Technical Jobs in Alaska in 1993

by Jeff Hadland, Paul Engelman and Kristen Tromble

Approximately 30,500 workers, or about 9 percent of all private sector, state or local government workers in Alaska received the majority of their 1993 wage and salary earnings in a technical occupation. (Federal government worker information is not available on the Alaska Department of Labor wage file.)

The Alaska Department of Labor used the Occupational Data Base (ODB) as the primary information source to identify Alaska's technical workers. The ODB contains quarterly earnings, place of work, industry, employer and occupation for Alaska wage and salary workers. Occupation data is available for more than 92 percent of all workers reported on the Alaska Department of Labor wage file.

Alaska's technical workers identified

Based on a review of job skills and requirements, a list of ninety unique occupational categories were identified as technical occupations. Technical occupations were defined as *occupations which require training in the application of a specific process, especially of, relating to, or involving the practical, mechanical or applied sciences, to achieve a commercial or industrial objective.* These occupations provide assistance and support to engineers, scientists, and other professional workers. Additional factors in the selection of technical occupations included the type of training required, the duration of the training, and the overall level of education needed to do the work.

All workers employed in one of the technical occupations at some time in 1993 were extracted from the ODB. If the technical workers had earned the majority of their earnings in 1993 in that technical occupation, they were selected and considered technical workers for purposes of this study. Earnings and employment history data were then extracted for each individual for 1992 and 1993 in order to determine the average earnings, number of quarters worked, industry in which they were employed and whether they were a new hire to the firm. Eighty-seven of the 90 selected occupations had workers and wages in Alaska in 1993.

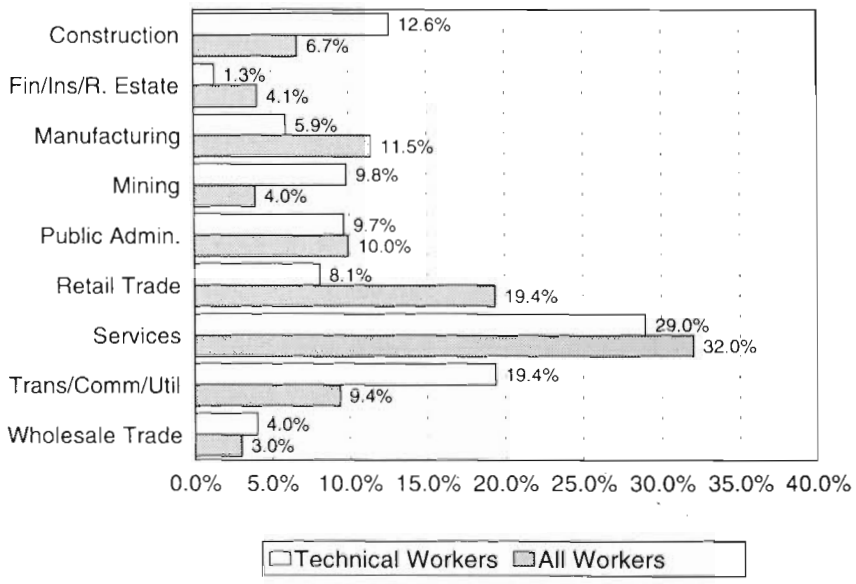
Technical workers are employed in all parts of Alaska and in all industries. Although the largest percent of technical workers are employed in the service industries, technical workers have a relatively higher representation in the mining, construction, transportation and wholesale trade industries. (See Figure 1.)

More than half of all technical workers were employed in the top ten occupational categories. (See Table 1.) More than one quarter of all technical jobs were mechanics of various types. Industrial, electrical and machine repairers were the next largest broad technical occupational category.

Jeff Hadland is an economist; Paul Engelman is a labor economist; and Kristen Tromble is a statistical technician. They are all located in Juneau with the Research & Analysis Section, Administrative Services Division, Alaska Department of Labor.

Figure • 1

Employment by Industry for All Workers and Technical Workers Calendar Year 1993



Source: Alaska Department of Labor, Research & Analysis Section.

