working with up-to-date equipment and will do so until the FAA says I have to move, then I will resign." These responses reflect not only concern about the cost of the relocation, but also concern about the perceived better "quality of life" available in the smaller communities relative to larger cities. The final subcategory (man-machine) included a small number of comments (11). Concerns were expressed that the move to remote monitoring would lessen or eliminate the "pride in ownership" that is presently evident at smaller facilities.

Solid State Equipment. Even though a large majority of the personnel favors the use of solid state equipment, these comments suggest that there is some concern over the reliability of solid state equipment. Several respondents expressed the opinion that their experience with such equipment indicated that it was not as reliable nor was it as easily repaired as is frequently described. A related concern, that the government purchases inferior equipment by "low bid," was reflected in the following comment: "The NMC will not work with the quality of the equipment the FAA buys." Additional comments were made concerning the necessity to repair the monitoring equipment and the sensitivity of the solid state equipment to lightning and other environmental events. There were very few positive statements about the reliability of this type of equipment.

General Critical. A total of 70 (8.82 percent) of the comments expressed a generally critical attitude concerning the proposed NMC. These responses indicated that the individuals saw the proposal as being idealistic, overly optimistic, and "someone's crazy dream." These reactions often seemed to be influenced by the respondent's previous experience with new equipment, as is reflected in the following comment: "Sounds good on paper, but so did the new ARSR-3 and DARC, both are real fiascos."

Favorable. There were 53 favorable comments. These comments were often focused around the need for new equipment, that it was about time the agency "caught up with today's technology." While a few people indicated that they supported the NMC "without reservation," most of the respondents indicated that they offered their support with some reservations. Comments like "will it be done in practice?" or "it depends on the quality of the equipment," reflect these concerns.

Lack of Information. A total of 51 comments was made about either a lack of information or a lack of detailed information. These comments ranged from statements such as: "I am not aware of any proposed changes," to "more information is needed by field personnel." One individual commented that "I feel I know more about the NMC than I did before I answered the questions." The general feeling was that some philosophical information had been provided; however, there had been little information available concerning specific organizational changes. A common concern was the potential impact of the NMC on the "technician."

Management. Twenty-six comments dealt with some aspect of managment. The general tenor of these comments was that "high level" management was not aware of what goes on in the field, that management needs to "start paying attention to people in the field."

As is evident in Table 28, there is a miscellaneous category that comprised a variety of comments, including some that deal with the potential cost of the proposed changes, the influence of the NMC on shift work, and the generally negative consequences of the move toward a computerized monitoring system (man-machine).

IV. Discussion.

Any attempt to assess attitudes toward organizational change must be placed within the context of how people typically respond to change. The development of homeostasis (a steady state) and subsequent resistance to change is not only evident in most individuals, but is commonly found in groups, organizations, and certainly in larger societies. Managers have known for some time that employees are capable of promoting, impeding, or preventing change. Issues concerning the resistance to change and the need to carefully plan change have been raised by numerous authors (e.g., Bennis et al. (Eds.) (1), Howes and Quinn (7), Mealiea (11), Meyer (12), McMurry (10), Schleh (14), Stewart (17), and Zander (19)), to mention a

few.

Since history suggests that individuals often tend to resist change, the AF work force does not appear to be highly unusual. In terms of their general response to the NMC, the work force indicated a mixed to slightly positive response; 42.8 percent were to some extent clearly positive, 30.8 percent were undecided, and 26.2 percent were to some extent clearly negative. However, there were specific aspects of the proposal that generated high levels of satisfaction. The use of solid state equipment and associated changes in specialization and knowledge, along with a reduction in routine maintenance, computer assisted instruction, automated record keeping, and a reduction in watchstanding generated the most positive responses, with 63 to 74 percent of the work force expressing some degree of acceptance for the various proposals.

The large number of statistically significant differences (which were expected a priori due to the large sample size) that were found in the analysis of the general reaction to the NMC made it important to determine which variables were most influential. Results from the multiple stepwise regression analyses and factor analyses are useful not only in determining the importance of the many variables but in looking at the interrelationships. One of the major factors related to the worker's resistance to change concerns his position within the work force. Individuals who were nonsupervisors and whose occupational identification was as electronic or environmental technicians were more likely to express a negative reaction concerning the proposal. Management needs to be aware that its view of change is not necessarily shared by those at the lower levels. This is especially evident in the reaction of supervisors vs. nonsupervisors to the proposed relocation. While only 11.2 percent of the supervisors indicated that they would dislike the possibility of their being relocated, 23 percent of the nonsupervisors indicated their dislike for this aspect of the proposal. The tendency for upper level personnel to express more favorable responses to the proposed changes was evident not only in terms of general aspects of the proposal, but also to the more specific changes. These findings are consistent with the work of Faunce (3), who found that supervisors, upper level personnel, and more educated personnel expressed greater readiness for changes in their jobs, and of Trumbo (18) who reported that more highly educated workers in an insurance company expressed greater readiness to change. This suggests that there may be characteristics of individuals who either seek higher formal education or become managers or supervisors that predispose them to be more receptive to change. However, in the case of the NMC proposal, it should be remembered that the proposed changes are least likely to affect individuals within the upper levels of management. There appear to be several possible explanations for why individuals in upper level positions are less resistive to change: (i) it will have little effect on them, (ii) they know more about it and thereby feel less threatened, (iii) due to their position they are often more closely associated with the implementation of the change and can thereby feel that they have greater control over what happens to their own position, (iv) in the process of

becoming a supervisor or manager they had to experience a greater number of changes in their jobs and thereby learned to become more accepting of change, and (v) supervisors feel less threatened by change due to their personality styles. While the extent to which a proposed change affects us is likely to be central in determining our reaction to the proposal, the influence of the other variables has yet to be determined empirically.

