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MACHINIST SPECIALTY AFSCS 42730, 42750, 42770, AND 42799.(U)
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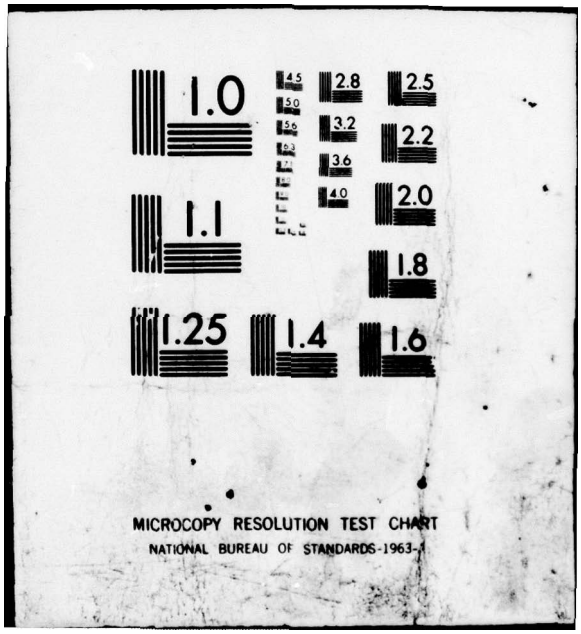
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OCCUPATIONAL SURVEY REPORT

MACHINIST SPECIALTY

AFSCs 42730, 42750, 42770, AND 42799

AFPT 90-427-373

AUGUST 1979

OCCUPATIONAL SURVEY BRANCH
USAF OCCUPATIONAL MEASUREMENT CENTER
RANDOLPH AFB TEXAS 78148

TABLE OF CONTENTS

PREFACE

This report presents the results of a detailed Air Force Occupational Survey of the Machinist Specialty (AFSCs 42730, 42750, 42770, and 42799). The project was directed by USAF Program Technical Training, Volume 2, dated January 1978. Authority for conducting occupational surveys is contained in AFR 35-2.

The survey instrument was developed by Second Lieutenant Robert L. Landry, Inventory Development Specialist. Captain William E. Griffith, Occupational Survey Analyst, analyzed the survey data and wrote the final report. This report has been reviewed and approved by Lieutenant Colonel Jimmy L. Mitchell, Chief, Airmen Career Ladders Analysis Section, Occupational Survey Branch, USAF Occupational Measurement Center, Randolph AFB, Texas, 78148.

The occupational survey program within the Air Force has been in existence since 1956 when initial research was undertaken by the Air Force Human Resources Laboratory to develop the methodology for conducting occupational surveys. By 1967, an operational survey program was established within Air Training Command and surveys were produced annually on 12 enlisted ladders. In 1972, the program was expanded to produce occupational surveys on 51 career ladders annually.

Computer programs for analyzing the occupational data were designed by Dr. Raymond E. Christal, Occupational and Manpower Research Division, Air Force Human Resources Laboratory (AFHRL), and were written by the Project Analysis and Programming Branch, Computational Science Division, AFHRL.

Copies of this report and computer outputs from which this report was produced are available to air staff sections, major commands, and other interested training and management personnel upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Survey Branch (OMY), Randolph AFB, Texas 78148.

This report has been reviewed and is approved.

BILLY C. McMASTER, COL, USAF
Commander
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WALTER E. DRISKILL, Ph.D.
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SUMMARY OF RESULTS

1. Survey Coverage: The Machinist career ladder USAF Job Inventory was administered during the period January through April 1979. The survey results are based on the responses of 557 of the 779 total assigned population, or 72 percent of the total ladder population.

2. Career Ladder Structure: The Machinist career ladder was found to be very homogeneous in terms of tasks performed. Job groups identified included Branch Supervisors, Shop Supervisors, and Production Machinists. The groups were differentiated by the amount of time devoted to supervision and management tasks relative to the amount spent on technical tasks.

3. DAFSC and AFMS Groups: As in most career ladders, job content was found to change as a function of time in service and increase in skill level. Through the fourth enlistment, Machinists performed technically oriented jobs, with performance of supervisory and management tasks increasing as TAFMS time increased. Machinists at the 3- and 5-skill levels performed as technically oriented workers and 7- and 9-skill level Machinists as supervisors.

4. CONUS and Overseas Differences: No major differences in tasks performed were identified. As expected, overseas Machinists averaged slightly more time in the career field and in the DAFSC than CONUS Machinists.

5. Tech School Graduates vs DDA Machinists: First job and first enlistment Machinists who attended course 5ABA42730 and those who were assigned DDA were compared on tasks performed. While little difference was found overall in tasks performed, minor differences were identified. Among Machinists in their first job assignment, those entering DDA performed several tasks rated above average in task difficulty to a greater degree than tech school graduates. However, by the end of the first enlistment, the situation was reversed, with tech school graduates performing 13 very difficult tasks to a greater degree than DDA Machinists.

6. POMO vs NON-POMO: No discernable differences were found in tasks performed based upon whether respondents worked in units operating under the POMO concept or other maintenance concepts.

7. Career Ladder Documents: The specialty descriptions in AFR 39-1 contain statements of responsibility sufficiently broad to include all required tasks performed by 427X0 personnel. The STS 427X0 appeared to be complete in providing general training requirements. There were several tasks performed by a majority of Machinists which were not specifically identified in the STS; these tasks should be examined to determine whether they merit inclusion in the next STS revision.

8. Implications: Survey data indicate that the career ladder has remained relatively stable with little impact as a result of the introduction of the Production Oriented Maintenance Organization (POMO) concept. There is a trend toward more routine tasks, such as removing screws, bolts, or helicoils on the flightline which is an irritant to career field incumbents. Write-in comments suggest that some of these flightline tasks might be performed by personnel in other specialties.

OCCUPATIONAL SURVEY REPORT
MACHINIST SPECIALTY
(AFSCs 42730, 42750, 42770, AND 42799)

INTRODUCTION

This occupational survey report was completed by the Occupational Survey Branch, USAF Occupational Measurement Center during July 1979. The study was initiated at the request of the Technical Training Center at Chanute AFB, Illinois. Their objective in requesting the survey was to update the task description of Machinists since the last occupational survey in 1971, and to examine how the Production Oriented Maintenance Organization (POMO) concept has affected the career ladder.

Machinists perform a variety of metal working functions which include the manufacturing, reworking, assembly, and design of machined parts. The specialty has remained relatively stable over the last eight years, with no major changes in major responsibilities or tasks. In April 1977, the AFSC was changed from 531X0 to its present AFSC, 427X0. Personnel generally enter the career ladder directly from Basic Military Training, with approximately one-quarter attending the basic Machinist course (5ABA42730) at the Aberdeen Proving Grounds in Maryland.

SURVEY METHODOLOGY

Inventory Development

The data for this survey was collected using USAF Job Inventory AFPT 90-427-373, which was developed in part from the 1971 531X0 inventory. The tasks listed in the 1971 survey were reviewed and revised after thorough research of specialty publications and directives. This process yielded a new tentative task list. The inventory developer then conducted personal interviews with 20 subject matter specialists at Bergstrom AFB, Texas; Carswell AFB, Texas; Dover AFB, Delaware; Charleston AFB, South Carolina; and the Aberdeen Proving Grounds in Maryland where the task list was reviewed with these specialists for accuracy and completeness. The result was a final inventory of 433 tasks grouped under 17 duty headings and a background section that included information about the respondents such as grade, TAFMS, duty title, job interest, and equipment used or maintained.

Inventory Administration

During the period January through April 1979, consolidated base personnel offices in operational units worldwide administered the inventory to job incumbents holding duty Air Force Specialty Code (DAFSC) 427X0. Job incumbents were chosen from a computer generated mailing list obtained from USAF personnel data tapes maintained by the Air Force Human Resources Laboratory (AFHRL). Each individual who completed the survey first completed an identification and biographical information section, and then checked each task performed in their current job.

After checking all tasks performed, each incumbent rated each of the tasks on a nine-point scale showing relative time spent on that task as compared to all other tasks checked. The ratings ranged from one (very small amount of time spent) through five (about average time spent) to nine (very large amount of time spent). To determine relative time spent for each task checked by a respondent, all an incumbents ratings are assumed to account for 100 percent of his or her time spent on the job and are summed. Each task rating is then divided by the total task responses and the quotient is multiplied by 100. This procedure provides a basis for comparing tasks in terms of average relative percent time spent and for comparing groups of tasks or jobs.

Survey Sample

Table 1 indicates the percentage distribution, by MAJCOM, of assigned personnel in the career ladder as of February 1979. Also included is the percent distribution, by major command, of respondents in the final survey sample.

Listed in Table 2 is the DAFSC distribution of the survey sample. The 557 machinists included in the final sample represent 72 percent of the total personnel assigned to the career ladder. Table 3 lists the percentage and number of respondents by Total Active Federal Military Service (TAFMS) time. In summary, the MAJCOM, DAFSC, and AFMS distributions indicate that the survey sample was adequate and representative of the 427X0 career ladder as a whole.

TABLE 1

COMMAND REPRESENTATION OF SURVEY SAMPLE

	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
TAC	27%	27%
SAC	23%	24%
MAC	18%	19%
USAFE	13%	12%
ATC	6%	8%
AFSC	4%	4%
PACAF	3%	3%
ADC	3%	3%
AFLC	1%	*
HQ USAF	*	*
AAC	*	*
USAFA	*	*
TOTAL	100%	100%

* INDICATES LESS THAN .5 PERCENT

TABLE 2

DAFSC DISTRIBUTION OF SURVEY SAMPLE

DAFSC	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
42730	8	4
42750	66	59
42770	26	37

* 9-SKILL LEVEL PERSONNEL AND CEMs SUPERVISE WORKERS IN SIX CAREER LADDERS; THEREFORE, SPECIFIC AUTHORIZATIONS ARE NOT AVAILABLE FOR EACH LADDER. FIFTEEN PERCENT OF THE FINAL SAMPLE INCLUDED 13 PERCENT IN DAFSC 42799 AND 2 PERCENT IN CEM CODE 42700.

