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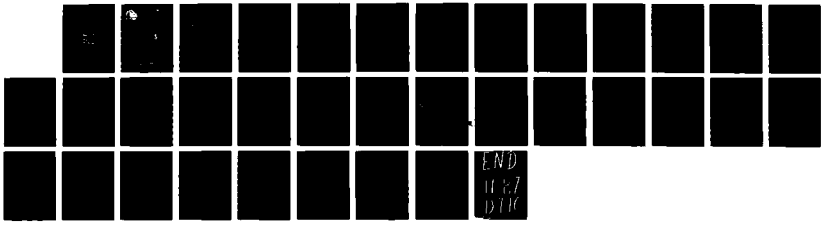

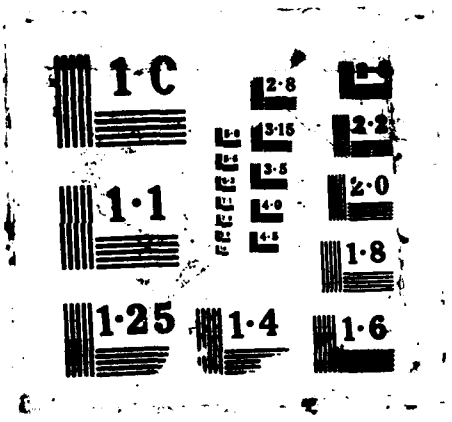
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UNITED STATES AIR FORCE

OCCUPATIONAL SURVEY REPORT

MACHINIST

AFSC 427X0

AFPT 90-427-780

AUGUST 1987

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150-5000

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HQ USAFE/TTGT	1		1	
HQ USMC (CODE TPI)	1			
NODAC	1			
3330 TCHTW/TTGX (Chanute AFB IL)	5	1	4	
3330 TCHTW/TTS (Chanute AFB IL)	1		1	
DET 2, USAFOMC (Chanute AFB IL)	1	1	1	1
USAFOMC/OMYXL	10	2m	5	10
388 TFW/MAT	2		2	
3507 ACS/DPKI	1			

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PREFACE

This report presents the results of a detailed Air Force occupational survey of the Machinist career ladder (AFSC 427X0). This survey was requested by Headquarters Air Training Command Technical Training, Combat Support Training Division/TTOC, and the Training Development Services Division of the USAF Occupational Measurement Center (UASFOMC/OMT) to determine the currency of career ladder documents and to obtain current data to determine training requirements and recommendations. Authority for conducting occupational surveys is contained in AFR 35-2. Computer products upon which this report is based are available for use by operations and training officials.

The survey instrument was developed by Lieutenant George F. Ward, Occupational Analyst, with computer programming support furnished by Ms Rebecca Hernandez. Chief Master Sergeant James T. Duffy, Occupational Analyst, analyzed the survey data and wrote the final report. Administrative support was provided by Ms Anita R. Carter. This report was reviewed by Lieutenant Colonel Thomas E. Ulrich, Chief, Airman Analysis Branch, Occupational Analysis Division, USAF Occupational Measurement Center.

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel. Additional copies are available upon request to the USAF Occupational Measurement Center, Attention: Chief, Occupational Analysis Division (OMY), Randolph AFB, Texas 78150-5000 (AUTOVON 487-6623).

RONALD C. BAKER, Colonel, USAF
Commander
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SUMMARY OF RESULTS

1. Survey Coverage: Of the 944 enlisted members in the 427X0 career ladder, 654 or 69 percent of the total career ladder were in the final survey sample. Eighty-three percent of personnel sampled were assigned to TAC, SAC, MAC, and USAFE.

2. Specialty Jobs: Two major jobs were identified in the analysis of the 427X0 Machinist career ladder. One was comprised primarily of personnel involved in the performance of various technical duties of the career ladder. The other was formed by personnel primarily performing supervisory, managerial, administrative, and training duties.

3. Career Ladder Progression: The 3- and 5-skill level jobs are highly technical, with little or no responsibility for management or supervision. Seven-level personnel, while performing some technical tasks, are clearly the supervisors and managers of the career ladder.

4. AFR 39-1 Specialty Descriptions: The 3-, 5-, and 7-skill level descriptions accurately depict the nature of the respective jobs.

5. Training Analysis: The STS is well supported by survey data. Some tasks not referenced to any STS item require review to see if they need to be included in the STS. The POI is also strongly supported by survey data; however, as in the STS, a series of tasks not referenced to any POI element require review in regard to the need for training and if required, the most appropriate method.

OCCUPATIONAL SURVEY REPORT
MACHINIST CAREER LADDER
(AFSC 427X0)

INTRODUCTION

This is a report of an occupational survey of the Machinist career ladder completed by the Occupational Analysis Division, USAF Occupational Measurement Center, in August 1987. The specialty was last surveyed in August 1979. This report was requested by HQ Air Training Command/TTOC and USAFOMC's Training Development Services Division to determine the currency of career ladder documents and to obtain current data to determine training requirements and recommendations.

Background

As described in the AFR 39-1 specialty description, Machinists are responsible for manufacturing, reworking, assembling, and fitting machined parts, and maintaining hand and machine tools. This includes performing calculations such as determining peripheral cutting speeds and settings for turning special threads.

AFSC 427X0 is a Category "B" AFSC. Fifty percent of the personnel entering this AFSC attend basic resident course C3ABA42730-000 at Det 1, 3340 TCHTG, Aberdeen Proving Ground MD. Course length is 16 weeks. The remaining 50 percent of personnel coming into the 427X0 AFSC receive training through OJT.