Overall response to the proposed changes was also related to an individual's attitudes toward local working conditions: satisfaction with the working conditions, satisfaction with supervision, and satisfaction with local and national management. These questions, along with the importance of the global question concerning job satisfaction (Q15), indicate that ratings of job satisfaction provide some measure of the individual's resistance and/or willingness to accept specific changes. This finding is somewhat paradoxical: when there is greater job satisfaction there is more acceptance of the changes, and when job satisfaction is lower there is increased resistance. One might expect that individuals who are dissatisfied with their jobs would be willing to accept change in the hope that their job would become more satisfying. Previous studies in this area have yielded contradictory results. Faunce (3) reported a low, positive, but insignificant correlation between a measure of job satisfaction and readiness for change, while Hardin's (6) review of several studies indicates a weak negative correlation; her own results show that the two variables were essentially uncorrelated ($r = -.09$). However, there is an important difference between this study and the studies of Faunce (3) and Hardin (6). In the present study, the focus was on attitudes toward specific changes that had been proposed by management, while in Faunce (3) and Hardin (6), the focus was on readiness for change. A dissatisfied worker may indicate a readiness for change, but he may be hesitant to accept a specific change and/or a change that is being imposed from an outside source (management). This is not a totally unexpected finding. If employees feel disenchanted with management in general, dissonance theory suggests that they would also tend to perceive their proposals as being unsatisfactory. It is possible that an important factor in determining reaction to organizational change lies in how the change is presented. While there has been limited research in the area, several writers indicate that workers are more accepting of change when they have been involved in the decision (participative management) than when the change is imposed from above (management). Additional research is needed to determine how job satisfaction, especially satisfaction with management, relates to resistance to change, relative to whether the changes occur as the result of a decision by management or if they come about through some type of participative process.

Age was another determinant of the individual's response to the NMC. Older workers tended to express greater satisfaction with the proposed changes. However, this finding is modified somewhat in terms of the length of time the worker has been in a particular position. The longer an individual has been in a certain position the more likely he or she is to express dissatisfaction with the proposed changes. If that worker has

also spent a larger amount of total work time on a rotating shift or on a shift other than the day shift, expressions of dissatisfaction with the proposal were more likely.

Finally, response to the NMC was determined by the individual's perception of the amount of stress and strain experienced while on the job. Respondents who indicated that their work was mentally straining (Q13), stressful (Q14), and involved a higher percentage of difficult workdays (Q9) were more likely to express a negative reaction to the general NMC proposal. Additionally, their responses on the state-trait anxiety inventory were indicative of higher levels of state anxiety at the time they completed the questionnaire. These results are consistent with the work of Trumbo (18), who found a significant negative correlation between anxiety and readiness for change ($r = -.16$). This is not an unexpected finding since the clinical literature is full of examples of how highly stressed and anxious individuals resist change and maintain stereotypical behavior patterns.

With the information gained from these analyses, it is possible to provide a description of the AF employee who expresses the greatest amount of dissatisfaction with the proposed changes. The generalized profile depicts a lower GS-level nonsupervisory technician who has worked at his position for several years. He is somewhat dissatisfied with his job, the working conditions, and management, and perceives his work environment as being stressful and mentally straining.

While the questionnaire did not focus specifically on the reasons for dissatisfaction with the proposal, issues raised in the "comments" section, as well as attitudes expressed towards various aspects of the proposed changes, offer some possible explanations. The specific aspect of the proposed changes that appeared to generate the lowest level of support was the proposal to relocate personnel from the smaller, more remote sites, to more centralized work hubs. It was this aspect of the plan that also generated a number of negative comments. In another context, Fox (4) indicates that apprehension concerning the relocation of a plant in Israel was centered around two basic issues: concern about changes in the job situation and concern about moving or the need for traveling greater distances to work. Both of these issues are likely to be of some concern for AF employees.

Concern about changes in the job situation would appear to be related to the manner in which or the extent to which these modifications interfere with the ability of the worker to meet his basic needs on the job. Mealiea (11) suggests that, in order to experience success at a job or to feel comfortable at a job, workers need to meet four basic needs. These needs are: (i) to be aware of specific information concerning his/her role within the job environment, (ii) to interact with others, (iii) to be able to predict what he/she will face in the future, and (iv) to have some degree of control over what takes place in his/her environment. Any alteration in the job environment is likely to disrupt

the manner in which the individual meets aspects of these needs. The greater the change, the greater the potential disruption in the ability of workers to meet their needs. Comments concerning the move to centralized work hubs, as well as the 20 percent of the work force that indicated that they would probably be relocated and would dislike the move, suggest that concern about relocating in a new work environment is a significant feature of the negative reactions to the NMC proposal. The movement to a new work environment where the worker may be required to develop additional specialized skills creates a setting in which the individual will be required to establish new ways of meeting needs. This will include the development of new work roles and new patterns of interaction with coworkers in a setting that is largely unpredictable, one in which the worker would initially experience little control. It is easy to see how the technician could perceive this change as involving considerable psychological cost. The additional expense of selling a house and buying a new house at a higher price and at a higher interest rate is another negative consequence. Relocation from country to city also impacts the family in that the move will require the development of a new lifestyle. Several individuals specifically indicated that a move to a larger city would create a significant (negative) change in the overall quality of their life.