Table • 1

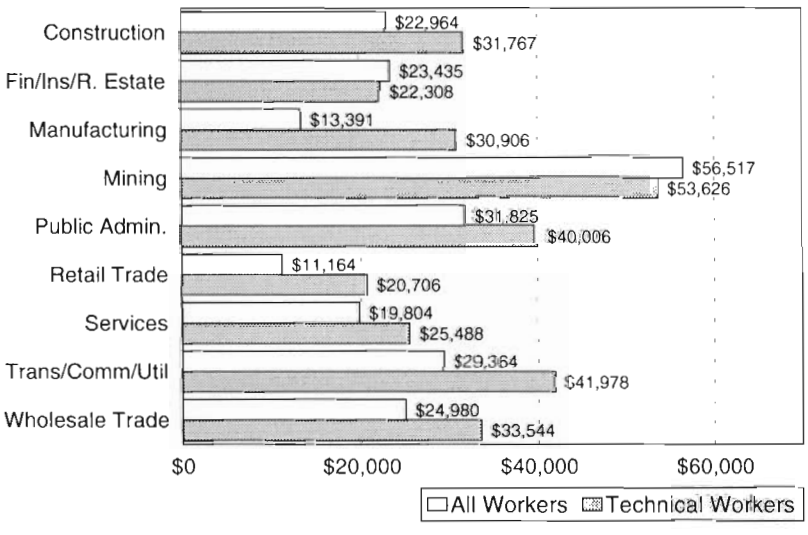
Top Ten Technical Occupations by the Number of Jobs Calendar Year 1993

Occupation	Average Wage	Number
Mechanics and Repairers, Not Elsewhere Classified	$32,507	2,844
Electricians	34,427	2,291
Airplane Pilots and Navigators	48,849	2,121
Automobile Mechanics	22,991	2,108
Heavy Equipment Mechanics	40,260	1,877
Health Technologists and Technicians, Not Elsewhere Classified	23,827	1,291
Welders and Cutters	31,634	1,287
Communications Equipment Repairers	44,137	911
Science Technologists and Technicians, Not Elsewhere Classified	22,689	783
Drafting Occupations	30,782	720

Source: Alaska Department of Labor, Research and Analysis Section.

Figure • 2

Average Annual Wage by Industry All Workers and Technical Workers Calendar Year 1993



Source: Alaska Department of Labor, Research & Analysis Section.

Earnings

Average earnings per worker were calculated for each occupation. Occupations with large turnover (high number of workers per job), or large numbers of seasonal workers would necessarily have a lower average wage, even if their wage rate was the same. Given these limitations, technical workers earned, on average, approximately $33,750 in 1993. Their total wages exceeded $1.0 billion. Sixty-five percent of technical workers worked all four quarters of the year.

For those occupations with more than 100 workers, the highest average annual earnings were received by mechanical control and valve repairers, electrical and electronic repairers, airplane pilots and navigators, programmers and electrical power installers and repairers.

Technical workers employed in the oil/mining industry earned the most, at an average of $53,626, while those employed in the retail trade industry earned the least ($20,706). (See Figure 2.)

Gender differences of technical workers

Technical jobs in Alaska are primarily male-dominated occupations. A match of technical worker wage records with the Alaska Permanent Fund Dividend file indicates that while women filled 46.9% of all jobs in Alaska in 1993, they were employed in only about 18 percent of all technical jobs during that same year. (See Figure 3.) A low percentage of female employment in an occupation could represent an employment and training opportunity.

Women working in technical jobs earned on average only 71% as much as men. (See Figure 4.) However, there were some occupations where women's earnings exceeded those of men including: household appliance repairers, nurses, petroleum technologists and technicians, dental hygienists and biological technologists and technicians (except health).

