

1980

Employer and Training Needs: Report 6 Machine Technologies

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Recommended Citation

DiMartino, David R., "Employer and Training Needs: Report 6 Machine Technologies" (1980). *Publications Archives, 1963-2000*. 122.
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Report Number Six

MACHINE TECHNOLOGIES

EMPLOYER AND TRAINING NEEDS

PREPARED FOR METROPOLITAN TECHNICAL COMMUNITY COLLEGE



Center for Applied Urban Research

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MACHINE TECHNOLOGIES

by

David R. DiMartino

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Purpose of the Study

The purpose of this study is to determine the employer and training needs in Metropolitan Omaha in the occupational area designated as machine technologies.

The study is intended to provide information to Metropolitan Technical Community College for consideration in the possible establishment of a new course of study in machine technologies. The potential program would provide training for students wishing to become professional machinists, machine tool operators, set-up workers, and tool and die workers. The proposed course of study could build upon the established course work at MTCC, including courses in machine and tool design, drafting, and metallurgy.

Study Design

The target population of this study consists of those labor organizations, large companies, and relatively smaller specialized shops (excluding auto shops) which deal largely with machine technology skills and personnel. Out of that population two labor organizations, seven large companies, and 16 specialized shops were surveyed within the Omaha metropolitan area.

A cluster sampling procedure was used to select specialized shops for surveying. The listings under four headings in the Omaha telephone directory (Machine Shops, Tool Designers, Tool and Die Makers, and Tool Grinding) were used to define the population of specialized shops. Shops within those listings were sampled for surveying. Two area labor organizations which deal with machinists were surveyed. Large companies were selected for surveying based upon the recommendations of the specialized shops and labor organizations. The resulting survey is a representative and rather comprehensive sampling of the machine technology operations in the Omaha area.

The data for the report were gathered through semi-structured telephone interviews with business owners and personnel managers concerned with machine technology. The data base of the study consists, therefore, of the informed opinions of professionals within the machine technology field. The survey instrument used was the one constructed for the other studies of employer and training needs.

Analysis

Employer Personnel Needs

Deciding whether a new program of studies should be established at an educational institution requires an evaluation of whether a demand exists for people trained in that program area. Such placement potential, or employability, for program trainees may be estimated from the personnel needs of established businesses which employ such trainees in the area. Those personnel needs may be measured by the size and growth potential of the existing workforce in the occupational field at the established area businesses.

A number of large businesses in the Omaha area were identified as employers of machine technologists as an integral part of their operations. These large businesses estimated their machine technologies workforce (including all grades, from apprentices to senior tool and die makers) to range from 31 to 450 persons. The mean size of these machine technology workforces was 144 employees, and the median was 75 employees.

The relatively smaller and more numerous shops generally employed significantly fewer machine technology personnel. The operators of the specialized shops reported their workforces to be from two to 36 machine technologists. The mean number of machine technologists was 16 per shop, and the median was 14.

The data on size of workforce employed in the machine technologies at businesses surveyed yielded a pattern of a few large businesses employing relatively large numbers and many small shops each employing relatively few persons. Most of those employed at the larger businesses were in the lower grade positions, such as in low-skill to semi-skilled machine operator positions, often requiring no previous training. Very few of the personnel at the larger businesses were actually employed in the senior, high-skill positions, such as tool and die makers. In addition, placement in the senior positions at larger businesses (particularly those unionized) is usually regulated by seniority systems and internal job-bidding. One labor leader, for instance, stated that advancement opportunities within the larger businesses are practically non-existent, so that even productive and skilled employees have remained at journeyman grades (and salaries) for more than nine years. Job opportunities do exist in the larger businesses for newly-trained personnel; however, opportunities for placement and

promotion are less than might be expected from the numbers alone, particularly for skilled positions.

A greater proportion of machine technology employees at the smaller specialized shops are highly skilled and experienced people. The smaller shops have grading systems comparable to the larger businesses (from apprenticeship through journeyman status to senior tool and die maker), but the opportunities for placement and advancement (while fewer per shop) appear to be better at these shops--"for a good man."

Employers were also asked about the growth potential of their businesses; that is, whether they anticipated additional hiring of machine technology personnel. Most employers--both larger businesses and smaller shops--were cautiously optimistic about future employment opportunities. A number of employers stated that this was the worst possible time for such a survey since "business is very slow right now." (One employer also suggested that the Omaha market for such skilled personnel was relatively small, as compared to places like Chicago, Cleveland and Baltimore.) Nevertheless, most employers suggested that the employment prospects are good for personnel in the machine technologies and that "no problem" placing such people should occur.

More specifically, when employers were asked whether they would be creating any new jobs in the machine technologies in the next three years, three-quarters said they would. The reasons offered for creating those additional jobs included personnel turnover (mostly due to retirement), an anticipated expansion of product lines or market areas, and an increased demand for products in established markets. Similarly, when employers were asked to estimate whether their need for employees in the machine technologies was likely to increase, decrease, or remain the same, two-thirds of the employers anticipated an increased need for those personnel.

Employers were also questioned about the employment of machine technologists from a slightly different point of view. Employers were asked about their difficulties in filling job openings. Almost all responded that they received too few qualified applicants for available jobs. The employers, particularly the specialized shops, stressed the "qualified" aspect of the applicants. Apparently no shortage exists in the total number of applicants for job openings, but often a lack of skilled, experienced applicants occurs. Typical comments included "good ones are hard to find," "we'll make room for a good man," and "I'll hire 200 before I

get a good 20." Similarly, when employers were asked to assess the need for trained personnel in the machine technologies throughout the Omaha metropolitan area, almost all suggested that there are "more job openings than trained people available." Thus, employers find it difficult to fill positions with applicants of high quality.