TABLE 3

AFMS DISTRIBUTION OF SURVEY SAMPLE

AFMS (MONTHS)	PERCENT OF SAMPLE
1-48	24
49-96	23
97-144	15
145-192	13
193-240	13
241+	12

CAREER LADDER STRUCTURE

A key aspect of the USAF occupational analysis program is to examine the structure of career ladders -- what people are actually doing in the field, rather than how official career field documents say they are organized. This analysis is made possible by the Comprehensive Occupational Data Analysis Programs (CODAP). CODAP consists of 40 programs which generate a number of statistical products used in the analysis of career ladders. The primary product used to analyze career ladders is a hierarchical clustering of all jobs based on the similarity of tasks performed and relative time spent. This process permits identification of the major types of work being performed in the occupation (career ladder) and is analyzed in terms of the job description and background data of each type of job. This information is then used to examine the accuracy and completeness of career ladder documents (AFR 39-1 specialty descriptions and specialty training standards) and to formulate an understanding of current utilization patterns.

The basic identifying group used in the hierarchical job structure is the Job Type. A job type is a group of individuals who perform many of the same tasks and spend similar amounts of time performing these tasks. A Cluster is a group of job types which have a substantial degree of similarity. Finally, there are often specialized jobs that are too dissimilar to be grouped into any cluster. These unique groups are labeled Independent Job Types.

Based on task similarity and relative percent time spent, the best division of the jobs performed in the 427X0 career ladder is illustrated in Figure 1. These job clusters and job types are listed below. The GRP number shown beside each title is a reference to computer printed information included for use by classification and training officials.

I. BRANCH SUPERVISORS (GRP007, N=80)

II. SHOP SUPERVISORS (GRP022, N=44)

III. PRODUCTION MACHINISTS (GRP021, N=414)

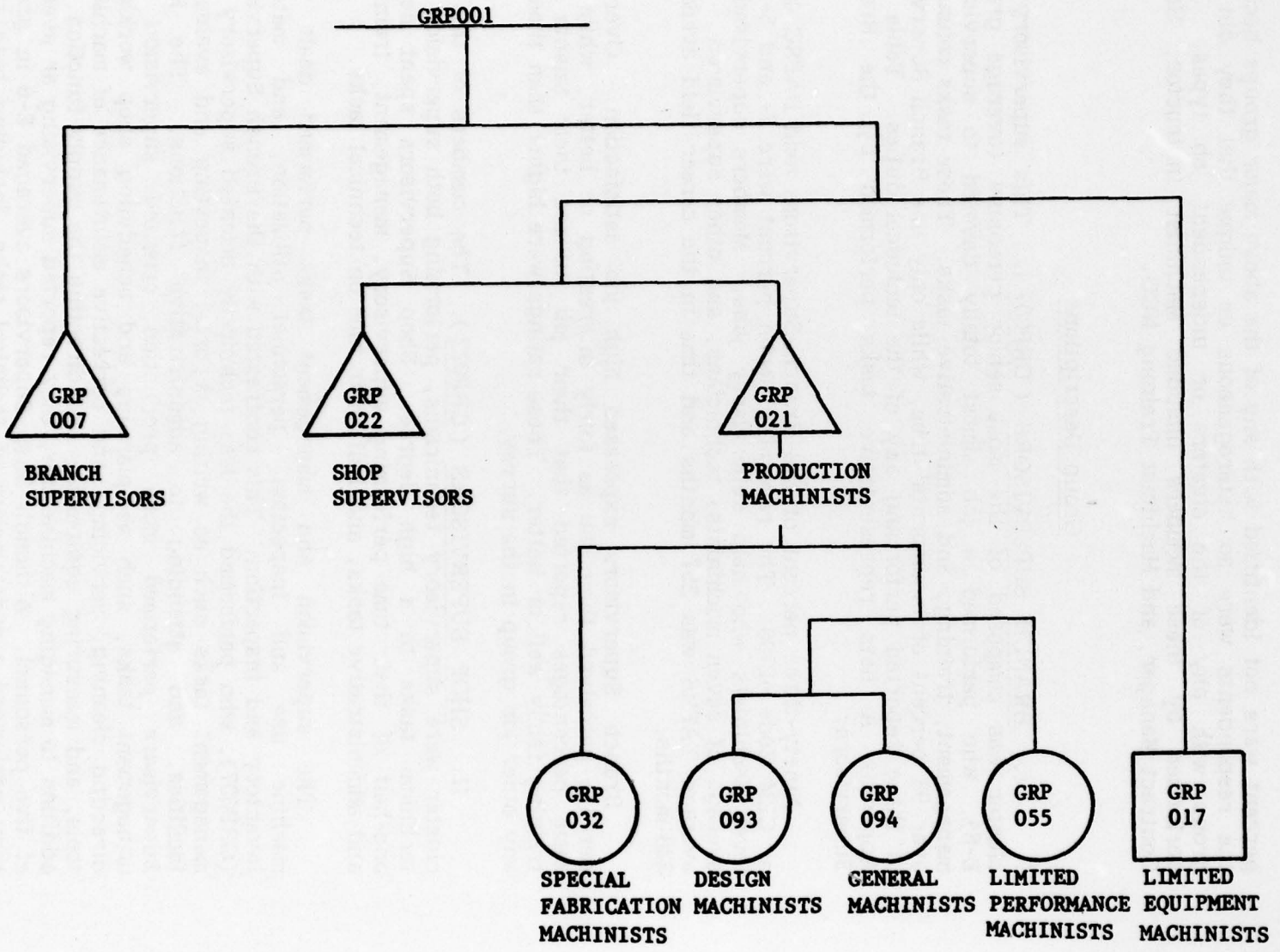
- a. Special Fabrication Machinists (GRP032, N=7)
- b. Design Machinists (GRP093, N=14)
- c. General Machinists (GRP094, N=355)
- d. Limited Performance Machinists (GRP055, N=19)

IV. LIMITED EQUIPMENT MACHINISTS (GRP017, N=7)

Ninety-eight percent of the respondents in the sample were found to perform jobs roughly equivalent to those described in the three clusters and one independent job type listed above. The remaining two

FIGURE 1

MACHINIST CAREER LADDER
AFSC 427X0



percent were not identified with any of the above major groups because the respondents were so heterogeneous or unique that they did not group with any of the clusters or independent job types. Jobs performed by these members included Machinist Instructor, Group Contract Manager, and Machinist Training NCO.

Group Descriptions

I. BRANCH SUPERVISORS (GRP007). This supervisory job cluster was composed of the most senior personnel (average grade, E-8), who performed a job almost totally devoted to supervision, management, training, and administrative tasks. These tasks consumed over 93 percent of incumbents' time, while only one Branch Supervisor in three reported performing any of the technical duties. Table I in Appendix A lists representative tasks performed by the Branch Supervisors.

Ninety-three percent of the Branch Supervisors held DAFSC 42799 or CEM Code 42700. The remaining seven percent were 7- and 5-skill level Machinists who held supervisory jobs. Members supervised an average of seven machinists, technicians, and other supervisors. The average TAFMS was 257 months and time in the career field averaged 228 months.

Branch Supervisors expressed high job satisfaction. Over 95 percent perceived their job as fairly interesting or better, while the same percentages reported that their job utilized their talents and training fairly well or better. These ratings were higher than those of any other job group in the survey.

II. SHOP SUPERVISORS (GRP022). The members of this job cluster were supervisory technicians, performing both supervision and technical tasks to a high degree. Shop Supervisors spent nearly one-half of their time performing supervisory, management, training, and administrative tasks, and half their time on technical tasks.

The supervision and management tasks performed dealt with machine use and inspection, personnel utilization, and materiel inventory and inspection. This contrasted with the Branch Supervisors (GRP007), who performed the less technically oriented supervisory and management tasks such as writing reports, inspecting and evaluating facilities, and attending to administrative functions. The Shop Supervisors performed more production oriented supervision and management tasks, such as planning and scheduling shop workload; directing cleaning, servicing, and corrective maintenance of machines, tools, and measuring equipment; and directing the supply function. In addition to managing machine use, they reported supervising an average of five personnel. Although Shop Supervisors averaged E-6 in grade, they performed a wide variety of technical tasks, including both those commonly performed and those not performed by the Production Machinists (GRP021) they supervised. Tasks performed in common with

the Production Machinists included the full range of benchwork, flightline, and machine operation tasks, such as removing damaged fasteners and inserts, cutting threads, and using machine shop hand and power equipment. Tasks not widely performed by the Production Machinists included inspecting shop equipment for safety and operating condition; drafting and analyzing blueprints, working drawings, and sketches of machined parts; and checking parts for conformance with work specifications. Table II in Appendix A lists representative tasks performed by Shop Supervisors.

Within the Shop Supervisor cluster, two job types were identified, differing only slightly. One job type was composed of supervisors who spent slightly more time on equipment operation tasks, while the second job type spent slightly more time on supervision and management tasks. Beyond this minute differentiation, the job types were too similar to distinguish.

III. PRODUCTION MACHINISTS (GRP021). Members of this job cluster accounted for 74 percent of machinists surveyed. The tasks performed by this group were overwhelmingly technical in nature, with several technical duties consuming large amounts of incumbents' time. Production Machinists, as a cluster, average 16 percent of their time on benchwork, 11 percent on flightline tasks, and 46 percent operating a variety of power tools such as lathes, milling machines, grinders, presses, shapers, and saws.

Four job types were identified within the Production Machinists cluster. The four job types differed in the degree to which flightline machinist tasks, tool and parts design tasks, and custodial tasks were performed.

IIIa. Special Fabrication Machinists (GRP032). This small job type was composed of machinists who fabricated special purpose machined parts. Several group members reported working in training aids construction; fabricating very specialized parts for aircraft simulators and missile procedures trainers. Others reported working in automotive shops, where they fabricated special parts, such as brake parts.

In addition to the specialized design and fabrication tasks, members of this group also performed the common core of machinist tasks. Special Fabrication Machinists were low, however, on performing flightline machinist tasks and removing and replacing damaged screws, bolts, and other fasteners and inserts. Table III in Appendix A shows representative tasks performed by Special Fabrication Machinists.

Special Fabrication Machinists reported high job satisfaction. All rated the job as interesting. Seventy-one percent felt that their talents were well utilized, and 86 percent felt the job utilized their training fairly well or better. Seventy-one percent indicated a desire to reenlist, a figure matched by Design Machinists (GRP093) and exceeded only by Shop Supervisors (GRP022).