Table • 2

Top Ten Technical Occupations that Employed More Women than Men in 1993

Occupation	Female		Male		Percent Female in Occupation
	Average Wage	Number	Average Wage	Number	
Dental Hygienists	$29,316	282	$27,209	11	96.2
Licensed Practical Nurses	25,513	422	21,902	25	94.4
Health Record Technologists and Technicians	22,558	234	30,330	24	90.7
Clinical Laboratory Technologists and Technicians	29,511	229	33,261	64	78.2
Radiologic Technologists and Technicians	33,171	140	45,160	55	71.8
Optical Goods Workers	15,914	57	22,735	24	70.4
Health Technologists and Technicians, Not Elsewhere Classified	22,593	710	32,216	339	67.7
Photographic Process Workers	15,265	67	21,165	63	51.5
Chemical Technologists and Technicians	32,038	28	41,176	28	50.0
Cartographic Technicians	33,172	26	36,695	27	49.1

Note: Excludes occupations with fewer than 50 workers.
Source: Alaska Department of Labor, Research and Analysis Section.

Women earned the most in the following occupations: mechanical controls and valve repairers, electronic and electrical repairers, petroleum technologists and technicians and telephone line installers and repairers. Women held more than 60 percent of the jobs in the following technical occupations: dental hygienists, licensed practical nurses, health record technologists, clinical laboratory technicians, radiologic technologists and technicians, optical goods workers, health technologists and technicians, miscellaneous precision printing occupations and precision hand molders and shapers (except jewelers).

In occupations in which there were more than 50 women reported working in 1993, their highest annual average earnings were achieved in programmers-scientific, communications equipment repairers, programmers-business, engineering technologists and technicians not elsewhere classified, and radiologic technologists and technicians. Table 2 shows occupations which have the highest percentage of women.

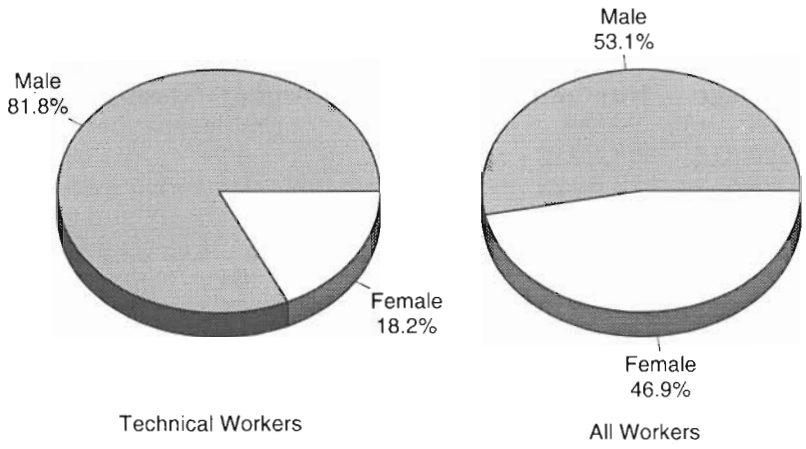
Men held more than 98 percent of all jobs in the following occupations: small engine repairers, aircraft mechanics, bus/diesel engine mechanics, heavy equipment mechanics, millwrights, automobile mechanics, machinists, and electrical and electronic repairers.

Some technical jobs more likely filled by younger workers

The average age of technical workers in 1993 is estimated to be 38 based upon a match with recent Permanent Fund Dividend applicant data. Photographic process workers, drafting occupations, mechanical control and valve repairers and marine equipment mechanics have a much lower than average age. Welders, engineering technologists not elsewhere classified, and diesel engine mechanics have a higher than average age. (See Figure 5.)

Figure • 3

Employment by Gender 1993
All Workers and Technical Workers



Source: Alaska Department of Labor, Research & Analysis Section.

Nonresidents working in technical jobs

A large number of nonresidents is one indicator of a lack of trained and available Alaska workers in a particular occupation. In order to estimate the number of nonresidents working by occupation, each individual's wage record was matched with the most recent Permanent Fund Dividend file. This conservative measure of residency provides a good indicator of the number of nonresidents or new residents.