SURVEY METHODOLOGY

Inventory Development

The data collection instrument for this survey was USAF Job Inventory AFPT 90-427-780, dated September 1986. A tentative task list was prepared by the inventory developer after reviewing pertinent career ladder publications and directives, tasks from previous survey instruments, and data from the last OSR. To ensure full coverage of the variety of tasks performed by members of the career ladder, critical bases were identified and visited by the inventory developer. This step is important, since visiting bases with similar systems and overlooking bases with unique or different systems may bias the task list and invalidate the results. Those bases and the reason visited are as follow:

Aberdeen Proving Ground MD	Technical School
Carswell AFB TX	SAC Wing
Bergstrom AFB TX	TAC Wing

Also, informal talks were held with personnel from Grand Forks AFB ND, Randolph AFB TX, and Kelly AFB TX. The Air Force Functional Manager, HQ ATC Training Staff Officer, MAJCOM Functional Managers, Classification and Standards, and Assignments personnel for the field were also contacted.

Data Collection

From November 1986 to February 1987, Consolidated Base Personnel Offices at operational units worldwide administered the inventory to personnel holding a DAFSC of 42730, 42750, 42770, and 42790. Participants were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Air Force Human Resources Laboratory (AFHRL).

Each individual who was administered the inventory first completed an identification and biographical information section and then checked each task performed in their current job. The participants then rated the tasks checked on a 9-point scale showing the relative time spent on that task as compared to all other tasks. The time spent ratings are measured on a scale which ranges from 1 (very small amount of time) through 5 (about average amount of time) to 9 (very large amount of time).

Time spent is a relative measure of how much time individuals perceive themselves to spend on each task, as compared to all other tasks checked in the survey. To calculate time spent, all of an incumbent's ratings are assumed to account for 100 percent of his or her time spent on the job. The rating for each task is divided by the sum of all ratings, then multiplied by 100 to provide a basis for comparing tasks in terms of both percent members performing (where a task is checked by an incumbent) and relative time spent (based on the calculations from the 1-9 scale).

Survey Sample

Personnel were selected to participate in this survey to ensure an accurate representation across major commands and paygrade groups. All eligible DAFSC 427X0 personnel were mailed survey booklets. To be eligible for the survey, personnel must have worked in their present job for at least 6 weeks. Those ineligible, and not mailed booklets, include personnel in hospital status, retiring, or being discharged.

Table 1 shows the percentage distribution, by major command, of assigned personnel in the career ladder as of November 1986. Also listed in this table is the percentage distribution, by MAJCOM, of respondents in the final survey. The 654 respondents included in the final sample represent 83 percent of those eligible. Table 2 reflects the paygrade group distribution. As reflected in these tables, the survey sample provides excellent representation of the overall career ladder population.

TABLE 1

COMMAND REPRESENTATION OF 427X0 SURVEY PERSONNEL

COMMAND	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
TAC	29	30
SAC	23	24
MAC	16	16
USAFE	11	12
ATC	8	8
PACAF	6	5
AFSC	4	3
AAC	2	1
OTHERS	1	1

Total Assigned: 944
Total Eligible for Survey: 787
Total in Sample: 654
Percent of Assigned in Sample: 69%
Percent of Eligible in Sample: 83%

TABLE 2

PAYGRADE DISTRIBUTION OF SURVEY SAMPLE

PAYGRADE	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
AIRMAN	31	31
E-4	27	26
E-5	22	23
E-6	11	13
E-7	8	6
E-8	*	*

* Indicates less than 1 percent

Task Factor Administration

In addition to the job inventory, selected senior personnel completed a second booklet which provided separately processed information concerning either task difficulty (TD) or training emphasis (TE) ratings. TD refers to the length of time required for the average job incumbent to learn to do the task. TE refers to the importance of structured training for first-enlistment personnel. Structured training is training provided through any organized training method, such as resident technical school, field training detachments, mobile training teams, or formal OJT.

Task Difficulty (TD). Each individual completing a TD booklet rated each task with which they were familiar. Tasks were rated on a 9-point scale, ranging from 1 (extremely low relative difficulty) to 9 (extremely high relative difficulty). The interrater reliability (as assessed through components of variance of standardized group means) of the TD data provided by 31 senior NCOs was .95, indicating very good agreement among raters. TD ratings were adjusted to give a rating of 5.00 for a task of average difficulty, with a standard deviation of 1.00. Data are then used to rank-order the inventory tasks in terms of relative difficulty.

Training Emphasis (TE). Individuals completing TE booklets were asked to rate all tasks on a 10-point scale, ranging from no training required to extremely heavy training required. TE data were independently collected from 38 experienced 7-skill level personnel stationed worldwide. The interrater reliability (as assessed through components of variance of standard group means) for this group of raters was high (.95), indicating very high agreement among raters as to which tasks required some form of structured training and which did not. As discussed in the TD section above, TE rating data may be used to rank-order tasks which senior NCOs in the field consider the most important for first-term airmen to know.

When used in conjunction with the primary criterion of percent members performing, TD and TE ratings can provide insight into first-term personnel training requirements. Such insight may suggest a need for shortening portions of instruction supporting AFSC entry-level jobs.

SPECIALTY JOBS
(Career Ladder Structure)

An important function of the USAF occupational analysis program is to examine the job structure within a specialty. Based on responses to survey questions, the computer clustering program clusters individuals together based on similarity of tasks performed and the amount of time spent on those tasks. Analysis of the distinct jobs performed within the career ladder and their relationship to each other results in a display of the structure of work in the specialty. This information can be used to understand current utilization of personnel and to identify job satisfaction trends that may impact

management decisions, or to examine such career ladder documents as AFR 39-1 Specialty Descriptions, Specialty Training Standards (STS), or course Plans of Instruction (POI).