In view of the potential costs involved in the change, there has been limited emphasis on the positive aspects of the change as they relate to the technician. As indicated by Schleh (14), management typically justifies proposals for change by demonstrating their positive impact on the organization (economic savings), giving less attention to the impact of these changes on the average worker. This assessment seems to be generally true concerning the NMC proposal. The primary focus appeared to be on the potential savings and increased efficiency for the agency; there was less emphasis on the benefits for the average employee, an increase in efficiency and reliability when using new solid state equipment, and a possible reduction in watchstanding. Little emphasis was placed on other potential rewards: the challenge and opportunity of working with more sophisticated equipment, the opportunity for upgrading skills, and the increased potential for promotion. The provision of such additional information to the technicians would be beneficial in helping them see the proposal in a different manner.

Meyer (12), Mealiea (11), and Howes and Quinn (7) all stress the importance of effective communication in the reduction or prevention of resistance to change. Employees are less likely to resist change if they are given the relevant facts concerning how change will affect them. An attempt was made through the use of multiple sources, including a videotape, an article in the agency magazine that is received by all employees, an FAA Order that was widely distributed, as well as more informal means, to communicate the proposed changes. However, since nearly one-fourth (22.6 percent) of the work force indicated that they had received "very little" information concerning the plan, questions need to be raised concerning the effectiveness of the communication. For example,

the article in FAA WORLD (9) entitled "Better Service at Less Cost" at first glance gives no indication that the article concerns the NMC. While the focus of the article is on the savings generated by the move to solid state equipment and remote monitoring, there was significantly less space provided for a discussion of the influence of these changes on the employee's job and the proposal for a reduction in work sites. Thus, the average worker at the smaller facility received little information to indicate how these changes would impact on his job and location. Communication could have been improved by using this article as a basis for a series of articles to continue to inform the work force as additional details concerning the proposed changes were developed. Furthermore, a question and answer column might have been implemented where the workers could write in and ask questions concerning the proposed changes and answers would have been supplied by headquarters personnel. This would not only have allowed the average worker to express his/her concerns, but it would have allowed management to determine the aspects of the changes that were being viewed critically by the worker in terms of the types of questions that were being raised. The existence of a large number of workers who indicated that they were undecided about the overall plan (30.8 percent, Q27) suggests that the development and presentation of additional informational programs could be of some utility in ensuring a more positive reaction in the future.

An additional benefit from increased communication is that there is research evidence suggesting that the presence of adequate information prevents the occurrence of rumors among lower level employees (12). A fear expressed in several comments, that under the proposal there is a potential for the electronics technicians to have their positions downgraded when they become "module swappers," could be an example of this type of a rumor. The existence of effective two-way communication both within and between levels of employees is critical to the implementation of change. Meyer (12) indicates that communication within an organization is typically greater within levels than between levels. Limited communication flow in the AF work force seems indicated since upper level personnel reported that they possessed a greater amount of information concerning the proposal than did those at lower levels. Not only do they report possessing more information, but they tend to perceive the proposal in more favorable terms than the technician. This suggests a need for additional communication, especially two-way communication between upper level management and technicians. In developing more effective communication, it should be remembered that when changes are imposed there tends to be greater resistance (5). If at all possible, attempts should be made to involve technicians in some of the decision-making concerning their jobs. The typical approach of having a few representatives meet with personnel involved in the decision making may not be sufficient to accomplish the desired result. Since a majority of the technical work force may be unaware that this input was obtained and utilized, it may be necessary to develop and circulate communication from the representatives, concerning their involvement.

REFERENCES

1. Bennis, C., K. Benne, R. Chin, and R. Corey (Eds.). 1972. The Planning of Change. New York: Holt, Reinhart, and Winston.

2. Federal Aviation Administration. 1979. Transmittal of Maintenance Philosophy Steering Group (MPSG) Report. FAA Order 6000.27.

3. Faunce, W. A. 1960. Social Stratification and Attitude Toward Change in Job Content. Social Forces. 39:140-148.

4. Fox, S.. 1979. Workers' Apprehensions Due to Plant Relocation. Psychological Report. 45:327-332.

5. Hall, D. T., J. G. Goodale, S. Rabinowitz, and M. Morgan. 1978. Effects of Top-Down Departmental and Job Change Upon Perceived Employee Behavior and Attitudes: A Natural Field Experiment. Journal of Applied Psychology. 63:62-72.

6. Hardin, E. 1967. Job Satisfaction and Desire for Change. Journal of Applied Psychology. 51:20-27.

7. Howes, N. J., and R. E. Quinn. 1978. Implementing Change: From Research to a Prescriptive Framework. Group and Organizational Studies. 3:71-84.

8. Lauer, R. H., and R. Thomas. 1976. A Comparative Analysis of the Psychological Consequences of Change. Human Relations. 29:239-248.

9. Lavey, G. E. 1979. Better Service at Less Cost. FAA World. 9(12):2-5.

10. McMurry, R. N. 1947. The Problem of Resistance to Change in Industry. Journal of Applied Psychology. 31:589-593.

11. Mealiea, L. W. 1978. Learned Behavior: The Key to Understanding and Preventing Employee Resistance to Change. Group and Organizational Studies. 3:211-223.

12. Meyer, M. C. 1976. Managing Organizational Change. Personnel Journal. 55:570-572, 579.

13. Nie, N. H., C. H. Hull, J. G. Jenkins, K. Steinbrenner, and D. H. Bent. 1975. SPSS: Statistical Package for the Social Sciences. New York: McGraw-Hill.

14. Schleh, E. C. 1960. Selling Technological Change as the Company's Way of Life. Personnel. 37:57-66.

15. Smith, R. C., and G. L. Hutto. 1977. Job Attitudes of Airway Facilities Personnel. Office of Aviation Medicine, OAM Report No.