In 1993, nonresidents earned approximately three-fourths as much as residents in technical occupations. (See Table 3.) This difference was due primarily to the fact that nonresidents work, on average, fewer quarters during the year. Nonresidents held approximately 19 percent of all technical jobs, lower than the rate for all Alaska jobs. (The Alaska Department of Labor estimated that 23.7% of all workers in Alaska in 1992 were nonresidents). The technical occupations with the largest percent nonresidents were machin-

Table • 3

Top Ten Technical Occupations with the Largest Number of Nonresident Workers in 1993

Occupation	Resident		Nonresident		Percent Nonresident in Occupation
	Average Wage	Number	Average Wage	Number	
Airplane Pilots and Navigators	$45,559	1,247	$53,544	874	41.2
Science Technologists and Technicians, Not Elsewhere Classified	23,603	569	20,259	214	27.3
Aircraft Mechanics (except engine specialists)	30,274	440	17,992	175	28.5
Heating, Air-conditioning and Refrigeration Mechanics	33,495	435	22,003	161	27.0
Machinery Maintenance Mechanics, Marine Equipment	21,970	58	18,079	147	71.7
Millwrights	47,380	211	41,132	110	34.3
Machinists	31,114	172	21,330	99	36.5
Radiologic Technologists and Technicians	36,237	198	20,996	75	27.5
Precision Inspectors, Testers and Graders	35,955	49	35,919	48	49.5
Camera, Watch and Other Precision Instrument Repairers	39,979	77	23,008	28	26.7

Note: Excludes occupations with fewer than 50 workers. Residency based upon a match of technical workers with the 1993 Permanent Fund Dividend file.
Source: Alaska Department of Labor, Research and Analysis Section.

ery maintenance mechanics (marine equipment), precision inspectors, airplane pilots and navigators, machinists and millwrights. Many of the jobs held by nonresidents required relatively longer periods of training.

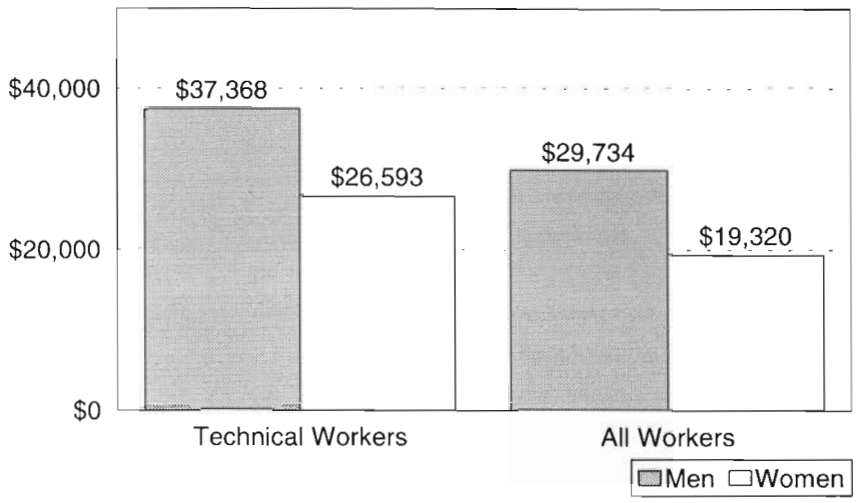
Occupational turnover and new hires

In order to determine if a technical worker was a new hire to the firm, the individual was tracked during each of the four quarters of 1992 to determine if they had worked for that firm at any time during the year. If they were new to the firm, they were considered a new hire. Overall, about 39 percent of all technical workers in 1993 had not worked for the same firm in 1992. (See Table 4.)

Employees in some technical occupations were much more likely to change employers. Boilermakers, precision inspectors, welders, sheet metal workers, and electricians were much more likely to work for a different employer than were cartographic technicians, programmers-scientific, telephone installers or mechanical controls and valve repairers.

Figure • 4

Average Annual Wage by Gender for Calendar Year 1993



Source: Alaska Department of Labor, Research & Analysis Section.