IIIb. Design Machinists (GRP093). This group was differentiated from General Machinists (GRP094) by its greater performance of tool, cutter, and parts design tasks, and more frequent use of working drawings, blueprints, and sketches. Further, unlike General Machinists, group members performed no flightline machinist tasks. Design Machinists performed most of the common core machinists' tasks. These tasks included lathework, removing damaged fasteners and inserts in the shop, cutting threads, and operating machine shop equipment. In addition, Design Machinists performed tasks characteristic of design work. They measured parts to determine machining operation; performed materiel layout for machine work; analyzed and interpreted working drawings and blueprints; designed parts, hardware, cutter, jigs, and fixtures; and examined parts for serviceability, repair, and manufacture (see Table IV in Appendix A). These tasks were not unique to Design Machinists; however, fewer General Machinists spent less time performing them.

Major command distribution of Design Machinists also differed from the total sample. Only 21 percent were assigned to either SAC, TAC, or MAC, whereas 70 percent of the total sample were. The commands with the largest representation were AFSC and USAFE, with 29 percent each.

Design Machinists rated their job satisfaction as very high compared to other job groups. Ninety-three percent rated their job as fairly interesting or better, while the same percentage stated that their job utilized their talents and training fairly well or better. These job satisfaction ratings were exceeded only by the Branch Supervisors.

IIIc. General Machinists (GRP094). Comprising 64 percent of all machinists surveyed, this group performed more tasks on the average (248) than any other group. Most tasks performed were technical, with supervision, management, and training tasks accounting for only a small percentage of time. Most of the General Machinists' time was used in performing benchwork, flightline machinist tasks, and in machine operation tasks. For example, removing and replacing damaged screws, bolts, studs, pins, bearings, helicoils, rosans, and frozen or seized parts accounted for a sizable percentage of this groups time (nine percent). A wide variety of lathe related, thread cutting, and machine inspection and cleaning tasks were also performed. Table V in Appendix A illustrates respesentative tasks for General Machinists.

Compared to other machinists within the cluster, General Machinists performed more tasks which are considered difficult. This high task difficulty, combined with the large number of tasks performed, accounted for the General Machinists' job having the highest Job Difficulty Index (JDI) of all groups in the sample (see Table 21). (For a detailed discussion of job difficulty, refer to the section on Job Difficulty Index.)

Within this job type, eight subgroups performing specialized functions were identified. Most were so similar that they did not warrant special mention, however, two groups were different from the others. The first was a group of NCOICs and ANCOICs of the machine shop. Although members of this group performed more supervisory and management tasks than other machinists, technical tasks they performed were so similar to other machinists that could not be clearly differentiated. The second group identified was a small research and development group. Members spent much time on tasks dealing with equipment layout, design, and analysis, but were also heavily involved with machine operation. Because of the high machine use, the research and development personnel were included in the General Machinist group.

IIId. Limited Performance Machinists (GRP055). The performance of simple flightline, custodial, benchwork, and machine operation tasks differentiated this group of junior machinists (average grade, E-4) from other production machinists. Group members performed an average of 111 tasks, spending comparatively more time on tasks dealing with removing damaged screws and inserts, cutting threads, custodial tasks, and simple saw and lathe work. They also operated various shop equipment (see Table VI in Appendix A).

Limited Performance Machinists reported having spent little time in the 427X0 career field. While they reported an average TAFMS time of 53 months, the average time in the career field was 35 months. Job satisfaction indices were low for this job group. Sixty-three percent found their job dull or so-so, while only 37 percent found it interesting. Forty-two percent reported that their job utilized their training and 56 percent felt it utilized their talents (see Table 5).

IV. LIMITED EQUIPMENT MACHINISTS (GRP017). This independent job type was differentiated by its low average number of tasks performed (51), and by its low use of most shop power machines. While group members did use lathes and grinding machines to the same extent as Production Machinists (GRP021), their use of presses, shapers, contour machines, milling machines, and cutoff saws was much lower. Production Machinists spent 24 percent of their time operating these machines, while Limited Equipment Machinists devoted only eight percent to their operation. Group members devoted 32 percent of their time to benchwork, which involves the extensive use of hand tools.

The high involvement with hand tools and low use of most power machines was reflected in the tasks which were most time consuming. Incumbents spent much of their time removing and replacing damaged fasteners and inserts, reworking and cutting threads with hand tools and lathes, and operating hand-held tools and power equipment (see Table VII in Appendix A).

This small group performed very few difficult tasks and reported little job satisfaction. Forty-three percent of the group perceived their job as dull while the same percentage stated that the job did not utilize

their talents. Seventy-one percent reported that their job did not utilize their training (see Table 5).

Summary

The career ladder as it emerged in this study, indicated a very homogeneous specialty. Almost 75 percent of the respondents were identified in one cluster, the Production Machinists. The Shop Supervisors, for the most part 7-skill level technicians, performed many technical machinist tasks in addition to supervising and managing. Only the Branch Supervisors were sharply differentiated, due to their performance of few technical tasks, their job focusing primarily on the management and supervision of the technical work of others.

TABLE 4

SELECTED BACKGROUND DATA ON CAREER LADDER FUNCTIONAL GROUPS

	BRANCH SUPERVISORS	SHOP SUPERVISORS	SPECIAL FABRICATION MACHINISTS	DESIGN MACHINISTS	GENERAL MACHINISTS	LIMITED PERFORMANCE MACHINISTS	LIMITED EQUIPMENT MACHINISTS
NUMBER IN GROUP	80	44	7	14	355	19	7
PERCENT OF SAMPLE	14	8	1	3	64	3	1
DAFSC DISTRIBUTION							
42730	0%	0%	14%	0%	3%	11%	14%
42750	1%	9%	57%	71%	63%	89%	57%
42770	6%	75%	29%	29%	33%	0%	29%
42799	80%	14%	0%	0%	1%	0%	0%
NOT INDICATED	13%	2%	-	-	-	-	-
AVERAGE GRADE	7.7	6.3	4.0	4.6	4.5	3.6	3.4
AVERAGE TIME IN CAREER FIELD (MONTHS)	228	154	79	74	75	35	36
AVERAGE TIME IN SERVICE (MONTHS)	257	188	87	89	93	53	38
AVERAGE NUMBER OF PERSONS SUPERVISED	7.0	5.0	.2	.2	1.2	.7	.0
AVERAGE NUMBER OF TASKS PERFORMED	69	195	104	173	248	111	51
JOB DIFFICULTY INDEX	9.91	13.80	8.18	12.03	14.64	6.43	2.35

TABLE 5

COMPARISON OF JOB SATISFACTION INDICES BY CAREER LADDER FUNCTIONAL GROUPS
(PERCENT MEMBERS)

	BRANCH SUPERVISORS GRP007 (N=80)	SHOP SUPERVISORS GRP022 (N=44)	SPECIAL FABRICATION MACHINISTS GRP032 (N=7)	DESIGN MACHINISTS GRP093 (N=14)	GENERAL MACHINISTS GRP094 (N=355)	LIMITED PERFORMANCE MACHINISTS GRP055 (N=19)	LIMITED EQUIPMENT MACHINISTS GRP017 (N=7)
JOB INTEREST:							
DULL	1	7	-	7	11	42	43
SO-SO	3	20	-	-	16	21	-
INTERESTING	95	73	100	93	73	37	57
NOT REPORTED	1	-	-	-	-	-	-
JOB UTILIZES TALENTS:							
VERY LITTLE OR NOT AT ALL	5	16	29	7	25	42	43
FAIRLY WELL OR BETTER	95	84	71	93	75	58	57
JOB UTILIZES TRAINING:							
VERY LITTLE OR NOT AT ALL	3	14	14	7	24	58	71
FAIRLY WELL OR BETTER	97	86	86	93	75	42	29
NOT REPORTED	-	-	-	-	1	-	-
PLAN TO REENLIST:							
NO OR PROBABLY NO	50	23	29	29	44	79	57
YES OR PROBABLY YES	49	77	71	71	55	21	43
NOT REPORTED	1	-	-	-	1	-	-

ANALYSIS OF DAFSC GROUPS

In conjunction with identifying the job structure in the career ladder, differences in tasks performed as a function of skill level are identified. The skill level comparison is useful in determining the accuracy of the career ladder documents (AFR 39-1 and the Specialty Training Standard (STS)) in terms of reflecting what personnel are actually doing on the job.

Table 6 reflects the relative percent time spent by skill level groups on each duty. As in most career ladders, performance of supervision, management, and training tasks increased as skill level increased. Conversely, technical task performance decreased as skill level increased. The technical duties included designing and planning machine work and performing mathematical calculations (Duties F and G); performing benchwork, machinist flightline work, and maintaining machine shop facilities and tools (Duties H, I, and Q); and operating power cutoff saws, contour machines, grinding machines, presses, lathes, milling machines, and shapers (Duties J, K, L, M, N, O, and P).

DAFSC 42730. Apprentice Machinists (3-skill level) spent nearly all their time (98 percent) performing technical tasks. For example, Apprentice Machinists reported spending 20 percent of their time operating lathes. Lathework included drilling holes with lathes, performing straight turning operations, and selecting lathe cutting tools, feeds, and speeds. Group members also reported spending 17 percent of their time on benchwork tasks, such as drilling holes with drill presses, cutting and reworking threads with hand tools, and removing and replacing damaged screws, bolts, and inserts.

Although technical in nature, the tasks most performed by Apprentice Machinists were rated less difficult than tasks most performed by higher skill level machinists. An apparent contradiction was noticed, however, when the tasks that most differentiate 3-skill level personnel from 5-skill level machinists were analyzed. As Table 7 illustrates, higher percentages of Apprentice Machinists were performing several tasks that were rated very difficult by senior technicians. (For a discussion of task difficulty, refer to the ANALYSIS OF TASK DIFFICULTY section in this report.)

Apprentice Machinists were identified primarily in one job group, with over 88 percent being identified in the Production Machinist cluster (GRP021).

DAFSC 42750. While half the 5-skill level Machinists reported performing some supervision and management tasks, their job was still primarily technical. Ninety-three percent of their time was spent on technical tasks, with respondents performing benchwork and lathe related tasks to the same extent as Apprentice Machinists. However, 5-skill level personnel reported spending more time on flightline tasks

than did apprentices. Table 11 indicates tasks frequently performed by 42750 personnel. These tasks included removing and replacing damaged parts on the line, working with various hand tools on the line, and inspecting for and cleaning the flightline area of Foreign Objects Damage (FOD).

Five-skill level respondents were identified primarily in the Production Machinist cluster (GRP021). Some 5-skill level individuals were identified in the Shop Supervisor cluster (GRP022), where they comprised nine percent of that group.