AM-77-21.

Spielberger, C. D. Test Manual for the State-Trait Anxiety Inventory (Form Y). Palo Alto, California: Consulting Psychologists Press (In Press).

Stewart, M. 1957. Resistance to Technological Change in Industry. Human Organization. 16:36-39.

Trumbo, D. A. 1961. Individual and Group Correlates of Attitudes Toward Work-Related Change. Journal of Applied Psychology. 45:338- 344.

Zander, A. 1950. Resistance to Change- Its Analysis and Prevention. Advanced Management. 15:9-11.

AIRWAY FACILITIES MAINTENANCE PHILOSOPHY AND WATCHSTANDING QUESTIONNAIRE

PURPOSE

The questionnaire is being sent to all field personnel of the Regional Airway Facilities (AF) Divisions by the Civil Aeromedical Institute of the FAA. It is concerned with two issues, the new maintenance concept to be implemented during the 1980s and watchstanding (shiftwork). As you know, plans are being made to change the agency's approach to maintenance so that on-line performance will be improved in a cost-effective manner. This questionnaire is concerned with your thoughts about the changes being proposed.

There are also many questions that need to be studied about the effects of watchstanding on those employed in the AF Divisions. Although watchstanding will be substantially reduced under the new maintenance concept, it will probably always be a requirement in some settings. The results of this questionnaire will be used to help plan the most appropriate ways to handle the watchstanding requirement in the future.

INSTRUCTIONS

1. Enclosed in this packet are a questionnaire, an answer sheet, a comments sheet, and a preaddressed return envelope.

2. Your participation in this survey is voluntary and anonymous. Therefore, please do **not** put your name on the questionnaire.

3. Please read the instructions carefully before each part of the questionnaire.

4. Please use a pencil (Number 2, if possible) to mark your responses on the answer sheet. See side 2 of the answer sheet for the correct way to mark your answers so that they will be read accurately by the scoring machine. **MAKE A HEAVY, DARK MARK**--not a cross or checkmark.

5. Work quickly; do not spend a long time on any one item--use your **first impression** to answer each item. If you do wish to change an answer, please erase your first choice completely. It is important to complete as much of the questionnaire as possible; however, if there are questions you prefer not to answer, please omit these while completing the rest of the questionnaire. If you omit an item, please be sure that your subsequent answers line up with the correct space on the answer sheet.

6. The completed answer sheet and comments sheet should be returned directly to:

   Dr. Roger C. Smith
   AAC-118, FAA, CAMI
   P.O. Box 25082
   Oklahoma City, OK 73125

   in the preaddressed return envelope provided for this purpose. It is *not* necessary to return the questionnaire.

BASIC INFORMATION

(These items are to be answered in the spaces to the *left* of the heavy green line on side 1 of your answer sheet.)

Sex: Male (M) or Female (F)

Grade or Education: Enter the number of years of formal education (e.g., high school graduate — 12, 2 years of college — 14).

Special codes (located at bottom center of side 1)

Age — **Enter in Column J**

24 and under	0
25 to 29	1
30 to 34	2
35 to 39	3
40 to 44	4
45 to 49	5
50 to 54	6
55 to 59	7
60 or over	8

Ethnic background — **Enter in Column K**

Oriental	0
Black	1
White (Caucasian)	2
Hispanic	3
American Indian or Alaskan Native	4
Other	5

Degrees — **Enter in Column L**

High school diploma	0
Associate degree (junior college graduate)	1
Bachelor's degree (college degree)	2
Master's degree	3
Doctoral degree	4
Trade school -1 year	5
Trade school -2 years	6
Trade school -3 or more years	7

Pay schedule — **Enter in Column M**

GS	0
WG	1
WL	2
WS	3

Grade level — **Enter in Column N**

Grade 5 or lower	0
Grade 6	1
Grade 7	2
Grade 8	3
Grade 9	4
Grade 10	5
Grade 11	6
Grade 12	7
Grade 13	8
Grade 14 or higher	9

Years worked for FAA/CAA — **Enter in Column O**

- Less than 1 year 0
- 1 year 1
- 2 years 2
- 3 years 3
- 4 years 4
- 5 years 5
- 6 to 10 years 6
- 11 to 20 years 7
- 21 or more years 8

Years in your present position — **Enter in Column P**

- Less than 1 year 0
- 1 year 1
- 2 years 2
- 3 years 3
- 4 years 4
- 5 years 5
- 6 to 10 years 6
- 11 to 20 years 7
- 21 or more years 8

AF INFORMATION

(These items are to be answered in the spaces to the *right* of the heavy green line on your answer sheet.)

Enter

1. At what type of facility do you work?
   - ARTCC 1
   - Major tower (Level 4 or 5) 2
   - Intermediate tower (Level 3) 3
   - Small tower or station (Level 1 or 2) .. 4
   - Remote nontower 5
   - Regional office 6
   - Other 7

2. What is your AF specialty?
   - Communications 1
   - Radar 2
   - Navaids 3
   - Automation 4
   - Environmental systems 5
   - Staff support 6
   - Other 7

3. What is your major occupational identification?
   - Electronics technician 1
   - Environmental support technician 2
   - Engineer 3
   - Staff support 4
   - Other 5

4. Which AF program do you work under?
   - F & E 1
   - Maintenance 2
   - Other 3

5. In which FAA region do you work?
   - NE 1
   - EA 2
   - SO 3
   - GL 4
   - CE 5
   - SW 6
   - RM 7
   - WE 8
   - NW or AL 9
   - EU or PC 10