Each individual in the survey performs a set of tasks called a JOB. A group of individuals who perform many tasks in common and spend similar amounts of time performing those tasks is called a JOB TYPE. Job types having a substantial degree of similarity are clustered and called a MAJOR JOB GROUP.

Responses from the AFSC 427X0 personnel in the sample survey indicate a career ladder where most people perform a rather large number of common tasks. Based on this similarity of tasks performed and the amount of time spent performing each task, two major job groups were identified in the examination of the Machinist career ladder. These major jobs are described on the following pages. The group (GRP) number shown beside each title is a reference to computer-printed information, and the letter "N" refers to the number of personnel in the group.

I. GENERAL MACHINISTS (GRP024, N=593)

II. SUPERVISORS (GRP021, N=37)

The respondents forming these two groups accounted for 96 percent of the survey sample. Of the remaining 4 percent, most formed groups too small to be identified as a distinct job type in the analysis, and the functions they performed were too dissimilar to be grouped with the other job types.

Group Descriptions

The following narratives describe the major job groups identified in the analysis. Table 3 provides selected background data for these groups. (Additional background and job satisfaction data, together with representative tasks for both groups, are listed in Appendix A.)

I. GENERAL MACHINISTS (GRP024). The 593 airmen forming this major job group (91 percent of the total sample) represent the essence of the job performed by Machinist personnel. Group members perform a rather broad job which covers generalized machinist functions, operating lathes, maintaining machine shop facilities and tools, compiling mathematical calculations, operating milling machines, designing and planning machine work, and operating grinding machines. The job is also highly technical, with 76 percent of their relative job time devoted to performance of tasks pertaining to the various machinist functions or the administrative or supply functions associated with the machinist career ladder. Typical of the 237 average tasks performed are:

TABLE 3

SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

	MACHINIST (GRP024)	SUPERVISORS (GRP021)
NUMBER IN GROUP:	593	37
PERCENT OF SAMPLE:	91%	5%
PERCENT IN CONUS:	75%	70%
DAFSC DISTRIBUTION:		
42730	15%	0%
42750	65%	16%
42770	20%	84%
AVERAGE GRADE:	E-4	E-6
AVERAGE MONTHS IN CAREER FIELD:	60	161
AVERAGE MONTHS IN SERVICE:	76	188
PERCENT IN FIRST ENLISTMENT:	53%	3%
PERCENT SUPERVISING:	25%	65%
AVERAGE NUMBER OF TASKS PERFORMED:	237	160

remove damaged screws or bolts using powered or nonpowered tools
perform straight turning operations with lathes
face and center-drill materials using lathes
select and set speeds and feeds for lathe work
cut threads with hand taps and dies
select lathe cutting tools
select tool holders and lathe attachments
perform drilling operations with drill presses
drill holes using lathes
deburr machined surfaces

Within this group, two variations were identified--Technician Supervisors and Apprentice Machinists. The Technician Supervisors are performing a highly technical job, but indicate spending 22 percent of their time on supervisory functions. Four of the Apprentice Machinists variation (6 total group members) are 3-skill level.

The average paygrade for group members is E-4, with 5 years (60 months) being the Time in Career Field and just under 7 years (76 months) average for Total Active Federal Military Service (TAFMS). The group is dominated by 5-skill level personnel (65 percent) and contains representatives from all of the major commands using 427X0 resources.

II. SUPERVISORS (GRP021). The 37 airmen forming this group indicate they spend 69 percent of their relative job time performing tasks pertaining to general supervisory, managerial, and administrative duties. With an average paygrade of E-6, personnel in this group are the senior group of the sample survey (averaging 15.6 years TAFMS). One variation of branch supervisors was identified in this group. The seven members forming this group indicated performing duties such as Fabrication or Assistant Fabrication Branch Chief, Survival Equipment NCOIC, or Fabrication Branch Quality Assurance Inspector. Examples of the tasks performed are:

inspect personnel for compliance with military standards
inspect manufactured or repaired items
counsel personnel on military-related or personal problems
conduct safety inspections
perform safety inspections of equipment or facilities
conduct shop meetings
write APR

evaluate work completed or in-progress for
compliance with specifications or standards
review maintenance data collection forms
review inventories of supplies or materials

The results of this survey were compared to those of the previous Occupational Survey Report (AFPT 90-427-373), dated August 1979. This analysis can help identify changes in the career ladder due to new missions, changing management policies, new equipment, and other areas and functions of management which might change over time. In the 1987 survey, two major jobs were identified versus three clusters and one independent job type in the 1979 survey. While the actual jobs performed have changed little over time, they are not as distinctly defined in the 1987 survey. For example, Shop Supervisors and Production Machinists were separate clusters in the 1979 survey. In the 1987 survey, these groups are clustered under one major job, Machinists. Also the independent job of Limited Equipment Machinists, those who showed low use of most shop power machines in the 1979 survey, did not group separately in the current survey.

Aside from these minor differences, the overall career ladder is relatively stable, and the present classification structure is well supported by survey data.

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational analysis project. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information can be used to evaluate how well career ladder documents, such as AFR 39-1 Specialty Descriptions and the Specialty Training Standards (STS), reflect what career ladder personnel actually are doing in the field.

A comparison of tasks performed between DAFSCs 42730 and 42750 indicates that, while there are some minor differences, by and large the jobs they perform are essentially the same. Therefore, they will be discussed as a combined group in this report.