DAFSC 42770. Although Machine Shop Technicians reported performing both supervisory and technical tasks, their job was still predominantly technical. Like Machinists and Apprentice Machinists, technicians reported performing benchwork, lathe operation, and machinists flightline tasks. However, of the three lower skill levels, technicians performed more tasks that were rated high in difficulty. These tasks included analyzing and interpreting blueprints and working drawings, inspecting unserviceable parts for repair or manufacture, and inspecting machines for safety and operating condition. Table 8 shows the tasks that best differentiate between 7- and 5-skill level machinists.

Technicians reported spending only 20 percent of their time on supervision, management, and training tasks. While this percentage differentiated them sharply from the two lower skill levels, it is an unusually low figure for 7-skill level personnel. The relatively low percentage of time spent on nontechnical tasks indicates that Machinists in DAFSC 42770 performed primarily as technicians and less frequently as supervisors. Table 12 lists representative tasks for Machine Shop Technicians.

The technicians were identified primarily in two functional job groups. Almost two-thirds of them were identified in the General Machinist job type (GRP094). There, most were identified as NCOICs of the machine shop. A second more homogeneous group was found in the Shop Supervisor cluster (GRP022).

DAFSC 42799. As in most career fields, 9-skill level incumbents reported performing primarily nontechnical tasks. Virtually all Fabrication Superintendents reported performing supervisory, management, and training tasks, spending 78 percent of their time on them. Administrative and supply tasks, such as preparing and maintaining files, plans, requests, and rosters consumed another 12 percent of their time. Performance of technical tasks was very limited. Those technical tasks performed dealt heavily with inspecting various equipment and working areas and analyzing blueprints, working drawings, and failed parts.

Common nontechnical tasks performed by group members included writing and reviewing correspondence, reports, and APRs; counseling personnel; conducting and participating in staff meetings; inspecting

facilities and evaluating problem areas; and assigning personnel specific responsibilities and duty positions. Table 13 lists representative tasks for 9-skill level personnel.

Machinists in DAFSC 42799 were found almost exclusively in the Branch Supervisor job cluster (GRP007). They were identified by a variety of duty titles including Fabrication Branch Chief or NCOIC, Accessory Maintenance Branch Superintendent, and NCOIC of Structural Repair. A small number of 42799 personnel were found in the Shop Supervisor cluster (GRP022). In this cluster, they were identified as NCOICs of Fabrication Branch and NCOICs of the Machine Shop.

Summary

As machinists progressed through the skill levels from apprentice to superintendent, the nature of the job performed changed. Apprentice Machinists performed simple technical tasks, while 5-skill level machinists performed a wider range of both simple and more difficult tasks. Machine Shop Technicians performed a job that was a hybrid of supervision and management tasks and the more difficult technical tasks. Finally, as in most career ladders, the 9-skill level personnel performed first as supervisors and managers and then as machinists.

TABLE 6

PERCENT TIME SPENT PERFORMING DUTIES BY DAFSC GROUPS

DUTIES	TOTAL (N=557)	DAFSC 42730 (N=17)	DAFSC 42750 (N=278)	DAFSC 42770 (N=177)	DAFSC 42799 (N=73)
A PLANNING AND ORGANIZING	5	*	1	5	20
B DIRECTING AND IMPLEMENTING	6	1	2	7	18
C EVALUATING	8	*	1	6	34
D TRAINING	2	*	1	3	6
E PERFORMING ADMINISTRATIVE OR SUPPLY FUNCTIONS	4	*	1	4	12
F DESIGNING AND PLANNING MACHINE WORK	5	5	5	7	2
G PERFORMING MATHEMATICAL CALCULATIONS	5	8	5	5	1
H PERFORMING BENCH WORK	13	17	17	13	2
I PERFORMING MACHINIST FLIGHTLINE WORK	9	8	12	8	1
J OPERATING POWER CUTOFF SAWS	3	4	4	3	*
K OPERATING CONTOUR MACHINES	5	7	6	4	*
L OPERATING GRINDING MACHINES	5	6	7	5	*
M OPERATING PRESSES	2	2	3	2	*
N OPERATING LATHES	12	20	15	12	1
O OPERATING MILLING MACHINES	8	11	9	8	1
P OPERATING SHAPERS	2	2	3	2	*
Q MAINTAINING MACHINE SHOP FACILITIES AND TOOLS	6	8	8	6	1
TOTAL	100	100	100	100	100

* INDICATES LESS THAN .5 PERCENT

TABLE 7

TASKS WHICH BEST DIFFERENTIATE BETWEEN 3- AND 5-SKILL LEVEL MACHINISTS
(PERCENT MEMBERS PERFORMING)

TASKS		DAFSC 42730 (N=17)	DAFSC 42750 (N=278)	DIFFERENCE
Q433	SCRAPE OR PAINT MACHINES	41	78	-37
N334	PERFORM EXTERNAL TAPER TURNING USING TAPER ATTACHMENTS	47	79	-32
N333	PERFORM EXTERNAL TAPER TURNING USING TAILSTOCK OFFSET	35	65	-30
0378	PERFORM FLYCUTTING OPERATIONS WITH MILLING MACHINES	59	88	-29
P402	ROUGH OR FINISH HORIZONTAL SURFACES WITH SHAPERS	41	69	-28
P407	SELECT AND SET SPEEDS AND FEEDS OF SHAPERS	41	68	-27
I224	REAM HOLES WITH HAND REAMER ON LINE	47	73	-26
P400	INSPECT SHAPER SET UPS FOR SAFE AND RELIABLE OPERATION	41	67	-26
H201	REMOVE OR REPLACE DAMAGED PLUGS SUCH AS DRAIN PLUGS OR SPARK PLUGS IN SHOP	53	79	-26
I232	REMOVE OR REPLACE HELICOILS ON LINE	65	90	-25
N339	PERFORM TAPER BORING USING TAPER ATTACHMENTS	41	65	-24
P406	ROUGH OR FINISH VERTICAL SURFACES WITH SHAPERS	29	53	-24
I222	PERFORM DRILLING OR REAMING OPERATIONS USING PNEUMATIC DRILL MOTORS	65	88	-23
Q424	PAINT FACILITIES	59	81	-22
P398	CLEAN OR LUBRICATE SHAPERS	53	75	-22
G149	CALCULATE COMPOUND INDEXING	76	50	+26
N309	CUT EXTERNAL METRIC THREADS WITH LATHES USING SINGLE POINT CUTTING TOOLS	47	25	+22
G175	MAKE TRIGONOMETRIC CALCULATIONS OTHER THAN FOR GEAR BLANK VALUES	47	25	+22
L281	PERFORM MACHINE HONING AND LAPPING OPERATIONS	47	25	+22

TABLE 8

TASKS WHICH BEST DIFFERENTIATE BETWEEN 5- AND 7-SKILL LEVEL MACHINISTS
(PERCENT MEMBERS PERFORMING)

TASKS		DAFSC 42750 (N=278)	DAFSC 42770 (N=177)	DIFFERENCE
C68	PREPARE AIRMEN PERFORMANCE REPORTS (APR)	26	80	-54
C53	COUNSEL PERSONNEL ON MILITARY RELATED PROBLEMS	21	73	-52
B51	SUPERVISE MACHINISTS (AFSC 42750)	26	77	-51
B28	ASSIGN PERSONNEL SPECIFIC RESPONSIBILITIES	28	77	-49
B30	CONDUCT SHOP MEETINGS	19	67	-48
C55	DETERMINE ACTION ON TECHNICAL PROBLEMS IN USE OR MAINTENANCE OF HAND TOOLS OR PRECISION MEASURING DEVICES	26	73	-47
A26	SCHEDULE LEAVES OR PASSES	13	60	-47
A15	PLAN OR SCHEDULE SHOP WORKLOAD	27	74	-47
G433	SCRAPE OR PAINT MACHINES	78	56	+22
L274	CUT OFF MATERIALS WITH GRINDING MACHINES	50	30	+20
L278	PERFORM FACE GRINDING OPERATIONS	64	45	+19
P398	CLEAN OR LUBRICATE SHAPERS	75	56	+19
I242	WORK MATERIALS WITH PUNCHES OR HAMMERS ON LINE	86	68	+18
Q424	PAINT FACILITIES	81	64	+17
N340	REAM STRAIGHT OR TAPERED HOLES WITH LATHES	90	73	+17
L282	PERFORM STRAIGHT GRINDING OPERATIONS	71	55	+16

TABLE 9

TASKS WHICH BEST DIFFERENTIATE BETWEEN 7- AND 9-SKILL LEVEL MACHINISTS
(PERCENT MEMBERS PERFORMING)

TASKS		DAFSC 42770 (N=177)	DAFSC 42799 (N=73)	DIFFERENCE
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	85	7	+78
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	85	7	+78
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	87	10	+77
H199	REMOVE OR REPLACE BEARINGS IN SHOP	84	7	+77
N344	SELECT LATHE CUTTING TOOLS	85	8	+77
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	86	10	+76
H207	REWORK EXTERNAL THREADS WITH HAND TOOLS SUCH AS THREAD FILES OR DIES IN SHOP	86	10	+76
N304	BORE STRAIGHT HOLES WITH LATHES	83	7	+76
C73	REVIEW OR INDORSE APRs	41	97	-56
B48	SUPERVISE AFSCs OTHER THAN 427X0	16	70	-54
B31	CONDUCT STAFF MEETINGS	11	64	-53
C71	REVIEW MANPOWER OR PERSONNEL CHANGE REQUESTS	26	78	-52
A12	PARTICIPATE IN STAFF MEETINGS	43	95	-52
C76	REVIEW UNSATISFACTORY REPORTS (UR) OR PRODUCT IMPROVEMENT PROGRAMS (PIP)	23	71	-48
A1	DETERMINE LONG RANGE BUDGETING OR FINANCIAL REQUIREMENTS	23	70	-47
A13	PLAN INSPECTION OF FACILITIES	23	69	-46

TABLE 10

REPRESENTATIVE TASKS FOR MACHINISTS IN DAFSC 42730

TASKS		PERCENT OF DAFSC MEMBERS PERFORMING
N326	DRILL HOLES WITH LATHES	100
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	100
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	100
N344	SELECT LATHE CUTTING TOOLS	100
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	100
N337	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	94
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	94
N304	BORE STRAIGHT HOLES WITH LATHES	94
G166	CALCULATE ROUGHING AND FINISHING DEPTH OF CUTS	94
K257	PERFORM EXTERNAL SAWING FOR CONTOUR MACHINE OPERATIONS	94
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	94
N323	CUT THREADS USING GEOMETRIC HEAD	94
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	94
0361	CLEAN OR LUBRICATE MILLING MACHINES	94