Enter

6. Are you presently a supervisor; that is, does your official job description include the responsibility for directly supervising the work of others?
   - Yes 1
   - No 2

RATING YOUR JOB

7. In general, how difficult is your job?
   - Very difficult 1
   - Difficult 2
   - Neither difficult nor easy 3
   - Easy 4
   - Very easy 5

8. Up to now, how difficult has today's shift been? If you are just starting the shift or have been working 2 hours or less when you answer this, mark the 6 on the answer sheet.
   - Very difficult 1
   - Difficult 2
   - Neither difficult nor easy 3
   - Easy 4
   - Very easy 5
   - Just starting 6

9. What percentage of your workdays are difficult?
   - 10% or less 1
   - 10-20% 2
   - 20-30% 3
   - 30-40% 4
   - 40-50% 5
   - 50-60% 6
   - 60-70% 7
   - 70-80% 8
   - 80-90% 9
   - 90-100% 10

10. What percentage of your workdays are easy?
    - 10% or less 1
    - 10-20% 2
    - 20-30% 3
    - 30-40% 4
    - 40-50% 5
    - 50-60% 6
    - 60-70% 7
    - 70-80% 8
    - 80-90% 9
    - 90-100% 10

Enter

11. How would you rate your typical workload (the amount of work you have to do)?
    - Very heavy 1
    - Heavy 2
    - Moderate 3
    - Light 4
    - Very light 5

12. Is your present work physically straining?
    - Very much so 1
    - Moderately so 2
    - Somewhat 3
    - Very little 4

13. Is your present work mentally straining?
    - Very much so 1
    - Moderately so 2
    - Somewhat 3
    - Very little 4

14. How stressful is your work?
    - Very much so 1
    - Moderately 2
    - Somewhat 3
    - Very little 4

JOB SATISFACTION

15. How satisfied are you with being employed in AF?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

16. How satisfied are you with your present position in AF?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

17. How satisfied are you with your choice of occupation; that is, with being an electronics technician, engineer, or whatever?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

Enter

18. How satisfactory are your working conditions in AF?
    - Very Satisfactory 1
    - Satisfactory 2
    - Indifferent 3
    - Unsatisfactory 4
    - Very unsatisfactory 5

19. How satisfied are you with your salary?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

20. In terms of the work you do now, how would you rate your present salary?
    - Very good 1
    - Good 2
    - Adequate 3
    - Inadequate 4
    - Very inadequate 5

21. How satisfied are you with your immediate supervisor?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

Enter

22. How satisfied are you with your local sector management?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

23. How satisfied are you with regional management?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

24. How satisfied are you with national FAA management?
    - Very satisfied 1
    - Satisfied 2
    - Indifferent 3
    - Dissatisfied 4
    - Very dissatisfied 5

THE NEW MAINTENANCE CONCEPT

This section of the questionnaire is concerned with your understanding of, and attitudes toward, the new maintenance concept planned for implementation during the 1980's. Be sure to check that your answers start in space 25 on the answer sheet.

Enter

25. How much have you heard about the new AF maintenance concept being proposed for the 1980's?
    - Very little — do not know much about it 1
    - Some — am acquainted with basic concepts of plan 2
    - Considerable — am familiar with most aspects of the plan 3
    - Great deal — am thoroughly familiar with most details of the plan 4

26. Where have you obtained most of your information about the new maintenance concept?
    - FAA Order 6000.27 (6/6/79) describing the new maintenance concept and plan 1
    - Article in *FAA WORLD*, "Better Service at Less Cost" (December 1979) 2
    - Video tape presentation on new maintenance concept 3
    - Union communications 4
    - Management channels 5
    - Word of mouth 6
    - Other 7

Enter

27. From what you know now, what is your general reaction to the new maintenance concept?
    - Very positive — believe it will be a progressive change for AF 1
    - Generally positive — am generally supportive, but have some concerns 2
    - Uncertain — do not know whether I support this program 3
    - Generally negative — see some good points, but generally think the overall plan is not a good one 4
    - Very negative — believe it will be bad for the AF Service 5

28. The new maintenance concept proposes two levels of facilities: (1) Maintenance hubs where maintenance technicians will do the monitoring, remote certification, and repair of modules and (2) remote facilities that will be unmanned, remotely monitored and feature easily diagnosed and replaced system modules. What do you think about this concept?
    - This is a good idea that I strongly support 1
    - Accept with reservations about remote maintenance monitoring 2
    - Accept with reservations about maintenance hubs 3
    - Accept with reservations about both monitoring and hubs 4
    - Uncertain about this concept 5
    - Do not feel that this will be a good change, am generally not in favor of it 6
    - Not workable — concept should be rejected 7

29. The new maintenance concept also proposed two types of certification: (1) facility certification (i.e., initial, quarterly, etc.) accomplished through on-site calibration and certification of equipment and remote monitoring devices and (2) periodic certification (i.e., daily, weekly, etc.) through the remote maintenance monitoring system. What do you think about this concept?
    - This is a good idea that I strongly support 1
    - Generally accept with reservations about periodic certification process 2
    - Generally accept with reservations about on-site facility certification 3
    - Generally accept with reservations about both processes 4
    - Uncertain about this concept 5
    - Do not feel this will be a good change, am generally not in favor of it 6
    - Not workable — concept should be rejected 7

30. Under the new maintenance concept, four levels of system repair have been proposed:
    - (i) First level — module replacement
    - (ii) Second level — basic module repair at sector
    - (iii) Third level — specialized module repair at depot
    - (iv) Fourth level — on-site repair for nontransportable items.