The distribution of skill level groups across career ladder jobs is displayed in Table 4, while Table 5 offers another perspective by displaying the relative time spent on each duty across skill level groups. A typical pattern of progression is present, with personnel spending more of their relative time on duties involving supervisory, managerial, and administrative tasks (see Table 5, Duties A, B, C, D, and E) as they move upward from the 5- to the 7-skill level.

TABLE 4

DISTRIBUTION OF DAFSC GROUP MEMBERS ACROSS CAREER LADDER MAJOR GROUPS

JOB GROUP	DAFSC 42730/50 (N=488) NUMBER	PERCENT	DAFSC 42770 (N=165) NUMBER	PERCENT
I. MACHINISTS (N=593)	474	97%	119	72%
II. SUPERVISORS (N=37)	6	1%	31	19%
NOT GROUPED	8	2%	15	9%

TABLE 5

AVERAGE PERCENT TIME SPENT PERFORMING DUTIES BY DAFSC GROUPS

DUTIES	DAFSC 42730/50 (N=488)	DAFSC 42770 (N=165)
A. ORGANIZING AND PLANNING	1	7
B. DIRECTING AND IMPLEMENTING	1	5
C. INSPECTING AND EVALUATING	2	10
D. TRAINING	1	6
E. PERFORMING ADMINISTRATIVE OF SUPPLY FUNCTIONS	3	10
F. DESIGNING AND PLANNING MACHINE WORK	7	7
G. PERFORMING MATHEMATICAL CALCULATIONS	6	5
H. PERFORMING GENERALIZED MACHINIST FUNCTIONS	23	14
I. OPERATING POWER CUTOFF SAWS	4	3
J. OPERATING CONTOUR MACHINES	5	3
K. OPERATING GRINDING MACHINES	7	5
L. OPERATING PRESSES	3	2
M. OPERATING LATHES	15	9
N. OPERATING MILLING MACHINES	10	6
O. OPERATING SHAPERS	1	*
P. MAINTAINING MACHINE SHOP FACILITIES AND TOOLS	10	7

* Less than 1 percent

Skill Level Descriptions

DAFSC 42730/42750. The 488 airmen in the 3- and 5-skill level group (representing 75 percent of the survey sample) perform an average of 222 tasks. Performing a highly technical job, 91 percent of their relative duty time is devoted to tasks covering generalized machinists functions, operating lathes, milling machines, grinding machines, contour machines, power cutoff saws, maintaining machine shop facilities and tools, and designing and planning machine work. The majority of these personnel were found in the Machinists job, with a limited number in the Supervisors job (see Table 4). Representative tasks performed by these airmen are displayed in Table 6.

DAFSC 42770. Representing 25 percent of the survey sample, the 165 airmen in the 7-skill level group perform an average of 235 tasks. Even though there is a rise in supervisory functions (see Table 5, Duties A, B, C, D, and E) from the 5- to the 7-skill level, 61 percent of the group's relative job time is spent performing technical tasks. The technical nature of this group is further highlighted by the fact that 72 percent of the 7-skill level personnel are in the Machinists job (First-Line Supervisors). Table 7 displays representative tasks performed by these 7-skill level airmen, while Table 8 shows tasks which best differentiate between DAFSCs 42730/50 and 42770.

Summary

Career ladder progression is evident, with the jobs being highly technical up through the 7-skill level, although 7-levels do pick-up some supervisory responsibilities.

AFR 39-1 SPECIALTY DESCRIPTIONS

Survey data for the 3-, 5-, and 7-skill level were compared to the AFR 39-1 Specialty Descriptions for the Machinist (AFSC 42730/42750), and Machine Shop Technician (AFSC 42770), dated 1 January 1982. Based on the findings of this OSR, these descriptions appear complete and accurately reflect the range of duties and responsibilities of the career ladder at the time of the occupational survey.

TRAINING ANALYSIS

Occupational survey data are one of the many sources of information which can be used to assist training managers in the development of training programs. Proper use of these data will produce training programs which are more relevant to the needs of personnel working in their first assignments in a career ladder. Factors which may be used in evaluating training include the overall description of the jobs being performed by first-enlistment personnel

TABLE 6

REPRESENTATIVE TASKS PERFORMED BY DAFSC 42730/50 PERSONNEL

TASKS		PERCENT PERFORMING
M383	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	98
M372	FACE AND CENTER-DRILL MATERIALS USING LATHES	97
H253	REMOVE DAMAGED SCREWS OR BOLTS USING POWERED OR NONPOWERED TOOLS	97
M390	SELECT LATHE CUTTING TOOLS	97
H224	CUT THREADS WITH HAND TAPS AND DIES	97
I280	PERFORM STRAIGHT SAWING OPERATIONS	97
M371	DRILL HOLES USING LATHES	97
H240	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	96
H264	REPLACE HELICOILS	96
M388	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	96
M391	SELECT TOOL HOLDERS AND LATHE ATTACHMENTS	96
P473	CLEAN MACHINES	96
H225	DEBURR MACHINED SURFACES	96
M378	PERFORM FILING OPERATIONS ON LATHES	96
H268	REWORK EXTERNAL THREADS WITH HANDTOOLS, SUCH AS THREAD FILES OR DIES	96
H269	REWORK INTERNAL THREADS WITH HANDTOOLS, SUCH AS TAPS OR THREADING TOOLS	96
I285	SELECT SPEEDS AND FEEDS FOR SAWING OPERATIONS	96
N407	CLEAN OR LUBRICATE MILLING MACHINES	95
H256	REMOVE HELICOILS	95
H254	REMOVE DAMAGED STUDS	95