TABLE 11

REPRESENTATIVE TASKS FOR MACHINISTS IN DAFSC 42750

TASK		PERCENT OF DAFSC MEMBERS PERFORMING
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	97
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	96
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	96
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	96
N304	BORE STRAIGHT HOLES WITH LATHES	96
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	96
H203	REMOVE OR REPLACE HELICOILS IN SHOP	95
N344	SELECT LATHE CUTTING TOOLS	95
N326	DRILL HOLES WITH LATHES	95
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	95
H202	REMOVE OR REPLACE DAMAGED STUDS IN SHOP	95
H207	REWORK EXTERNAL THREADS WITH HAND TOOLS SUCH AS THREAD FILES OR DIES IN SHOP	95
N345	SELECT TOOL HOLDERS AND LATHE ATTCHMENTS	94
N337	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	94
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	94

TABLE 12

REPRESENTATIVE TASKS FOR MACHINISTS IN DAFSC 42770

TASKS		PERCENT OF DAFSC MEMBERS PERFORMING
H177	ANALYZE AND INTERPRET WORKING DRAWINGS	92
F133	INSPECT UNSERVICEABLE PARTS FOR REPAIR OR MANUFACTURE	90
H188	INSPECT WORKING AREA FOR SAFE WORKING ENVIRONMENT IN SHOP	90
H176	ANALYZE AND INTERPRET BLUEPRINTS	90
F136	LOCATE INFORMATION IN MACHINIST'S HANDBOOKS	89
N328	INSPECT LATHES FOR SAFETY AND OPERATING CONDITION	89
F132	EXAMINE PARTS FOR SERVICEABILITY	88
F131	ESTIMATE TIME FOR JOB COMPLETION	87
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	87
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	86
H207	REWORK EXTERNAL THREADS WITH HAND TOOLS SUCH AS THREAD FILES OR DIES IN SHOP	86
H203	REMOVE OR REPLACE HELICOILS IN SHOP	86
H208	REWORK INTERNAL THREADS WITH HAND TOOLS SUCH AS TAPS OR THREADING TOOLS IN SHOP	86
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	85
N344	SELECT CUTTING TOOLS	85

TABLE 13

REPRESENTATIVE TASKS FOR FABRICATING SUPERINTENDENTS
(DAFSC 42799)

TASKS		PERCENT OF DAFSC MEMBERS PERFORMING
C73	REVIEW OR INDORSE APRs	97
C53	COUNSEL PERSONNEL ON MILITARY RELATED PROBLEMS	97
C54	COUNSEL PERSONNEL ON PERSONAL PROBLEMS	97
C68	PREPARE AIRMEN PERFORMANCE REPORTS (APR)	96
C70	REVIEW CORRESPONDENCE OR REPORTS	95
A12	PARTICIPATE IN STAFF MEETINGS	95
C65	INSPECT FACILITIES, EQUIPMENT UTILIZATION, OR HOUSEKEEPING	89
C72	REVIEW OR FOLLOW UP INSPECTION REPORTS	89
C59	EVALUATE OR TAKE CORRECTIVE ACTION ON PERSONNEL AND MANNING PROBLEMS	86
C57	EVALUATE OR TAKE CORRECTIVE ACTION ON ADMINISTRATIVE PROBLEMS	86
B29	ASSIGN PERSONNEL TO DUTY POSITIONS	86
C56	EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, OR RECLASSIFICATION	86
A26	SCHEDULE LEAVES OR PASSES	86
A22	REVIEW LOCAL POLICY DIRECTIVES, OFFICE INSTRUCTIONS (OI), OR STANDING OPERATING PROCEDURES (SOP)	85
E125	WRITE CORRESPONDENCE OR REPORTS	82

ANALYSIS OF AFMS GROUPS

Tasks performed by the various AFMS groups were analyzed to determine changes in job content based on length of service. As in most career ladders, as the length of service increased for Machinists, performance of supervision, management, and training tasks increased, and technical tasks performance decreased (see Table 14). Through the fourth enlistment (145-192 months), the job remained basically technical in nature. At the fifth enlistment (192-240 months) a shift occurred, when time spent on supervision and management tasks increased, consuming 40 percent of incumbents' time. Respondents in their sixth enlistment (241+ months), performed more as supervisors and managers and less as technicians, with 84 percent of their time devoted to nontechnical tasks.

First Job Assignment (1-24 Months)

Airmen in their first job assignment (1-24 months TAFMS) performed a wide variety of technical machinist tasks, ranging from benchwork to flightline tasks. Many of the tasks performed by first job machinists were rated low in difficulty when compared to other tasks. These less difficult tasks included simple lathe operation tasks; screw, bolt, helicoil, and other insert removal; and several custodial tasks. Table 15 identifies common tasks performed by first job airmen.

First job airmen also reported using a wide variety of power equipment and hand tools. Members reported devoting an above average amount of time to the operation of bench grinders, band cutoff saws, engine lathes, and power-fed and hand-fed drill presses. Above average usage of micrometers (outside diameter), machinist scribers, machinist rules, and vernier and outside diameter calipers was also reported.

Airmen in their first job were identified almost exclusively in the Production Machinist cluster (GRP021), serving, in most cases, in Fabrication Branches, Accessory Maintenance Branches, and Field Maintenance Squadrons.

TABLE 14

PERCENT TIME SPENT PERFORMING DUTIES BY AFMS GROUPS

DUTY	1-48 MOS	49-96 MOS	97-144 MOS	145-192 MOS	193-240 MOS	241+ MOS
A PLANNING AND ORGANIZING	1	1	2	6	10	19
B DIRECTING AND IMPLEMENTING	1	2	5	8	11	17
C EVALUATING	1	1	4	9	15	31
D TRAINING	*	1	2	5	4	5
E PERFORMING ADMINISTRATIVE OR SUPPLY FUNCTIONS	1	1	2	5	7	11
F DESIGNING AND PLANNING MACHINE WORK	5	5	6	7	5	3
G PERFORMING MATHEMATICAL CALCULATIONS	5	5	5	5	4	1
H PERFORMING BENCH WORK	17	17	15	12	9	4
I PERFORMING MACHINIST FLIGHTLINE WORK	13	12	10	7	5	2
J OPERATING POWER CUTOFF SAWS	4	4	3	2	2	*
K OPERATING CONTOUR MACHINES	6	6	5	4	3	1
L OPERATING GRINDING MACHINES	7	7	6	4	3	1
M OPERATING PRESSES	2	3	2	2	1	1
N OPERATING LATHES	17	16	15	10	9	2
O OPERATING MILLING MACHINES	10	10	9	6	6	1
P OPERATING SHAPERS	3	3	2	2	1	*
Q MAINTAINING MACHINE SHOP FACILITIES AND TOOLS	7	8	7	6	5	1
TOTAL	100	100	100	100	100	100

* INDICATES LESS THAN .5 PERCENT TIME SPENT

TABLE 15

REPRESENTATIVE TASKS FOR FIRST JOB MACHINISTS
(1-24 MONTHS TAFMS)

TASKS		PERCENT MEMBERS PERFORMING
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	100
N326	DRILL HOLES WITH LATHES	100
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	100
N344	SELECT LATHE CUTTING TOOLS	98
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	98
N304	BORE STRAIGHT HOLES WITH LATHES	98
H195	REAM HOLES WITH HAND REAMERS IN SHOP	98
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	96
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	96
I225	REMOVE DAMAGED SCREWS OR BOLTS ON LINE	94
N337	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	94
J246	PERFORM STRAIGHT SAWING OPERATIONS	94
N345	SELECT TOOL HOLDERS AND LATHE ATTACHMENTS	94
J250	SELECT SPEEDS AND FEEDS FOR SAWING OPERATIONS	94
H202	REMOVE OR REPLACE DAMAGED STUDS IN SHOP	94
N324	CUT THREADS USING HAND DIES	94
N329	KNURL PARTS WITH LATHES	94
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	92
N323	CUT THREADS USING GEOMETRIC HEAD	92
H203	REMOVE OR REPLACE HELICOILS IN SHOP	92
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	92
H208	REWORK INTERNAL THREADS WITH HAND TOOLS SUCH AS TAPS OR THREADING TOOLS IN SHOP	92
H213	WORK MATERIALS WITH PUNCHES OR HAMMERS IN SHOP	92
H209	ROUGH OR FINISH SURFACES WITH HAND FILES IN SHOP	92
J247	REMOVE OR REPLACE SAW BLADES	92
H207	REWORK EXTERNAL THREADS WITH HAND TOOLS SUCH AS THREAD FILES OR DIES IN SHOP	92
N335	PERFORM PARTING OPERATIONS WITH LATHES	92
I241	WORK MATERIALS WITH PORTABLE HAND DRILLS ON LINE	90
K257	PERFORM EXTERNAL SAWING FOR CONTOUR MACHINE OPERATIONS	90
0388	SELECT SPEEDS AND FEEDS FOR MILLING WORK	90
0371	MILL VERTICAL SURFACES	90
H200	REMOVE OR REPLACE BUSHINGS IN SHOP	90
N305	COUNTERBORE OR COUNTERSINK HOLES WITH LATHES	90
J243	CLEAN OR LUBRICATE POWER CUTOFF SAWS	90
0361	CLEAN OR LUBRICATE MILLING MACHINES	90

COMPARISON OF MACHINISTS IN POMO AND NON-POMO UNITS

Differences in tasks performed between machinists in Production Oriented Maintenance Organization (POMO) and Non-POMO units were very small. The job descriptions for the two groups were very similar, with nearly equal percentages of both groups spending roughly equivalent amounts of time on the same tasks.

Very minor differences in percent members performing some tasks were found. Thirteen tasks having a greater than ten percent differential in percent members performing were identified. Of these 13 tasks, five were tasks performed on the flightline while the other eight tasks varied in nature. Table 16 lists the 13 tasks which most differentiate between POMO and Non-POMO machinists.