Table • 4

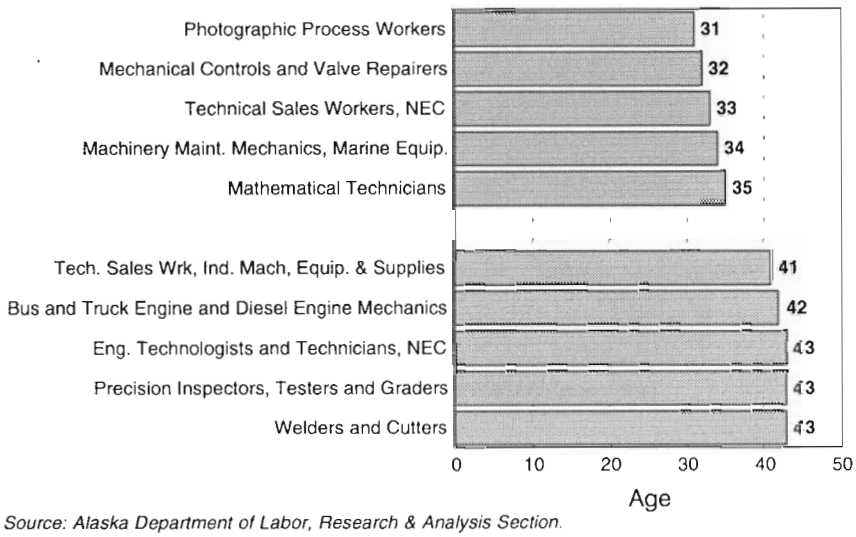
Top Ten Technical Occupations by Percent Workers that Were New Hires in 1993

Occupation	Average Wage	Number	Percent New Hires
Boilermakers	$27,160	52	65.4
Precision Inspectors, Testers and Graders	35,937	97	62.9
Welders and Cutters	31,634	1,287	60.2
Sheet Metal Workers	32,501	264	57.2
Electricians	34,427	2,291	56.7
Surveying Technicians	25,302	263	53.6
Technical Sales Workers, Not Elsewhere Classified	23,915	64	51.6
Industrial Engineering Technologists and Technicians	25,897	181	49.7
Petroleum Technologists and Technicians	40,828	510	49.4
Household Appliance and Power Tool Repairers	21,234	185	48.6

Note: Excludes occupations with fewer than 50 workers.
Source: Alaska Department of Labor, Research and Analysis Section.

Figure • 5

Technical Occupations with the Oldest and Youngest Average Ages Calendar Year 1993



Source: Alaska Department of Labor, Research & Analysis Section.

Which technical occupations present the greatest opportunity for employment?

Technical occupation categories with large numbers of workers, large numbers of nonresidents, high average wage and high turnover seem to be good occupations to consider when looking at employment or training. Each occupation was ranked based upon these four factors. A combined ranking that derived from the sum of these four rankings was calculated. The top opportunity occupations were airplane pilots and navigators, heavy equipment mechanics, electricians, mechanics and repairers, not elsewhere classified, electrical power installers and repairers, welders and cutters, communications equipment repairers, industrial machinery repairers, petroleum technologists and technicians, bus and truck engine and diesel engine mechanics, millwrights.