TABLE 7

REPRESENTATIVE TASKS PERFORMED BY DAFSC 42770 PERSONNEL

TASKS		PERCENT PERFORMING
F178	MEASURE PARTS OR HARDWARE	85
C76	INSPECT MANUFACTURED OR REPAIRED ITEMS	84
H232	INSPECT WORKING AREA FOR SAFE WORKING ENVIRONMENT	83
H234	INTERPRET WORKING DRAWINGS	83
C85	WRITE APR	82
M373	INSPECT LATHES FOR SAFETY AND OPERATING CONDITION	82
F167	DETERMINE MACHINING OPERATIONS FOR PARTS	81
B38	COUNSEL PERSONNEL ON MILITARY-RELATED OR PERSONAL PROBLEMS	81
H233	INTERPRET BLUEPRINTS	81
F170	EXAMINE PARTS FOR SERVICEABILITY	80
N409	INSPECT MILLING MACHINE SET UPS FOR SAFE AND RELIABLE OPERATION	80
F175	LOCATE INFORMATION IN TECHNICAL ORDERS, STANDARDS, OR SPECIFICATIONS	79
I277	INSPECT METAL CUTTING SAWS FOR SAFETY AND OPERATING CONDITION	79
C81	PERFORM SAFETY INSPECTIONS OF EQUIPMENT OR FACILITIES	78
F171	INSPECT UNSERVICEABLE PARTS FOR REPAIR OR MANUFACTURE	78
C77	INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS	78
F169	ESTIMATE TIME FOR JOB COMPLETION	78
P479	INSPECT COMPOSITE TOOL KITS (CTK)	77
A24	REVIEW INVENTORIES OF SUPPLIES OR MATERIALS	76
H253	REMOVE DAMAGED SCREWS OR BOLTS USING POWERED OR NONPOWERED TOOLS	76

TABLE 8

TASKS WHICH BEST DIFFERENTIATE DAFSC 42730/50 AND 42770 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING		
	42730/50 PERSONNEL	42770 PERSONNEL	DIFFERENCE
CLEAN MACHINES	96	67	+29
PERFORM STRAIGHT SAWING OPERATIONS	97	70	+27
PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	98	74	+24
REPLACE HELICOILS	96	73	+23
DRILL HOLES USING LATHES	97	75	+22
SELECT LATHE CUTTING TOOLS	97	75	+22
FACE AND CENTER-DRILL MATERIALS USING LATHES	97	76	+21
REMOVE DAMAGED SCREWS OR BOLTS USING POWERED OR NONPOWERED TOOLS	97	76	+21
CUT THREADS WITH HAND TAPS AND DIES	97	77	+20
PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	96	76	+20
WRITE APR	24	82	-58
COUNSEL PERSONNEL ON MILITARY-RELATED OR PERSONAL PROBLEMS	24	80	-56
MAKE ENTRIES ON AF FORMS 623 (ON-THE-JOB TRAINING RECORD)	25	75	-50
ASSIGN PERSONNEL SPECIFIC RESPONSIBILITIES	21	71	-50
INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS	31	77	-46
SUPERVISE MACHINISTS (AFSC 42750)	31	75	-44
CONDUCT SAFETY INSPECTIONS	26	70	-44
REVIEW INVENTORIES OF EQUIPMENT	31	70	-39
PERFORM SAFETY INSPECTIONS OF EQUIPMENT OR FACILITIES	41	78	-37
INSPECT MANUFACTURED OR REPAIRED ITEMS	49	84	-35

and their overall distribution across career ladder jobs, percentages of first-job (1-24 months TAFMS) or first-enlistment (1-48 months TAFMS) members performing specific tasks, and TE and TD ratings (previously explained in the SURVEY METHODOLOGY section).

To assist specifically in the review of the Specialty Training Standard (STS) and the Plans of Instruction (POI), subject-matter experts (SME) from Det 1, 3340 Technical Training Group, Aberdeen Proving Grounds, Maryland, matched job inventory tasks to the appropriate paragraphs and subparagraphs of the STS and POI for Course C3ABA42730-000. It is this task matching upon which comparison to those documents is based. A complete computer listing displaying the percent members performing tasks, TE and TD ratings for each task, along with STS and POI matchings, has been forwarded to the technical school for their use in further detailed reviews of training documents. Summaries of the above-mentioned data and information are given below.

First-Enlistment Personnel

There are 316 members in their first enlistment in this study (1-48 months TAFMS), representing 49 percent of the total survey sample. The job performed by these personnel covers a range of Machinist activities. As displayed in Table 9, approximately 87 percent of their duty time is devoted to technical and administrative task performance. Fifty-three percent of the Machinist job is made up of first-enlistment personnel, while only 3 percent of first-enlistment personnel are in the Supervisor's job. Table 10 displays some of the average 215 tasks performed by the group.

Specialty Training Standard (STS)

A comprehensive review of STS 427X0, dated August 1980, compared STS items to survey data. STS paragraphs and subparagraphs containing general knowledge information or subject-matter knowledge requirements were not addressed. Overall, the STS provides comprehensive coverage of the work performed by personnel in the field.

Some elements of the STS do require review by subject-matter experts and training personnel to ensure retention in the STS. These items do not meet the 20 percent performing requirement, as stipulated in ATCR 52-22. Table 11 displays these five items. Also, there are 59 tasks not matched to any paragraph or subparagraph in the STS that exceeded the 20 percent performing criteria. Training personnel and subject-matter experts should review these tasks for possible inclusion in the STS. Examples of these unmatched tasks are shown in Table 12. A computer-generated listing of tasks not referenced has been forwarded to the technical school for review.