TABLE 16

TASKS DIFFERENTIATING BETWEEN POMO AND NON-POMO MACHINISTS
(PERCENT MEMBERS PERFORMING)

TASKS		POMO (N=255)	NON-POMO (N=298)	DIFFERENCE
I218	INSPECT FOR OR CLEAN WORK AREA OF FOREIGN OBJECTS DAMAGE (FOD)	78	64	14
D81	CONDUCT OJT	47	33	14
B44	IMPLEMENT OR REVIEW IMPROVEMENTS IN PRODUCTION LINE METHODS, PROCEDURES, OR TECHNIQUES	36	23	13
I220	MAKE ENTRIES IN MAINTENANCE DATA COLLECTION FORMS ON LINE	71	59	12
B49	SUPERVISE APPRENTICE MACHINISTS (AFSC 42730)	42	30	12
M297	INSPECT ARBOR PRESSES FOR SAFETY AND OPERATING CONDITION	77	66	11
I219	INSPECT WORK AREA FOR SAFE WORKING ENVIRONMENT OTHER THAN FOD ON LINE	71	60	11
L274	CUT OFF MATERIALS WITH GRINDING MACHINES	42	32	10
G161	CALCULATE MATERIAL STRENGTH	40	30	10
I236	REVIEW AIRCRAFT MAINTENANCE FORMS (AFTO FORM 781 SERIES)	63	53	10
H179	BENCH CHECK PARTS OR ASSEMBLIES FOR CONFORMANCE WITH WORK SPECIFICATIONS	70	60	10
K262	PERFORM STACK SAWING FOR CONTOUR MACHINE OPERATIONS	60	50	10
I224	REAM HOLES WITH HAND REAMERS ON LINE	65	55	10

ANALYSIS OF GRADUATES AND NONGRADUATES OF THE BASIC MACHINIST COURSE

Tasks performed by graduates of the Basic Machinist course (5ABA42730) and directed duty assignment machinist were compared to determine what differences, if any, existed. Machinists were compared in both first job assignment (1-24 months TAFMS) and first enlistment (1-48 months TAFMS) groups. Virtually no important differences were found in either category. When the tasks most performed were compared, the job descriptions for contrasting groups were very similiar. However, in examining less performed tasks, minor differences between tech school graduates and DDA machinists became evident.

First Job Comparison: Eighteen tasks were identified that were performed by over half of the DDA machinists but by less than one quarter of the tech school graduates. Of the 18 tasks, 13 were perceived by technicians as being of above average difficulty. These difficult tasks involved primarily lathework and specialized milling machine operations. Table 17 lists the 13 difficult differentiating tasks.

First Enlistment Comparison: In comparing tech school graduates and DDA machinists in their first enlistment, it was the graduates who performed differentiating difficult tasks. Graduates were found to perform 13 very difficult technical tasks to a greater extent than nongraduates. These tasks included performing specialized lathe and milling machine operations, making mathematical calculations, and performing special grinding operations. Table 18 lists these difficult tasks.

Summary: Overall, the tasks performed by tech school graduates and DDA machinists were very similar. Twenty-six difficult tasks were identified however, that were performed to varying degrees by the two groups. In comparing machinists in their first job assignment, more DDA machinists performed 13 difficult tasks than did graduates. This may be attributed to the earlier arrival of DDA machinists at their duty station from Basic Military Training. In contrast, in comparing machinists in their first enlistment, more tech school graduates performed 13 different difficult tasks than did DDA machinists.

TABLE 17

COMPARATIVE PERFORMANCE OF SELECTED DIFFICULT TASKS BY TECH SCHOOL GRADS AND DDA MACHINISTS (1-24 MONTHS AFMS)

TASKS		PERCENT MEMBERS PERFORMING FIRST JOB GRADS (N=19)	FIRST JOB DDA (N=25)	DIFFERENCE	TASK DIFF RATING
I223	PERFORM FUNCTIONAL TRYOUT OF JIGS, DIES, OR FIXTURES ON LINE	16	64	-48	5.43
N310	CUT EXTERNAL MULTIPLE LEAD THREADS WITH LATHES	16	56	-46	6.85
G147	CALCULATE CHANGE GEARING FOR THREADING	21	60	-39	6.44
I235	REMOVE OR REPLACE ROSANS ON LINE	21	60	-39	5.15
O389	SET UP ANGLE PLATES OR TOOLMAKER'S KNEE ON MILLING MACHINES	16	52	-36	5.48
N330	METALIZE DAMAGED PARTS TO REFORM TO ORGINAL CONFIGURATION	21	56	-35	5.85
N357	WIND TENSION OR COMPRESSION SPRINGS ON LATHES	21	56	-35	5.57
O396	SET UP UNIVERSAL MILLING ATTACHMENTS	21	56	-35	6.31
O397	SET UP VERTICAL MILLING ATTACHMENTS	21	56	-35	5.65
O373	MILL WORK BETWEEN CENTERS	26	60	-34	5.29
N312	CUT EXTERNAL SQUARE THREADS WITH LATHES	21	52	-31	6.51
O384	PERFORM STRADDLE MILLING OPERATIONS	21	52	-31	5.41
N314	CUT INTERNAL ACME THREADS WITH LATHES	26	52	-26	6.93

TABLE 18

COMPARATIVE PERFORMANCE OF TECH SCHOOL GRADS AND DDA MECHANISTS FOR TASKS RATED ABOVE 6.0 IN TASK DIFFICULTY

TASKS		PERCENT MEMBERS PERFORMING FIRST TERM GRADS (N=41)	FIRST TERM DDA (N=69)	DIFFERENCE	TASK DIFF RATING
L281	PERFORM MACHINE HONING AND LAPPING OPERATIONS	46	23	23	6.02
L287	SET UP OR PERFORM TAPER GRINDING OPERATIONS	41	22	19	6.61
N346	SET UP END GEARING FOR CUTTING METRIC THREADS	34	19	15	6.34
G175	MAKE TRIGONOMETRIC CALCULATIONS OTHER THAN FOR GEAR BLANK VALUES	39	15	14	7.51
G157	CALCULATE GEAR BLANK VALUES	34	20	14	6.91
N349	SET UP TRACER LATHES	29	16	13	7.06
0377	PERFORM DEGREE INDEXING WITH MILLING MACHINES	68	55	13	6.23
N309	CUT EXTERNAL METRIC THREADS WITH LATHES USING SINGLES POINT CUTTING TOOLS	41	29	12	6.61
G162	CALCULATE OPEN OR SHUT HEIGHT OF DIES OR PRESSES	29	17	12	6.68
G174	CONVERT TO METRIC MEASUREMENT	32	20	12	6.18
G158	CALCULATE GEAR TOOTH OR CUTTER VALUES	34	23	11	6.92
N352	TURN RADII WITH LATHES USING FORM RODS	37	26	11	6.22

ANALYSIS OF TASK DIFFICULTY

From a listing of personnel identified for the AFSC 427X0 job survey, technicians holding primarily the 7-skill level from various locations and commands were selected to rate task difficulty. Tasks were rated on a nine-point scale from extremely low to extremely high difficulty. Difficulty is defined as the length of time it takes an average career ladder member to learn to do the task. Interrater reliability (as assessed through components of variance of standardized group means) among the 50 raters was .97. Ratings were adjusted so that tasks of average difficulty have ratings of 5.00.

Tasks rated above average in difficulty were associated mainly with designing and planning machine work, and with performing mathematical calculations. Many tasks dealing with specialized operations performed with grinding machines, lathes, and milling machines were also rated above average in difficulty. In contrast, most tasks dealing with benchwork, flightline work, administrative functions, and contour machine and power cutoff saw operation were rated below average in difficulty. Tables 19 and 20 illustrate tasks which were rated as most and least difficult respectively.

Job Difficulty Index (JDI)

In addition to reviewing the relative difficulty of tasks, it is useful to examine the relative difficulty of jobs. To obtain a relative Job Difficulty Index (JDI), the task difficulty ratings for tasks performed and the time spent on those tasks by specified job groups were entered into a statistically reliable formula which predicts overall job difficulty. The resultant JDIs provide a relative measure of how jobs vary in difficulty when compared to other jobs identified in the sample. The index ranks jobs on a scale of one (for very easy jobs) to 25 (for very difficult jobs). The indices are then adjusted so that the average JDI is 13.00. Individual JDIs were computed for the major job groups identified in the CAREER LADDER STRUCTURE section of this report and are listed in Table 21.

Within the 427X0 survey sample, the General Machinists performed the job rated most difficult, while the Limited Equipment Machinists performed the job rated lowest in difficulty. Much of this variance is related to the number of tasks performed. General Machinists performed an average of 248 tasks while Limited Equipment Machinists averaged only 51 tasks. However, the nature of the tasks performed also accounted for differences in job difficulty. As mentioned in the CAREER LADDER section, Limited Equipment Machinists did not operate the full range of machine shop equipment. Instead most operated lathes and grinding machines and performed benchwork and flightline tasks. These tasks tend to be rated less difficult than many tasks commonly performed by General Machinists, such as milling, machine, contour machine, and shaper tasks.

TABLE 19

THE 15 TASKS RATED MOST DIFFICULT FOR DAFSC 427X0

TASKS		TASK DIFFICULTY RATING	PERCENT MEMBERS PERFORMING (N=557)
0366	MILL HELICES OTHER THAN GEARS	8.09	27
0365	MILL HELICAL GEARS	7.85	15
G175	MAKE TRIGONOMETRIC CALCULATIONS OTHER THAN FOR GEAR BLANK VALUES	7.51	25
0364	MILL BEVIL GEARS	7.44	19
N318	CUT INTERNAL MULTIPLE LEAD THREADS WITH LATHES	7.43	24
0374	MILL WORM WHEELS	7.37	12
L291	SHARPEN REAMERS ON GRINDING MACHINES	7.35	20
F127	DESIGN JIGS OR FIXTURES	7.24	61
N315	CUT INTERNAL BUTTRESS THREADS WITH LATHES	7.22	23
N320	CUT INTERNAL SQUARE THREADS WITH LATHES	7.19	24
L290	SHARPEN MILLING CUTTERS ON TOOL AND CUTTER GRINDERS	7.16	28
0395	SET UP TABLE END GEARING ON MILLING MACHINES	7.14	20
G152	CALCULATE DIE BLANKING OR STRIPPING PRESSURES	7.12	14
N325	CUT WORM GEAR WITH LATHES	7.10	18
G145	CALCULATE BLANK LENGTH OF DIE FORMING	7.10	15