Table • 5

Alaska Technical Occupation Summary Table Calendar Year 1993

	Average Wage	Number	Average Age	Percent Female	Percent Nonresident	Percent New Hires	Expected Growth Rate to 1997
Air Traffic Controllers (See Note 1)	$15,710	68	33	71.4	13.2	42.6	0.0
Aircraft Engine Mechanics	31,038	583	37	3.3	18.9	35.5	NA
Aircraft Mechanics (except engine specialists)	26,779	615	36	0.9	28.5	38.0	1.1
Airplane Pilots and Navigators	48,849	2,121	40	3.0	41.2	37.2	1.7
Automobile Mechanics	22,991	2,108	34	1.6	14.8	44.6	0.9
Baader Technologists	41,871	12	42	0.0	50.0	16.7	NA
Biological Technologists and Technicians, Except Health	22,170	255	36	34.1	7.1	16.9	0.2
Boilermakers	27,160	52	41	5.1	11.5	65.4	NA
Bus and Truck Engine and Diesel Engine Mechanics	34,128	664	38	1.2	18.2	36.1	1.1
Camera, Watch and Other Precision Instrument Repairers	35,453	105	40	10.8	26.7	40.0	-0.2
Cartographic Technicians	34,501	57	35	49.1	7.0	8.8	NA
Chemical Technologists and Technicians	37,699	65	35	50.0	12.3	32.3	0.8
Clinical Laboratory Technologists and Technicians	28,165	383	39	78.2	22.5	26.9	1.3
Communications Equipment Repairers	44,137	911	41	6.7	8.9	25.0	-0.4
Data Processing Equipment Repairers	39,107	118	37	6.7	10.2	30.5	2.7
Dental Hygienists	27,069	366	36	96.2	18.6	41.8	3.1
Dental Laboratory Technicians	18,094	36	34	41.4	19.4	27.8	1.0
Drafting Occupations	30,782	720	36	29.9	15.4	34.4	0.2
Electric Motor, Transformer and Related Repairers	35,304	18	41	0.0	33.3	27.8	0.0
Electrical Power Installers and Repairers	47,323	615	41	3.9	12.4	43.3	NA
Electrical and Electronic Engineering Technologists and Technicians	44,426	359	40	7.4	17.8	27.9	1.6
Electrical and Electronic Repairers, Commercial and Industrial Equipment	52,150	311	43	1.8	10.0	28.9	0.5

Alaska Technical Occupation Summary Table
Calendar Year 1993

	Average Wage	Number	Average Age	Percent Female	Percent Nonresident	Percent New Hires	Expected Growth Rate to 1997
Electricians	$34,427	2,291	39	4.0	19.8	56.7	2.1
Electronic Repairers, Home Entertainment Equipment	16,716	97	35	8.3	10.3	41.2	NA
Elevator Installers and Repairers	34,759	19	37	0.0	31.6	36.8	1.0
Engineering Technologists and Technicians, Not Elsewhere Classified	38,599	690	39	23.3	11.9	26.8	0.6
Engravers	8,751	12	31	40.0	16.7	58.3	NA
Farm Equipment Mechanics (See Note 2)							
Health Record Technologists and Technicians	22,527	284	37	90.7	7.4	23.9	2.3
Health Technologists and Technicians, Not Elsewhere Classified	23,827	1,291	36	67.7	16.8	34.9	2.7
Heating, Air-conditioning and Refrigeration Mechanics	30,391	596	35	2.7	27.0	44.6	2.2
Heavy Equipment Mechanics	40,260	1,877	40	1.3	18.7	38.0	-0.3
Household Appliance and Power Tool Repairers	21,234	185	37	17.1	12.4	48.6	1.8
Industrial Engineering Technologists and Technicians	25,897	181	31	33.8	18.8	49.7	NA
Industrial Machinery Repairers	36,983	694	40	4.6	19.0	29.8	NA
Land Surveyors	29,991	496	38	7.1	11.9	42.1	0.2
Lay-out Workers	31,673	22	40	37.5	22.7	54.5	-1.5
Licensed Practical Nurses	23,034	564	41	94.4	17.9	26.2	2.3
Locksmiths and Safe Repairers	22,169	34	36	3.6	11.8	20.6	0.4
Machinery Maintenance Mechanics, Marine Equipment	19,180	205	36	2.0	71.7	39.5	NA
Machinists	27,540	271	40	1.8	36.5	36.5	-0.1
Mathematical Technicians (See Note 2)							
Mechanical Controls and Valve Repairers	66,881	179	42	5.0	14.0	12.3	-0.5
Mechanical Engineering Technologists and Technicians	45,099	53	37	2.2	11.3	20.8	NA
Mechanics and Repairers, Not Elsewhere Classified	32,507	2,844	39	9.8	11.1	34.5	0.8
Millwrights	45,239	321	43	1.6	34.3	39.6	1.1
Miscellaneous Electrical and Electronic Equipment Repairers	36,976	326	39	29.0	9.2	32.2	0.6
Miscellaneous Precision Metal Workers	17,822	8	29	0.0	25.0	87.5	0.0
Miscellaneous Precision Printing Occupations	16,713	10	32	66.7	10.0	50.0	1.3
Musical Instrument Repairers and Tuners	40,057	13	39	9.1	7.7	15.4	NA
Nuclear Technologists and Technicians (See Note 2)							
Office Machine Repairers	27,448	99	35	10.7	11.1	30.3	-0.2
Optical Goods Workers	16,497	110	35	70.4	23.6	45.5	2.6
Petroleum Technologists and Technicians	40,828	510	35	12.0	15.7	49.4	-2.4
Photographic Process Workers	16,565	155	32	51.5	16.1	40.6	NA
Precision Adjusters and Calibrators (See Note 2)							
Precision Assemblers (metal)	18,662	14	41	33.3	14.3	50.0	NA
Precision Electrical and Electronic Equipment Assemblers	16,175	9	28	0.0	33.3	88.9	NA
Precision Hand Molders and Shapers (except jewelers)	5,337	14	29	60.0	28.6	78.6	NA
Precision Hand Molders and Shapers (jewelers)	23,901	36	34	21.4	19.4	50.0	NA
Precision Inspectors, Testers and Graders	35,937	97	38	13.0	49.5	62.9	NA
Precision Lithographers and Photoengravers	17,997	10	32	11.1	10.0	40.0	NA
Precision Patternmakers, Lay-out Workers and Cutters (See Note 2)							
Precision Typesetters	12,610	12	32	50.0	25.0	66.7	NA
Programmers, Business	42,156	315	37	34.3	12.4	23.5	2.2
Programmers, Numerical, Tool and Process Control (See Note 2)							
Programmers, Scientific	48,715	315	39	34.2	5.4	10.8	NA
Radio and Related Operators	23,850	311	35	48.3	14.8	32.2	NA
Radiologic Technologists and Technicians	32,050	273	39	71.9	27.5	30.0	3.5
Sales Engineers	42,662	203	38	15.5	13.3	28.6	1.0
Science Technologists and Technicians, Not Elsewhere Classified	22,689	783	36	40.7	27.3	47.1	-0.1
Sheet Metal Workers	32,501	264	39	2.6	20.5	57.2	3.1