TABLE 9

RELATIVE TIME SPENT ON DUTIES BY
FIRST-ENLISTMENT PERSONNEL

DUTIES	PERCENT TIME SPENT
A. ORGANIZING AND PLANNING	*
B. DIRECTING AND IMPLEMENTING	*
C. INSPECTING AND EVALUATING	*
D. TRAINING	*
E. PERFORMING ADMINISTRATIVE OR SUPPLY FUNCTIONS	3
F. DESIGNING AND PLANNING MACHINE WORK	7
G. PERFORMING MATHEMATICAL CALCULATIONS	6
H. PERFORMING GENERALIZED MACHINIST FUNCTIONS	24
I. OPERATING POWER CUTOFF SAWS	5
J. OPERATING CONTOUR MACHINES	5
K. OPERATING GRINDING MACHINES	7
L. OPERATING PRESSES	3
M. OPERATING LATHES	16
N. OPERATING MILLING MACHINES	11
O. OPERATING SHAPERS	*

* Denotes less than 1 percent

TABLE 10

REPRESENTATIVE TASKS PERFORMED
BY 427X0 FIRST-ENLISTMENT PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=316)
M383	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	98
M390	SELECT LATHE CUTTING TOOLS	98
M372	FACE AND CENTER-DRILL MATERIALS USING LATHES	98
H264	REPLACE HELICOILS	97
H253	REMOVE DAMAGED SCREWS OR BOLTS USING POWERED OR NONPOWERED TOOLS	97
I280	PERFORM STRAIGHT SAWING OPERATIONS	97
H256	REMOVE HELICOILS	97
H269	REWORK INTERNAL THREADS WITH HANDTOOLS, SUCH AS TAPS OR THREADING TOOLS	97
M371	DRILL HOLES USING LATHES	97
H240	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	97
M388	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	97
N407	CLEAN OR LUBRICATE MILLING MACHINES	97
H254	REMOVE DAMAGED STUDS	97
H224	CUT THREADS WITH HAND TAPS AND DIES	96
M391	SELECT TOOL HOLDERS AND LATHE ATTACHMENTS	96
M378	PERFORM FILING OPERATIONS ON LATHES	96
H225	DEBURR MACHINED SURFACES	96
P473	CLEAN MACHINES	96
N438	SELECT SPEEDS AND FEEDS FOR MILLING WORK	95
F178	MEASURE PARTS OR HARDWARE	94
P477	DISPOSE OF SCRAP METAL, CHIPS, OR SHAVINGS	94

TABLE 11

STS PARAGRAPHS THAT DO NOT MEET 20 PERCENT PERFORMING REQUIREMENT

STS PARAGRAPH	PERCENT PERFORMING 1ST JOB	1ST TERM	42750	42770
19B. PLANE VERTICAL SURFACES				
0457 ROUGH OR FINISH VERTICAL SURFACES WITH SHAPERS	16	17	19	10
19D. PLANE SHOULDERS				
0456 ROUGH OR FINISH SHOULDERS OR CORNERS WITH SHAPERS	17	15	16	9
19F. PARTING OPERATION				
0451 PERFORM PARTING OPERATIONS ON SHAPERS	13	12	11	6
20C. INTERNAL GRINDING				
K318 PERFORM INTERNAL GRINDING	18	18	19	18
20L. HONING OPERATIONS				
K320 PERFORM MACHINE HONING	15	18	17	10

TABLE 12

EXAMPLES OF TASKS NOT MATCHED TO THE STS
WITH 20 PERCENT OR MORE PERFORMING

TASKS		TRNG EMPH*	TASK DIFF**	PERCENT PERFORMING
H255	REMOVE FROZEN OR SEIZED PARTS	6.4	5.5	94
H250	REMOVE BUSHINGS	5.8	4.3	94
H261	REPLACE BUSHINGS	5.8	4.2	92
P479	INSPECT COMPOSITE TOOL KITS (CTK)	6.1	4.4	90
H249	REMOVE BEARINGS	5.7	4.4	90
F167	DETERMINE MACHINING OPERATIONS FOR PARTS	5.7	5.6	90
H260	REPLACE BEARINGS	5.9	4.4	84
F170	EXAMINE PARTS FOR SERVICEABILITY	4.1	5.3	79
F169	ESTIMATE TIME FOR JOB COMPLETION	3.8	5.5	78
G182	CALCULATE ALLOWANCES AND TOLERANCES FOR FIT	5.6	5.3	76

* Mean TE = 3.4 Standard Deviation = 2.4
** Mean TD = 5.0 Standard Deviation = 1.0

Plan of Instruction (POI)

Based on the previously mentioned assistance from technical school subject-matter experts in matching tasks to the C3ABA42730-000 POI, a computer product was generated displaying the results of the matching process. Information furnished for consideration includes percent members performing data for first-job and first-enlistment personnel and TE and TD ratings. As in the STS, general knowledge information and subject-matter knowledge requirements were not addressed.

Review of the tasks matched to the POI reveals that all POI blocks and units of instruction are well supported by survey data (based on percentages of first-term personnel performing).

Analysis of the tasks not referenced to the POI objectives revealed a number of unreferenced tasks. Table 13 shows examples of these unreferenced tasks plus the ratings for TE and TD and the percent performing for first-job and first-enlistment personnel. Training specialists should review the "tasks not referenced" listing to see if these and other not referenced tasks need to be included in the POI.

JOB SATISFACTION ANALYSIS

As part of the background section of the survey, job incumbents were asked to respond to several questions indicating how interesting they found their job, their perception on how well their job utilized their talents and training, how satisfied they were with the sense of accomplishment gained from their work, and their intention to reenlist. Answers from these questions may help managers identify areas of concern.