TABLE 20

THE 15 TASKS RATED AS LEAST DIFFICULT FOR DAFSC 427X0

TASKS		TASK DIFFICULTY RATING	PERCENT MEMBERS PERFORMING (N=557)
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	2.54	79
Q418	DISPOSE OF SCRAP METAL, CHIPS, OR SHAVINGS	2.86	71
M296	CLEAN OR LUBRICATE ARBOR PRESSES	2.90	68
Q433	SCRAPE OR PAINT MACHINES	2.91	59
Q424	PAINT FACILITIES	2.97	63
Q427	POLICE OR MAINTAIN ADJACENT WORK AREAS	2.98	61
J243	CLEAN OR LUBRICATE POWER CUTOFF SAWS	2.98	68
Q413	APPLY CORROSION PREVENTIVE MATERIALS TO TOOLS	3.01	67
Q416	CLEAN OR STORE HAND TOOLS, FIXTURES, OR ATTACHMENTS	3.06	71
Q417	CLEAN OR STORE MACHINE FIXTURES, JIGS, OR ATTACHMENTS	3.08	66
Q415	CLEAN OR PLACE IN STORAGE CUTTERS OR CUTTING TOOLS	3.16	69
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	3.20	79
P398	CLEAN OR LUBRICATE SHAPERS	3.27	58
K253	CLEAN OR LUBRICATE CONTOUR MACHINES	3.33	71
E102	INVENTORY EQUIPMENT	3.35	45

TABLE 21

JOB DIFFICULTY INDICES AND RELATED DATA BY JOB GROUPS

JOB GROUPS	AVERAGE NUMBER OF TASKS PERFORMED	ATDPUTS*	JDI**
I. BRANCH SUPERVISORS (N=80)	69	4.96	9.91
II. SHOP SUPERVISOR (N=44)	195	4.77	13.80
III. PRODUCTION MACHINISTS (N=414)	232	4.60	13.87
A. SPECIAL FABRICATION MACHINISTS (N=7)	104	4.54	8.18
B. DESIGN MACHINISTS (N=14)	173	4.58	12.03
C. GENERAL MACHINISTS (N=355)	248	4.62	14.64
D. LIMITED PERFORMANCE MACHINISTS (N=19)	111	4.31	6.43
IV. LIMITED EQUIPMENT MACHINISTS (N=7)	51	4.28	2.35

* AVERAGE TASK DIFFICULTY PER UNIT TIME SPENT
** AVERAGE JDI = 13.0

COMPARISON OF CAREER LADDER DOCUMENTS TO SURVEY DATA

AFR 39-1 Specialty Descriptions

Survey data were compared with the specialty description contained in AFR 39-1. Overall, the specialty descriptions accurately portrayed the major functions and tasks performed by personnel in each skill level.

Specialty Training Standard

A review of STS 427X0, dated May 1977, was made for the 3-, 5-, and 7-skill levels. Assistance was provided by subject matter specialists at the technical training school, Aberdeen Proving Grounds, Maryland, who matched inventory tasks with STS items. Each of the STS subparagraphs containing task knowledge or performance requirements were compared to the survey results. In general, the STS appears to be complete in providing general training requirements. Most STS subparagraphs were supported by the survey data. However, there were several tasks performed by a fairly high percentage of 3-, 5-, and 7-skill level machinists that were not matched to specific STS references (see Table 22). These tasks should be reviewed by subject matter specialists to determine whether they merit specific reference in the STS. Survey data regarding these tasks will be furnished to the technical training school for this purpose.

TABLE 22

SELECTED TASKS NOT REFERENCED IN STS 427X0
(PERCENT MEMBERS PERFORMING)

TASKS		3-SKILL LEVEL (N=17)	5-SKILL LEVEL (N=278)	7-SKILL LEVEL (N=177)
G166	CALCULATE ROUGHING AND FINISHING DEPTH OF CUTS	94	77	67
M302	STRAIGHTEN OR BEND PARTS WITH PRESSES	82	87	77
M300	PERFORM OPERATOR MAINTENANCE ON HYDRAULIC PRESSES	71	63	63
G154	CALCULATE DIMENSIONS FOR PRECISION MEASUREMENT TOOLS SUCH AS MICROMETERS, VERNIER CALIPERS, OR DIAL INDICATORS	47	57	52
G165	CALCULATE RAW STOCK SIZES	47	53	59
H210	TAKE CORRECTIVE ACTIONS RESULTING FROM NONDESTRUCTIVE INSPECTIONS SUCH AS REMOVAL OF SURFACE FLAWS	47	60	58
N322	CUT KEYSEATS WITH LATHES	47	47	40
G168	CALCULATE STOCK UTILIZATION IN MACHINE WORK	59	56	63
F131	ESTIMATE TIME FOR JOB COMPLETION	65	71	87
G147	CALCULATE CHANGE GEARING FOR THREADING	59	48	47
M301	SET UP FIXTURES OR DIES FOR PRESS WORK	53	42	38
L283	POLISH OR BUFF WITH GRINDING MACHINES	53	34	28
F141	SELECT MICROFILM OF ITEMS TO BE MANUFACTURED	18	18	39
N336	PERFORM SPINNING OPERATIONS	53	38	29
N330	METALIZE DAMAGED PARTS TO REFORM TO ORGINAL CONFIGURATION	53	37	24
E104	MAINTAIN BENCH STOCK LEVELS	6	18	26
E112	MAINTAIN WORK ORDER FILES	18	24	56

ANALYSIS OF CONUS vs OVERSEAS GROUPS

The jobs and tasks performed by machinists (42750s) working in the CONUS were compared to those working overseas to determine whether geographic location affected the jobs or tasks performed. Only minor differences were found to exist between the two groups (see Table 23). Slightly more CONUS machinists reported supervising Apprentice Machinists (33 percent vs 19 percent), preparing Airmen Performance Reports (28 percent vs 16 percent), and conducting On-the-Job Training (30 percent vs 17 percent). Other differences in tasks performed were negligible.

The two groups also varied very little on demographic variables. The only discernable difference was the amount of time spent in the career field and in the duty AFSC. Overseas machinists averaged ten months more time in the career field and 11 months more time in DAFSC 42750 than CONUS machinists.

TABLE 23

TASKS WHICH BEST DIFFERENTIATE CONUS AND OVERSEAS 42750s

TASK		CONUS 42750 (N=218)	O'SEAS 42750 (N=58)	DIFFERENCE
N311	CUT EXTERNAL PIPE THREADS WITH LATHES USING SINGLE POINT CUTTING TOOLS	44	62	-18
N319	CUT INTERNAL PIPE THREADS WITH LATHES USING SINGLE POINT CUTTING TOOLS	34	48	-14
G156	CALCULATE DIMENSIONS OF PARTS FOR BLUEPRINTS OR SPECIFICATIONS	46	58	-12
F126	ANALYZE PARTS FAILURE AND DETERMINE CORRECTIVE ACTION SUCH AS DESIGN CHANGES	36	48	-12
F133	INSPECT UNSERVICEABLE PARTS FOR REPAIR OR MANUFACTURE	69	81	-12
I239	ROUGH OR FINISH SURFACES WITH HAND FILES ON LINE	59	71	-12
F137	LOCATE INFORMATION IN TECHNICAL ORDERS, STANDARDS, OR SPECIFICATIONS	74	86	-12
B49	SUPERVISE APPRENTICE MACHINISTS (AFSC 42730)	33	19	14
C68	PREPARE AIRMEN PERFORMANCE REPORTS (APR)	28	15	13
D81	CONDUCT OJT	30	17	13
I220	MAKE ENTRIES IN MAINTENANCE DATA COLLECTION FORMS ON LINE	75	64	11
G175	MAKE TRIGONOMETRIC CALCULATIONS OTHER THAN FOR GEAR BLANK VALUES	28	17	11
D84	COUNSEL TRAINEES ON TRAINING PROGRESS	22	12	10
L290	SHARPEN MILLING CUTTERS ON TOOL AND CUTTER GRINDERS	35	26	9

COMPARISON OF CURRENT STUDY TO THE 1971 STUDY

The results of this survey were compared to the results of Occupational Survey Report 90-531-051, dated 15 April 1971. The survey data indicate that the field has remained stable over the past eight years. Tasks performed by the total career field and DAFSC and AFMS groups were basically the same in 1979 as in 1971. In both surveys, benchwork and lathework for example, were the duties most commonly performed by all machinists.

One notable difference in tasks performed between the two surveys was identified. In the previous survey, neither the total sample nor the individual group job descriptions mentioned screw, bolt, helicoil, or insert removal. The present survey, however, identified screw, bolt, helicoil, and insert removal tasks as some of the most time consuming tasks machinists performed.

WRITE-IN COMMENTS

Over two percent of survey respondents volunteered write-in comments indicating that the machinists' job was frustrating or was not challenging or rewarding. The reason most given to explain this dissatisfaction was that machinists are required to spend too much time and effort removing screws, bolts, studs, and pins from aircraft panels. Respondents felt that these tasks could be more efficiently performed by aircraft mechanics if they were issued proper tools and tried harder to remove seized inserts and fasteners before requesting a standby machinist. Many machinists indicated that the frequency of screw removal detracted from machinists' pride, resulted in shop inefficiency, and contributed to young machinists separating from the Air Force.

Survey data tends to support the assertion that machinists perform screw and insert removal frequently. In considering the total survey sample, the two most time consuming tasks were removing damaged screws or bolts on the line, and removing them in the shop; tasks performed by over 73 percent of the 427X0 personnel. In looking at the General Machinists (GRP094) in particular, the three most time consuming tasks involved removing screws, bolts, and helicoils. These tasks were performed by over 96 percent of group members and consumed over two percent of their time.

DISCUSSION

The data gathered in the survey tends to give a picture of a stable, technically-oriented career field where the majority of the workers are performing interesting, challenging work and are making good use of their training (whether obtaining in technical school or through OJT). There are some jobs within the specialty, particularly those which have been titled in this report as "Limited Performance Machinists" (N=19) and "Limited Equipment Machinists" (N=7), where many of the low-difficulty tasks are performed. In these two groups, individuals' job interest and perceived use of their talents or thier training are much lower than is the case for other job groups. Job interest is highest among Special Fabrication Machinists and Design Machinists, where incumbents are performing unusual or difficult machinist tasks.

A comparison with the last occupational survey of this area suggests that there has been some increase in routine, nonmachine related tasks both on the flightline and at the workbench. Write-in comments indicate that this is a trend which bothers some machinists, in that they perceive such tasks to be the responsibility of aircraft mechanics, particularly if they need to be done on the flightline. It would be tempting to attribute this development to POMO; however, a contrast of tasks performed by POMO machinists versus non-POMO machinists failed to reveal any differences in tasks such as removing bolts, screws, studs, or helicoils. Thus, the trend toward more of these tasks cannot be said to be related to POMO.