    What do you think about this proposal?
    - This is a good idea that I strongly support 1
    - Generally accept with some reservations 2
    - Uncertain about this concept 3
    - Do not feel this will be a good change, am generally not in favor of it 4
    - Not workable — concept should be rejected 5

Enter

31. Along with use of solid-state equipment, the remote maintenance monitoring system is a key to the successful implementation of the new maintenance concept. It will be designed to monitor the equipment and alert personnel of deficiencies. It will also allow periodic certification of the facility from a central location and will give some degree of remote control of facility functions. It will have a recordkeeping capability. Other functions will be added later such as trend analysis and fault prediction. What do you think about this concept?
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

32. One goal of the new maintenance concept is to automate much of the recordkeeping, particularly facility logs. What do you think about this goal?
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

33. One of the goals of the new maintenance concept is to centralize most of the maintenance work of technicians at the sector office and at a more limited number of sector field offices rather than at distant sites. What do you think about this goal?
    This is a good idea that I strongly support 1
    Generally accept but have some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

Listed below are some of the changes that will have the most direct effects on the individual technician. How do you feel about these changes?

34. The job itself under the new maintenance concept will be directed toward diagnostics, corrective maintenance, and problem solving and away from routine preventive maintenance.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

35. Under the new maintenance concept, a large majority of AF personnel will probably work at and out of central maintenance hubs. These will be located at major facilities (such as ARTCCs and major terminals) and large sectors. There will probably be fewer sector field offices, and virtually no manned remote facilities.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

Enter

36. Travel under the new maintenance concept is likely to be less frequent for most maintenance personnel but may be of longer duration when it does occur.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

37. Needed skills under the new maintenance concept will tend to emphasize solid state electronics, digital logic, systematic troubleshooting skills, and computer programing capabilities.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

38. There will probably be an increased requirement for electro-mechanical technicians and they may require a greater knowledge of electronics than is presently the case.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

39. While the career plan for technicians may come to emphasize increasing specialization as one progresses in the AF system, the technician will still require multiple specialties and a greater knowledge of system interfaces. The senior technicians will become system diagnosticians, software specialists, and will be akin to the Technician-In-Depth (TID) of today.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

40. Training under the new maintenance concept will emphasize the use of new educational technology, particularly computer-assisted instruction. This will allow most of the technical theory training to be conducted at the home sector and hands-on training at the FAA Academy.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

41. Under the new maintenance concept, it is very likely that there will be a reduced need for watchstanding.
    This is a good idea that I strongly support 1
    Generally accept with some reservations 2
    Uncertain about this concept 3
    Do not feel this will be a good change, am generally not in favor of it 4
    Not workable — concept should be rejected 5

Enter

42. The implementation plans for the new maintenance concept calls for conversion to solid state and remote maintenance monitoring, and the associated reorganization to be completed by 1989. Which of the following best describes what you see for yourself in this time period?
    - Will have little or no effect on me as am currently at a facility that will change relatively little (for example an ARTCC or major tower) with the new system.....1
    - Will have little or no effect on me as will probably be retired by the time the plan is implemented.....2
    - Will probably mean my relocation to a maintenance hub which I would probably like to do.....3
    - Will probably mean my relocation to a maintenance hub which would probably not matter to me one way or the other.....4
    - Will probably mean my relocation to a maintenance hub which I will probably dislike.....5
    - Will lead me to retire at the time of implementation at my facility.....6
    - Will lead me to resign at the time of implementation.....7

43. With the implementation of the new maintenance concept, emphasis will be placed upon skills with solid state electronics, systems troubleshooting, digital logic equipment, and computers. Which of the following best describes your feelings about this change in the work situation?
    - Will have little or no effect since some or all of these skills are generally required in my present position.....1
    - Will have little or no effect since I will probably be retired by the time these skills are needed.....2
    - Will look forward to obtaining these new skills.....3
    - Does not matter since I can continue with present skills or acquire new ones as necessary.....4
    - Would prefer to work with present skills, would prefer not to have the transition to new system.....5
    - Will probably retire at time of implementation.....6
    - Will probably resign at time of implementation.....7

SHIFT INFORMATION

This part of the questionnaire is concerned with watchstanding (shiftwork) as you *now* experience it. Please indicate what your present and past experience has been with shiftwork. Please do *not* give consideration in this section to any anticipated changes in the shiftwork or watchstanding systems. Be sure to check that your answers start with space 44 on your answer sheet.

Enter

44. What is your present work schedule?
    - Straight days (approximately 6 a.m.-2 p.m., 7 a.m.-3 p.m., 8 a.m.-4 p.m., or 9 a.m.-5 p.m.) 1
    - Straight evenings (approximately 3 p.m.-11 p.m., 4 p.m.-midnight, or 5 p.m.-1 a.m.) 2
    - Straight nights (approximately 11 p.m.-7 a.m. or midnight-8 a.m.) 3
    - Rotating three-shift with at least one shift change within each workweek (e.g., 2 days, 2 evenings, I mid; 3 days, I night, 1 evening) 4
    - Rotating three-shift with a change each workweek (e.g., 5-5-5, 7-5-7) 5
    - Rotating three-shift with a change each month 6
    - Rotating three-shift with changes less frequent than monthly 7
    - Rotating two-shift with at least one change within each workweek 8
    - Rotating two-shift with a change after each workweek 9
    - Other 10

45. How long have you worked on this kind of schedule?
    - Less than 1 year 1
    - 1 year 2
    - 2 years 3
    - 3 years 4
    - 4 years 5
    - 5 years 6
    - Up to 10 years 7
    - Between 10 and 20 years 8
    - More than 20 years 9