Table • 5 (cont.)

Alaska Technical Occupation Summary Table
Calendar Year 1993

	Average Wage	Number	Average Age	Percent Female	Percent Nonresident	Percent New Hires	Expected Growth Rate to 1997
Small Engine Repairers	$20,844	292	32	0.0	13.7	46.2	0.7
Supervisors: Precision Production Occupations	44,098	114	41	19.8	7.9	25.4	0.1
Surveying Technicians	25,302	263	37	9.8	7.6	53.6	-0.2
Surveying and Mapping Technicians, Not Elsewhere Classified	30,283	37	36	16.7	10.8	40.5	NA
Technical Sales Workers, Agricultural Equipment and Supplies (See Note 2)							
Technical Sales Workers, Aircraft	26,076	13	37	23.1	0.0	38.5	-0.5
Technical Sales Workers, Chemicals and Chemical Products	47,407	38	40	17.9	23.7	39.5	NA
Technical Sales Workers, Electronic Equipment	27,567	179	35	25.7	12.3	40.8	NA
Technical Sales Workers, Industrial Machinery, Equipment & Supplies	35,429	152	36	16.3	11.2	36.8	NA
Technical Sales Workers, Medical and Dental Equipment & Supplies	44,810	36	36	50.0	25.0	30.6	NA
Technical Sales Workers, Not Elsewhere Classified	23,915	64	35	24.5	14.1	51.6	NA
Telephone Installers and Repairers	51,488	79	43	6.4	0.0	11.4	-2.0
Telephone Line Installers and Repairers	43,236	253	41	14.0	9.9	27.3	-0.5
Tool and Die Makers (See Note 2)							
Welders and Cutters	31,634	1,287	37	2.2	25.6	60.2	1.4
Technical Occupation Summary	33,751	30,478	38	18.2	19.0	38.8	NA

Note 1: Air traffic controllers excludes federal government employees. Primarily small air carrier personnel.
Note 2: Occupations with fewer than 6 workers are not discloseable.
NA = Not Available.
Source: Alaska Department of Labor, Research and Analysis Section.