This trend may not be a major problem; however, it does appear to be an irritant for at least some Air Force machinists. If possible, functional managers should explore the possibility of transfering such tasks, at least on the flightline, to the Aircraft Mechanics or Crew Chiefs.

APPENDIX A

TABLE I

REPRESENTATIVE TASKS FOR BRANCH SUPERVISORS
(GRP007)

TASKS		PERCENT MEMBERS PERFORMING
C53	COUNSEL PERSONNEL ON MILITARY RELATED PROBLEMS	99
C54	COUNSEL PERSONNEL ON PERSONAL PROBLEMS	99
C68	PREPARE AIRMEN PERFORMANCE REPORTS (APR)	98
C73	REVIEW OR INDORSE APRs	96
A12	PARTICIPATE IN STAFF MEETINGS	94
C70	REVIEW CORRESPONDENCE OR REPORTS	93
C72	REVIEW OR FOLLOW UP INSPECTION REPORTS	89
C59	EVALUATE OR TAKE CORRECTIVE ACTION ON PERSONNEL AND MANNING PROBLEMS	84
A22	REVIEW LOCAL POLICY DIRECTIVES, OFFICE INSTRUCTIONS (OI), OR STANDING OPERATING PROCEDURES (SOP)	86
C65	INSPECT FACILITIES, EQUIPMENT UTILIZATION, OR HOUSEKEEPING	85
B29	ASSIGN PERSONNEL TO DUTY POSITIONS	84
C56	EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, OR RECLASSIFICATION	84
A26	SCHEDULE LEAVES OR PASSES	83
C57	EVALUATE OR TAKE CORRECTIVE ACTION ON ADMINISTRATIVE PROBLEMS	81
C58	EVALUATE OR TAKE CORRECTIVE ACTION ON MATERIEL PROBLEMS	80

TABLE II

REPRESENTATIVE TASKS FOR SHOP SUPERVISORS
(GRP022)

TASKS		PERCENT MEMBERS PERFORMING
C53	COUNSEL PERSONNEL ON MILITARY RELATED PROBLEMS	100
C68	PREPARE AIRMEN PERFORMANCE REPORTS (APR)	100
B30	CONDUCT SHOP MEETINGS	98
C54	COUNSEL PERSONNEL ON PERSONAL PROBLEMS	98
A15	PLAN OR SCHEDULE SHOP WORKLOAD	95
C67	INSPECT TECHNICAL DATA USED IN SHOP OPERATIONS	95
B41	DIRECT ROUTINE OR CORRECTIVE MAINTENANCE OF TOOLS AND MEASURING INSTRUMENTS	95
B28	ASSIGN PERSONNEL SPECIFIC RESPONSIBILITIES	95
B51	SUPERVISE MACHINISTS (AFSC 42750)	93
B39	DIRECT ROUTINE CLEANING, LUBRICATION, OR SERVICING OF MACHINES	93
F131	ESTIMATE TIME FOR JOB COMPLETION	93
A9	ESTABLISH REQUIREMENTS FOR MAINTENANCE OR INSPECTION OF SHOP EQUIPMENT	93
C55	DETERMINE ACTION ON TECHNICAL PROBLEMS IN USE OR MAINTENANCE OF HAND TOOLS OR PRECISION MEASURING DEVICES	93
F132	EXAMINE PARTS FOR SERVICEABILITY	91
F133	INSPECT UNSERVICEABLE PARTS FOR REPAIR OR MANUFACTURE	91
B40	DIRECT ROUTINE OR CORRECTIVE MAINTENANCE OF INSTALLED MACHINES	91
C60	EVALUATE OR TAKE CORRECTIVE ACTION ON TECHNICAL PROBLEMS	91
E103	INVENTORY SUPPLIES OR MATERIALS	91
B34	DIRECT MACHINE USE OR OPERATION	91
E102	INVENTORY EQUIPMENT	91

TABLE III

REPRESENTATIVE TASKS FOR SPECIAL FABRICATION MACHINISTS
(GRP032)

TASKS		PERCENT MEMBERS PERFORMING
N326	DRILL HOLES WITH LATHES	100
F134	LAYOUT MATERIALS FOR MACHINE WORK	100
N344	SELECT LATHE CUTTING TOOLS	100
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	100
K252	BUTT WELD SAW BLADES	100
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	100
K253	CLEAN OR LUBRICATE CONTOUR MACHINES	100
N304	BORE STRAIGHT HOLES WITH LATHES	100
F140	MEASURE PARTS OR HARDWARE AND DETERMINE MACHINING OPERATIONS	86
N337	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	86
F139	MAKE SKETCHES OF PARTS TO BE MACHINED	86
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	86
G160	CALCULATE MACHINE SPEEDS AND FEEDS	86
G166	CALCULATE ROUGHING AND FINISHING DEPTH OF CUTS	86
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	86
H177	ANALYZE AND INTERPRET WORKING DRAWINGS	86
H176	ANALYZE AND INTERPRET BLUEPRINTS	86
K267	SELECT CUTTING BANDS FOR CONTOUR MACHINE OPERATIONS	86
K265	REMOVE OR REPLACE SAW BLADES FOR CONTOUR MACHINE OPERATIONS	86

TABLE IV

REPRESENTATIVE TASKS FOR DESIGN MACHINISTS
(GRP093)

TASKS		PERCENT MEMBERS PERFORMING
N337	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	100
N326	DRILL HOLES WITH LATHES	100
N334	PERFORM EXTERNAL TAPER TURNING USING TAPER ATTACHMENTS	100
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	100
F140	MEASURE PARTS OR HARDWARE AND DETERMINE MACHINING OPERATIONS	100
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	100
N328	INSPECT LATHES FOR SAFETY AND OPERATING CONDITION	100
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	100
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	100
F134	LAY OUT MATERIALS FOR MACHINE WORK	100
0388	SELECT SPEEDS AND FEEDS FOR MILLING WORK	100
N304	BORE STRAIGHT HOLES WITH LATHES	100
H213	WORK MATERIALS WITH PUNCHES OR HAMMERS IN SHOP	100
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	100
H209	ROUGH OR FINISH SURFACES WITH HAND FILES IN SHOP	100
N324	CUT THREADS USING HAND DIES	100
H207	REWORK EXTERNAL THREADS WITH HAND TOOLS SUCH AS THREAD FILES OR DIES IN SHOP	100
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	100
F136	LOCATE INFORMATION IN MACHINIST'S HANDBOOKS	100
0358	ALIGN MILLING MACHINE HEAD	100

TABLE V

REPRESENTATIVE TASKS FOR GENERAL MACHINISTS
(GRP094)

TASKS		PERCENT MEMBERS PERFORMING
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	100
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	100
N304	BORE STRAIGHT HOLES WITH LATHES	99
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	99
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	99
H203	REMOVE OR REPLACE HELICOILS IN SHOP	99
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	99
N345	SELECT TOOL HOLDERS AND LATHE ATTACHMENTS	99
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	99
N329	KNURL PARTS WITH LATHES	99
N337	PERFORM STRAIGHT TURNING OPERATIONS WITH LATHES	99
N326	DRILL HOLES WITH LATHES	99
H198	REMOVE FROZEN OR SEIZED PARTS IN SHOP	99
N344	SELECT LATHE CUTTING TOOLS	99
H202	REMOVE OR REPLACE DAMAGED STUDS IN SHOP	99
H200	REMOVE OR REPLACE BUSHINGS IN SHOP	99
H195	REAM HOLES WITH HAND REAMERS IN SHOP	99
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	98
H208	REWORK INTERNAL THREADS WITH HAND TOOLS SUCH AS TAPS OR THREADING TOOLS IN SHOP	98
N335	PERFORM PARTING OPERATIONS WITH LATHES	98

TABLE VI

REPRESENTATIVE TASKS FOR LIMITED PERFORMANCE MACHINISTS
(GRP055)

TASKS		PERCENT MEMBERS PERFORMING
I225	REMOVE DAMAGED SCREWS OR BOLTS ON LINE	100
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	100
H207	REWORK EXTERNAL THREADS WITH HAND TOOLS SUCH AS THREAD FILES OR DIES IN SHOP	100
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	100
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	95
I242	WORK MATERIALS WITH PUNCHES OR HAMMERS ON LINE	95
J246	PERFORM STRAIGHT SAWING OPERATIONS	95
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	95
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	95
I232	REMOVE OR REPLACE HELICOILS ON LINE	95
N344	SELECT LATHE CUTTING TOOLS	95
J247	REMOVE OR REPLACE SAW BLADES	95
J250	SELECT SPEEDS AND FEEDS FOR SAWING OPERATIONS	95
I227	REMOVE FROZEN OR SEIZED PARTS ON LINE	89
Q425	PERFORM CUSTODIAL TASKS	89
Q424	PAINT FACILITIES	89
I231	REMOVE OR REPLACE DAMAGED STUDS ON LINE	89
I241	WORK MATERIALS WITH PORTABLE HAND DRILLS ON LINE	89
Q416	CLEAN OR STORE HAND TOOLS, FIXTURES, OR ATTACHMENTS	89
H202	REMOVE OR REPLACE DAMAGED STUDS IN SHOP	89

TABLE VII

REPRESENTATIVE TASKS FOR LIMITED EQUIPMENT MACHINISTS
(GRP017)

TASKS		PERCENT MEMBERS PERFORMING
H196	REMOVE DAMAGED SCREWS OR BOLTS IN SHOP	100
H202	REMOVE OR REPLACE DAMAGED STUDS IN SHOP	86
H182	CUT THREADS WITH HAND TAPS AND DIES IN SHOP	86
N326	DRILL HOLES WITH LATHES	86
H203	REMOVE OR REPLACE HELICOILS IN SHOP	86
H181	CUT MATERIALS WITH HAND HACKSAWS IN SHOP	86
H212	WORK MATERIALS WITH PORTABLE HAND DRILLS IN SHOP	86
N342	SELECT AND SET SPEEDS AND FEEDS FOR LATHE WORK	86
N323	CUT THREADS USING GEOMETRIC HEAD	86
I225	REMOVE DAMAGED SCREWS OR BOLTS ON LINE	71
L289	SHARPEN DRILL BITS ON GRINDING MACHINES	71
H198	REMOVE FROZEN OR SEIZED PARTS IN SHOP	71
I241	WORK MATERIALS WITH PORTABLE HAND DRILLS ON LINE	71
N327	FACE AND CENTER-DRILL MATERIALS IN LATHES	71
H191	PERFORM DRILLING OR REAMING OPERATIONS WITH DRILL PRESSES	71