Of the two specialty jobs discussed earlier, incumbents' responses to job satisfaction indicators reveal they are highly satisfied with their jobs and the kind of work they do (see Table 14). Positive responses to these questions by 427X0 personnel in the high 70 and mid-80 percent range, with the exception of reenlistment intentions (mid-60 percent range), are unusually high.

Another view of job satisfaction data is reflected in Table 15, where data for AFSC 427X0 TAFMS groups are displayed, together with data for a comparative sample of mission equipment maintenance career ladders surveyed in 1986. These data can give a relative measure of how the job satisfaction of AFSC 427X0 personnel compares with that of other similar AF specialties. The AFSC 427X0 personnel were higher in all categories when compared to the other mission equipment maintenance career ladders, which include AFSCs 304X4, 309X0, 361X0, 404X0, 411X0A, 411X1A, 431X0C, 431X0D, and 462X0.

Finally, an indication of how job satisfaction perceptions within the career ladder have changed over time is provided in Table 16, where TAFMS group data for 1987 survey respondents is presented along with data from

TABLE 13

EXAMPLES OF COMMON TASKS NOT REFERENCED TO THE 427X0 POI

TASKS		TNG EMPH*	TASK DIFF**	PERCENT PERFORMING 1ST JOB	PERCENT PERFORMING 1ST ENL
H239	PERFORM DRILLING OR REAMING OPERATIONS USING PNEUMATIC DRILL MOTORS	6.0	4.10	71	94
H255	REMOVE FROZEN OR SEIZED PARTS	6.4	5.5	90	94
N427	PERFORM FLYCUTTING OPERATIONS WITH MILLING MACHINES	6.3	4.6	88	93
P479	INSPECT COMPOSITE TOOL KITS (CTK)	6.1	4.4	85	90
H230	INSPECT FOR OR CLEAN WORK AREA OF FOREIGN OBJECT DAMAGE (FOD)	5.9	3.2	90	89
M368	CUT THREADS USING GEOMETRIC HEAD	6.2	4.3	82	88
G216	MEASURE SURFACE NICKS, DENTS, AND SCRATCHES	5.9	4.1	71	83
P483	MAINTAIN CTK	6.3	5.1	68	77
H265	REPLACE INSERTS, OTHER THAN ROSANS OR HELICOILS	5.7	4.4	61	74
F163	DESIGN JIGS OR FIXTURES	3.8	7.2	58	71

* Mean TE = 3.4 Standard Deviation = 2.4
** Mean TD = 5.0 Standard Deviation = 1.0

TABLE 14

JOB SATISFACTION INDICATORS BY SPECIALTY JOB GROUPS
(PERCENT MEMBERS PERFORMING)

	MACHINISTS	SUPERVISORS
EXPRESSED JOB INTEREST		
INTERESTING	83	84
SO-SO	9	11
DULL	7	5
PERCEIVED USE OF TALENTS		
FAIRLY WELL TO PERFECTLY	83	84
LITTLE OR NOT AT ALL	16	16
PERCEIVED USE OF TRAINING		
FAIRLY WELL TO PERFECTLY	80	81
LITTLE OR NOT AT ALL	18	19
SENSE OF JOB ACCOMPLISHMENT		
SATISFIED	75	81
NEUTRAL	11	14
DISSATISFIED	13	5
REENLISTMENT INTENTIONS		
WILL/PROBABLY WILL REENLIST	67	65
WILL NOT/PROBABLY WILL NOT REENLIST	29	8
WILL RETIRE	4	27

TABLE 15

COMPARISON OF JOB SATISFACTION INDICATORS BY TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)*

	1-48 MOS TAFMS		49-96 MOS TAFMS		97+ MOS TAFMS	
	427X0 (N=316)	COMP SAMPLE** (N=3,924)	427X0 (N=90)	COMP SAMPLE** (N=2,613)	427X0 (N=241)	COMP SAMPLE** (N=3,573)
EXPRESSED JOB INTEREST						
INTERESTING	81	64	84	62	83	72
SO-SO	10	21	7	23	10	16
DULL	7	15	8	15	6	11
PERCEIVED UTILIZATION OF TALENTS						
FAIRLY WELL TO PERFECTLY	82	71	79	71	83	80
LITTLE OR NOT AT ALL	18	28	22	28	16	20
PERCEIVED UTILIZATION OF TRAINING						
FAIRLY WELL TO PERFECTLY	81	79	80	77	79	74
LITTLE OR NOT AT ALL	19	19	20	22	21	25
REENLISTMENT INTENTIONS						
WILL/PROBABLY WILL REENLIST	57	55	77	73	75	75
WILL NOT/PROBABLY WILL NOT REENLIST	42	44	20	26	11	10
WILL RETIRE	-	-	2	5	14	15

* Columns may not add to 100 percent due to nonresponse or rounding
** Comparative sample of Mission Equipment Maintenance career ladders surveyed in 1986 (includes AFSCs 304X4, 309X0, 361X0, 404X0, 411X0A, 411X1A, 431X0C, 431X0D, and 462X0)
- Less than 1 percent

TABLE 16

COMPARISON OF CURRENT SURVEY AND 1979 TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)

JOB SATISFACTION INFORMATION	1-48 MONTHS		49-96 MONTHS		97+ MONTHS	
	1987 (N=316)	1979 (N=135)	1987 (N=90)	1979 (N=129)	1987 (N=241)	1979 (N=286)
JOB FAIRLY INTERESTING OR BETTER	81	84	84	84	83	94
TALENTS UTILIZED FAIRLY WELL OR BETTER	82	38	79	69	83	85
TRAINING UTILIZED FAIRLY WELL OR BETTER	81	75	80	66	79	84
FAVORABLY CONSIDERING REENLISTMENT	57	46	77	50	76	68

respondents to the last occupational survey of the career ladder, published in 1979. Only those respondents in the 97+ months TAFMS category indicated they found their job less interesting than those in the 1979 survey. Also, these 97+ months TAFMS respondents found their talents and training slightly less utilized than those in the 1979 survey. In all other categories, the 1987 survey respondents indications were higher than those in the 1979 survey.