46. If you are not now on a rotating schedule, were you ever?
    - Never 1
    - Within the last year 2
    - Up until 1 year ago 3
    - Up until 2 years ago 4
    - Up until 3 years ago 5
    - Up until 4 years ago 6
    - Up until 5 years ago 7
    - More than 5 years ago 8

Enter

47. What is the total number of years since you were first employed full time that you have worked on a rotating shift schedule?
    - Less than 1 year 1
    - 1 year 2
    - 2 years 3
    - 3 years 4
    - 4 years 5
    - 5 years 6
    - Up to 10 years 7
    - Between 10 and 20 years 8
    - More than 20 years 9

48. Using your daytime productivity as a basis for comparison, what is your relative productivity on evening (approximately 4:00 p.m. to midnight) shifts?
    - More than 50% better than day shifts 1
    - 25-50% better than day shifts 2
    - Up to 25% better than day shifts 3
    - No different from day shifts 4
    - Up to 25% worse than day shifts 5
    - 25-50% worse than day shifts 6
    - More than 50% worse than day shifts 7

49. Using your daytime productivity as a basis for comparison, what is your relative productivity on midshifts (approximately midnight to 8: 00 a.m.)?
    - More than 50% better than day shifts 1
    - 25-50% better than day shifts 2
    - Up to 25% better than day shifts 3
    - No different from day shifts 4
    - Up to 25% worse than day shifts 5
    - 25-50% worse than day shifts 6
    - More than 50% worse than day shifts 7

50. When you are ordinarily awakened, do you
    - usually get up immediately 1
    - usually stay in bed for a while 2

51. How difficult is it for you to keep awake mornings (8:00 a.m. to noon)?
    - Often (70% or more of the time) 1
    - Sometimes (30-70% of the time) 2
    - Seldom (less than 30% of the time) 3

52. How difficult is it for you to keep awake afternoons (noon to 6:00 p.m.)?
    - Often (70% or more of the time) 1
    - Sometimes (30-70% of the time) 2
    - Seldom (less than 30% of the time) 3

53. How difficult is it for you to keep awake evenings (6:00 to 10:00 p.m.)?
    - Often (70% or more of the time) 1
    - Sometimes (30-70% of the time) 2
    - Seldom (less than 30% of the time) 3

Enter

54. How difficult is it for you to keep awake late evenings/nights (after 10:00 p.m.)?
    - Often (70% or more of the time) 1
    - Sometimes (30-70% of the time) 2
    - Seldom (less than 30% of the time) 3

55. Overall, what is your most efficient working time?
    - Morning (8:00 a.m. to noon) 1
    - Afternoon (noon to 6:00 p.m.) 2
    - Evening (6:00 p.m. to 10:00 p.m.) 3
    - Late evening/night (after 10:00 p.m.) 4

56. Which of these best describes you?
    - Alert in morning/alert in evening 1
    - Tired in morning/alert in evening 2
    - Alert in morning/tired in evening 3
    - Tired in morning/tired in evening 4

57. How well do you usually sleep after day shifts?
    - Usually my sleep is excellent 1
    - Usually my sleep is satisfactory 2
    - Usually my sleep is not so good 3
    - Usually my sleep is poor 4
    - Do not work day shifts 5

58. How well do you usually sleep after evening shifts?
    - Usually my sleep is excellent 1
    - Usually my sleep is satisfactory 2
    - Usually my sleep is not so good 3
    - Usually my sleep is poor 4
    - Do not work evening shifts 5

59. How well do you usually sleep after midshifts?
    - Usually my sleep is excellent 1
    - Usually my sleep is satisfactory 2
    - Usually my sleep is not so good 3
    - Usually my sleep is poor 4
    - Do not work midshifts 5

60. How often do you have trouble going to sleep after day shifts?
    - Seldom (less than 25% of the time) 1
    - Sometimes (25-50% of the time) 2
    - Often (50-75% of the time) 3
    - Usually (more than 75% of the time) 4
    - Do not work day shifts 5

61. How often do you have trouble going to sleep after evening shifts?
    - Seldom (less than 25% of the time) 1
    - Sometimes (25-50% of the time) 2
    - Often (50-75% of the time) 3
    - Usually (more than 75% of the time) 4
    - Do not work evening shifts 5

Enter

62. How often do you have trouble going to sleep after midshifts?
    - Seldom (less than 25% of the time) 1
    - Sometimes (25-50% of the time) 2
    - Often (50-75% of the time) 3
    - Usually (more than 75% of the time) 4
    - Do not work midshifts 5

63. How often do you have trouble staying asleep after day shifts?
    - Seldom (less than 25% of the time) 1
    - Sometimes (25-50% of the time) 2
    - Often (50-75% of the time) 3
    - Usually (more than 75% of the time) 4
    - Do not work day shifts 5

64. How often do you have trouble staying asleep after evening shifts?
    - Seldom (less than 25% of the time) 1
    - Sometimes (25-50% of the time) 2
    - Often (50-75% of the time) 3
    - Usually (more than 75% of the time) 4
    - Do not work evening shifts 5

65. How often do you have trouble staying asleep after midshifts?
    - Seldom (less than 25% of the time) 1
    - Sometimes (25-50% of the time) 2
    - Often (50-75% of the time) 3
    - Usually (more than 75% of the time) 4
    - Do not work midshifts 5

66. How much sleep do you usually *like* to get each night?
    - 5 or less hours 1
    - 6 hours 2
    - 7 hours 3
    - 8 hours 4
    - 9 hours 5
    - 10 hours or more 6