The salary scale for machine technology personnel compares favorably to other trades, particularly for personnel at the upper grades with considerable skill and experience. Employer estimates of starting wages for personnel with little or no experience ranged from \$3.50 to \$8.77 per hour and averaged \$5.45 per hour. Estimates of senior tool and die maker wages ranged from \$7.38 to \$12 per hour and averaged \$9.55 per hour. In general, larger employers pay higher wages at each employment grade, and this fact is recognized by both large employers and specialized shops.

Employer Skill and Training Preferences

Employers were asked what skills or knowledge were required to perform well as a machine technologist. In order of frequency cited, those skill/knowledge areas required by employers were:

- knowledge of equipment (particularly precision equipment)
- mathematics
- mechanical inclination and ability
- appropriate work habits and attitudes
- metallurgy
- computer operations (for numerical control machinery)
- welding

Knowledge of equipment accounted for nearly one-third of all responses, and equipment knowledge together with mathematics accounted for half of employer responses. Interestingly, nearly half of all skill/knowledge requirements cited were less directly related to coursework (machine experience, mechanical ability, and interest) and more a matter of employee character and experience.

Employers were also asked what skills, knowledge, or experience were most often lacking among job applicants. The trait most often lacking, listed by almost half of the employers, was machine knowledge and experience. In addition, attitude and technical ability were cited frequently. Included as technical ability were such traits as calculation and measurement ability, and computer (numerical control) skills. Attitudes included such traits as "ability to adapt," ability to "follow through," commitment and ability to "get the work done on time," and realization by apprentices that they don't "know it all."

Employers were also asked their opinions concerning the need for formal educational programs designed to train machine technologists. When asked, "What type of education/training is the best preparation for machine technology jobs?" half of the employers suggested enrollment in one-to-four year technical education programs (half of these suggesting a two-year program). The other half suggested the best training would be an apprenticeship program within their companies, and a few of these employers favored the combination of some formal course of studies with their apprenticeship programs. A point made by many employers was that formal education was desirable but not enough in itself to prepare employees for anything but entry-level (lowest grade) apprenticeship positions in the machine technologies. On-the-job experience was considered as valuable as, if not more valuable than, coursework by most employers.

Specific coursework recommended by employers for inclusion in a machine technology program focused on three course areas: mathematics, basic machine training, and drafting/blueprint reading. Other course recommendations included measurement, welding, and computer skills, and "basic" education, including communications skills.

The establishment of a program of studies in machine technologies by Metropolitan Technical Community College was recommended by approximately two-thirds of all employers surveyed. Only two responded negatively to the creation of such a program at MTCC. The remainder were undecided. One employer who had participated on an advisory board for such a program initiative cautioned that the startup and maintenance costs for equipment would be very high (initially around \$100,000) and that an effective program would require relatively small classes (of nine or ten rather than 30 or 40 students). In general, the employers surveyed were enthusiastic about the prospects of a machine technology program being created at MTCC.

Other relevant comments related to coursework in the machine technologies, whether at MTCC or not, demonstrated a concern about the quality of programs. One employer stressed the need for knowledgeable instructors; another said, "Don't be afraid to flunk 'em out!" Others suggested the need for a strong grounding in the basics--writing, mathematics, and basic machine skills.

A number of employers were dissatisfied with machine technology training that their employees had experienced at other schools, predominantly

because of too little hands-on and too narrow training. A few employers also have established relationships with other colleges for their training needs; three with Southeast Technical Community College in Milford, Nebraska, and one with Iowa Western Community College in Council Bluffs. Those other schools might constitute the competitors for students in the machine technologies.

Summary and Conclusions

Omaha has a smaller market for machine technologists than do other larger and more industrially-based metropolitan areas. Nevertheless, Omaha employers were very optimistic concerning the future job market for machine technologists.

The number of available machine technology jobs, particularly at the entry-level, was greater at the larger Omaha businesses, and salaries at each grade level were generally better with larger businesses. However, the number of upper grade jobs appeared to be greater and opportunities better for advancement at smaller specialized shops.

Most employers, both large and small, anticipated real growth for their businesses with an attendant increase in demand for skilled machinists. However, almost all employers expressed a concern for the quality of personnel and stated that qualified applicants were difficult to find.

Employers demonstrated consensus on the need for a high level of skills, knowledge, and experience from their machine technology employees. A clear desire was evident for experienced personnel with on-the-job training and for employees well versed in mathematics and machine skills.

In the abstract, employers were split on whether college training should be required or whether on-the-job training through apprenticeships would be equally capable of achieving the desired end. Employers stated that education "can't hurt" but didn't insure that coursework would result in high grade levels or salaries. However, when asked whether MTCC should offer a program in machine technologies, almost all employers with an opinion favored such a program.

Specific skills or knowledge required by employers included machine skills, mathematics, mechanical ability, and good work attitudes. Specific coursework recommended for a machine technology program included mathematics, basic machine training, and drafting/blueprint reading. In addition, good employee work attitudes were of prime concern to employers, and many

employers expressed a confidence in educational institutions' ability to instill those positive attitudes in trainees.

In conclusion, employers expressed both a confidence in their profession's ability to employ machine technologists and in the ability of educational institutions to assist in machine technologist training. In addition, employers clearly favored the establishment of a machine technologies program at MTCC. Not so clear is the cost efficiency of operating such a program. One more cost-efficient option would be to widen the base of such a program by establishing a formalized work-study program with area businesses.