IMPLICATIONS

Overall, the career ladder has remained stable, with no major problems surfacing in the areas of jobs, job satisfaction, or training, during the time period between this report and the last survey completed in 1979.

APPENDIX A

SELECTED REPRESENTATIVE TASKS FOR CAREER LADDER STRUCTURE GROUPS

TABLE A1

GROUP ID NUMBER AND TITLE: GRP024 - MACHINISTS

GROUP SIZE: N=593 PERCENT OF SAMPLE: 91

AVERAGE GRADE: E-4 AVERAGE TICF: 60 MONTHS

AVERAGE TAFMS: 76 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS		PERCENT MEMBERS PERFORMING
H253	REMOVE DAMAGED SCREWS OR BOLTS USING POWERED OR NONPOWERED TOOLS	98
M383	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	98
M372	FACE AND CENTER-DRILL MATERIALS USING LATHES	98
M388	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	98
H224	CUT THREADS WITH HAND TAPS AND DIES	98
M390	SELECT LATHE CUTTING TOOLS	98
H268	REWORK EXTERNAL THREADS WITH HANDTOOLS, SUCH AS THREAD FILES OR DIES	98
M347	BORE STRAIGHT HOLES ON LATHES	98
M391	SELECT TOOL HOLDERS AND LATHE ATTACHMENTS	98
H240	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	98
M371	DRILL HOLES USING LATHES	97
H225	DEBURR MACHINES SURFACES	97
H269	REWORK INTERNAL THREADS WITH HANDTOOLS, SUCH AS TAPS OR THREADING TOOLS	97
M378	PERFORM FILING OPERATIONS ON LATHES	97
H264	REPLACE HELICOILS	97
I280	PERFORM STRAIGHT SAWING OPERATIONS	97
H256	REMOVE HELICOILS	97
H223	CUT MATERIALS WITH HAND HACKSAWS	96
H254	REMOVE DAMAGED STUDS	96
I285	SELECT SPEEDS AND FEEDS FOR SAWING OPERATIONS	96
M381	PERFORM PARTING OPERATIONS USING LATHES	96
F178	MEASURE PARTS OR HARDWARE	96
N408	DRILL HOLES WITH MILLING MACHINES	96
H270	ROUGH OR FINISH SURFACES WITH HAND FILES	96
P473	CLEAN MACHINES	96

TABLE A2

GROUP ID NUMBER AND TITLE: GRP021 - SUPERVISORS

GROUP SIZE: N=37 PERCENT OF SAMPLE: 5

AVERAGE GRADE: E-6 AVERAGE TICF: 161 MONTHS

AVERAGE TAFMS: 188 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS		PERCENT MEMBERS PERFORMING
C77	INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS	100
C76	INSPECT MANUFACTURED OR REPAIRED ITEMS	97
B38	COUNSEL PERSONNEL ON MILITARY-RELATED OR PERSONAL PROBLEMS	97
C55	CONDUCT SAFETY INSPECTIONS	92
C81	PERFORM SAFETY INSPECTIONS OF EQUIPMENT OR FACILITIES	92
B36	CONDUCT SHOP MEETINGS	92
C85	WRITE APR	89
C73	EVALUATE WORK COMPLETED OR IN-PROGRESS FOR COMPLIANCE WITH SPECIFICATIONS OR STANDARDS	89
C82	REVIEW MAINTENANCE DATA COLLECTION FORMS	89
A24	REVIEW INVENTORIES OF SUPPLIES OR MATERIALS	89
D109	MAKE ENTRIES ON AF FORMS 623 (ON-THE-JOB TRAINING RECORD)	86
D113	REVIEW TRAINING RECORDS AND AND REQUIREMENTS	86
C70	EVALUATE SAFETY PROGRAMS	84
B34	ASSIGN PERSONNEL SPECIFIC RESPONSIBILITIES	84
C78	INVESTIGATE IN-SHOP ACCIDENTS OR INCIDENTS	84
C75	INDORSE AIRMAN PERFORMANCE REPORTS (APR)	81
C53	ANALYZE WORKLOAD REQUIREMENTS	81
A8	ESTABLISH OR REVIEW WORK PERFORMANCE STANDARDS FOR PERSONNEL	81
B51	SUPERVISE MACHINISTS (AFSC 42750)	81
A17	PLAN OR SCHEDULE SHOP WORKLOAD	81
A25	REVIEW LOCAL POLICY DIRECTIVES, OFFICE INSTRUCTIONS, (OI), OR STANDING OPERATING PROCEDURES (SOP)	81
H232	INSPECT WORKING AREA FOR SAFE WORKING ENVIRONMENT	81
C62	EVALUATE INDIVIDUALS FOR AWARDS, DEMOTION, OR RECLASSIFICATION	81
C74	EVALUATE WORK SCHEDULES	81
A11	ESTABLISH REQUIREMENTS FOR MAINTENANCE OR INSPECTION OF SHOP EQUIPMENT	81

END

11-87

DTIC