67. On the average, how much sleep do you *get* after working a day shift?
    - 5 or less hours 1
    - 6 hours 2
    - 7 hours 3
    - 8 hours 4
    - 9 hours 5
    - 10 hours or more 6
    - Do not work day shifts 7

68. On the average, how much sleep do you *get* after working an evening shift?
    - 5 or less hours 1
    - 6 hours 2
    - 7 hours 3
    - 8 hours 4
    - 9 hours 5
    - 10 hours or more 6
    - Do not work evening shifts 7

Enter

69. On the average, how much sleep do you *get* after working a midshift?

5 or less hours	1
6 hours	2
7 hours	3
8 hours	4
9 hours	5
10 hours or more	6
Do not work midshifts	7

A number of statements which people have used to describe themselves are given below. Indicate how you feel right now, that is, at *this moment*. That is, mark the answer that seems to describe your present feelings best.

Enter

70. I feel calm.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

71. I feel secure.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

72. I am tense.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

73. I feel strained.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

74. I feel at ease.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

75. I feel upset.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

76. I am presently worrying over possible misfortunes.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

77. I feel satisfied.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

Enter

78. I feel frightened.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

79. I feel comfortable.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

80. I feel self-confident.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

81. I feel nervous.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

82. I am jittery.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

83. I feel indecisive.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

84. I am relaxed.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

85. I feel content.
    - Not at all 1
    - Somewhat 2
    - Moderately 3
    - Very much so 4

Enter

86. I am worried
- Not at all 1
- Somewhat 2
- Moderately 3
- Very much so 4

87. I feel confused.
- Not at all 1
- Somewhat 2
- Moderately 3
- Very much so 4

Enter

88. I feel steady.
- Not at all 1
- Somewhat 2
- Moderately 3
- Very much so 4

89. I feel pleasant.
- Not at all 1
- Somewhat 2
- Moderately 3
- Very much so 4

Below are some more statements which people have used to describe themselves. This time indicate how you generally feel. That is, mark the answer that seems to best describe how you generally feel.

90. I feel pleasant.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

91. I feel nervous and restless.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

92. I feel satisfied with myself.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

93. I wish I could be as happy as others seem to be.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

94. I feel like a failure.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

95. I feel rested.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

96. I am "calm, cool, and collected."
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

97. I feel that difficulties are piling up so that I cannot overcome them.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

98. I worry too much over something that really doesn't matter.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

99. I am happy.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

100. I have disturbing thoughts.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

101. I lack self-confidence.
- Almost never 1
- Sometimes 2
- Often 3
- Almost always 4

Enter

102. I feel secure.
Almost never 1
Sometimes 2
Often 3
Almost always 4

103. I make decisions easily.
Almost never 1
Sometimes 2
Often 3
Almost always 4

104. I feel inadequate.
Almost never 1
Sometimes 2
Often 3
Almost always 4

105. I am content.
Almost never 1
Sometimes 2
Often 3
Almost always 4

Enter

106. Some unimportant thought runs through my mind and bothers me.
Almost never 1
Sometimes 2
Often 3
Almost always 4

107. I take disappointments so keenly that I can't put them out of my mind.
Almost never 1
Sometimes 2
Often 3
Almost always 4

108. I am a steady person.
Almost never 1
Sometimes 2
Often 3
Almost always 4

109. I get in a state of tension or turmoil as I think over my recent concerns and interests.
Almost never 1
Sometimes 2
Often 3
Almost always 4

GENERAL STATE OF HEALTH

Enter

110. How would you describe your general state of health?
    - Excellent 1
    - Good 2
    - Fair 3
    - Poor 4

111. Have you seen a physician in the past 12 months for any of the following reasons (if seen for more than one reason, check the one that required the most attention)?
    - Routine physical or checkup 1
    - High blood pressure/hypertension 2
    - Upper respiratory infection 3
    - Tension/nerves 4
    - Surgery 5
    - Injury 6
    - Cardiac (heart) problems 7
    - Stomach problems/ulcers 8
    - Other 9
    - Have not seen a physician in the past 12 months 10

112. Are you currently being treated by a physician for any of the following reasons (if being treated for more than one reason, check the one that requires the most attention)?
    - Routine physical or checkup 1
    - High blood pressure/hypertension 2
    - Upper respiratory infection 3
    - Tension/nerves 4
    - Surgery 5
    - Injury 6
    - Cardiac (heart) problems 7
    - Stomach problems/ulcers 8
    - Other 9
    - Not currently being treated 10

113. Have you ever required the attention of a physician for treatment of ulcers?
    - Never required 1
    - Have now 2
    - Have had in the past 3

114. Have you ever required the attention of a physician for treatment of high blood pressure?
    - Never required 1
    - Have now 2
    - Have had in the past 3

115. Have you ever required the attention of a physician for treatment of cardiac problems?
    - Never required 1
    - Have now 2
    - Have had in the past 3

Enter

116. Have you ever required the attention of a physician for treatment of lung problems?
   Never required 1
   Have now 2
   Have had in the past 3

117. Have you ever required the attention of a physician for treatment of upper respiratory infection?
   Never required 1
   Have now 2
   Have had in the past 3

118. Have you ever required the attention of a physician for treatment of tension or nerves?
   Never required 1
   Have now 2
   Have had in the past 3

119. Have you ever required the attention of a physician for treatment of stomach problems?
   Never required 1
   Have now 2
   Have had in the past 3

120. Have you ever required the attention of a physician for treatment of emotional problems?
   Never required 1
   Have now 2
   Have had in the past 3

☆U.S. Government Printing Office : 1983 - 381-428/3116