



AUBURN HILLS - M E M O R A N D U M

TO: DR. GRAM

FROM: WILLIAM J. O'MAHONEY, DEAN *WJO*
ACADEMIC SERVICES

SUBJECT: STATUS OF THE CIVIL ENGINEERING TECHNOLOGY NEEDS
ASSESSMENT

DATE: JULY 10, 1990

I am attaching for your information, a copy of the report done by the Research Office at the conclusion of the phase of needs assessment referred to as environmental scanning. I have had two meetings with Marty Orlowski and Mike Kobran, and in addition, Mike Kobran and I have had lunch with Dr. Muntaz Usmen. Dr. Usmen is professor and chairman of the Department of Civil Engineering at Wayne State University.

Mike Kobran has made preliminary contact with a number of individuals relative to their interest in serving as a member of an advisory committee for this program. I think it is appropriate that an advisory committee be appointed as soon as the decision is made to proceed with the data gathering phase of this needs assessment. There are some key questions that need to be answered relative to the type of information to be gathered, they include;

- 1) To what extent should drafting skills be included as a part of this program?
- 2) What level and type of computer aided design coursework should be included?
- 3) What specialty concentration should be adopted within the Civil Tech skill courses?
- 4) What types and level of field skills should be included?
- 5) Can calculus based programs serve the needs of establishing the technical skills that might be required?
- 6) What consideration should be given to licensure and certification requirements within the technical program?

Our initial idea is to pursue a program that provides as much transferability as possible. In other words, to use the calculus based and science transfer coursework based program in pre-engineering, providing the opportunity for three or four technical skill courses in civil engineering technology. In the typical and traditional civil engineering/civil engineering technology fields,

the educational programs diverge and go in different directions right from the very beginning. Our intent would be to follow a transfer context with the science and calculus based courses and offer three or four applied courses that would not transfer. The idea behind this concept is in existing fields individuals who are in the technology aspect of the field have to go back and start over if they want to become a civil engineer. People who are pursuing traditional civil engineering curricula do not have the opportunity to become employed in their field of study prior to completion of their program. By pursuing the curriculum model we are currently considering, students who follow this program would have minimal loss in transferring from the associate degree program to a civil engineering four year degree program. But at the same time, they would have employment opportunities available to them while they are in school, and if they cannot transfer to the upper level coursework, they can stop-out and work for a few years in order to gather the resources to continue on in the pursuit of their engineering degree.

Mike and I have had a discussion with Dr. Useman of Wayne State University proposing this new curriculum model, and while he indicates he is not familiar with this concept, he feels it is intriguing and has possibilities. He has volunteered to make some contacts with people at other institutions, as well as individuals at the engineering accreditation organization to see if there are existing programs similar to the one we propose.

As I mentioned to you earlier, I will continue with the needs assessment on this project until we have reached conclusion, and coordination responsibility should be transferred to someone at the Auburn Hills Campus following completion of the needs assessment as the program advances to the curriculum development stage.

ljt

pc Bill Rose
Marty Orłowski
Mike Kobran
Larry Pennefather

A:2status

CIVIL ENGINEERING TECHNOLOGY NEEDS ASSESSMENT

The purpose of this report is to present information to assist in evaluating the need for a Civil Engineering Technology program at Oakland Community College.

Initiation

Initiated by William J. O'Mahoney (Dean of Academic Services, Auburn Hills), this assessment involved a literature review including information from the Michigan Occupational Information System (MOIS), an examination of related academic programs in institutions of higher education within Michigan and a survey of local area engineering firms, the most common employers of civil engineering technologists.

Description of Proposed Program

As per the Civil Engineering Technology Mission Statement, the Civil Engineering Technology Program would provide the general, supportive, and technical education necessary for the student who completes the program to take a technician position in one of the following fields of civil engineering:

- Design of highways and other public works
- Construction of highways and other public works
- Surveying of highways and other public works
- Traffic and transportation engineering
- Environmental and solid waste planning, design, and construction
- Traffic signal design, construction, and maintenance

The proposed program, resulting in an associates degree in applied science-civil engineering technology, would consist of 28 credit hours of major requirements, 20 credit hours of supportive courses, and 16 credit hours of general education courses.

The major requirements for the Program would include:

- CET 100 (3) Property of Engineering Materials
- CET 110 (3) Engineering Plans & Specifications
- CET 120 (4) Surveying for Construction
- CET 130 (3) Nature of Soils
- CET 140 (4) Highway Design
- CET 150 (3) Bituminous and Concrete Materials
- CET 160 (3) Highway and Structure Maintenance
- CET 170 (4) Route Surveying
- CET 180 (4) Construction Safety and Traffic Maintenance
- CET 190 (3) Traffic Flow and Data
- CET 200 (4) Traffic Signal Control
- CET 210 (4) Highway and Construction Drainage
- CET 220 (3) Environmental Testing and Solid Waste

The supportive courses would include:

MAT 115 (4) Intermediate Algebra
MAT 156 (3) Trigonometry
DPR 103 (4) Principles of Computer Information Process
DRT 111 (3) Introduction to Technical Drawing
CAD 110 (3) Introduction to Computer Aided Design (Design Track)
CAD 120 (3) Computer Aided Design Applications I (Design Track)
PHY 161 (4) College Physics I
QAT 100 (3) Total Quality Control (Inspection Track)
QAT 101 (3) Principles of Quality Assurance (Inspection Track)
ELT 121 (3) Basic Electricity I (Signal Track)
ELT 124 (3) Basic Electricity II (Signal Track)

The general education courses would include:

Communications/English (3)
Fine Arts/Humanities (3)
Mathematics/Science (fulfilled above) (3)
Social Science (3)
American Government (POL 151) (3)
Written Communication (3)
Physical Education (1)

The Accreditation Board for Engineering and Technology, Inc. (ABET) has established criteria for accrediting programs in Engineering Technology. The relevant criteria have been included in the proposed Civil Engineering Technology Program. Specific criteria are listed in the Civil Engineering Technology Mission Statement.

Description of Occupation

Civil engineer technologists work under the direction of civil engineers and physical scientists. They work on the design and construction of roads, airports, tunnels, bridges, water supply systems, sewage systems and buildings. The technician must apply theories and principles of civil engineering in planning, designing and overseeing the construction and maintenance of structures and facilities. According to MOIS, civil engineering technologist's responsibilities include the following:

1. Overseeing production orders and assisting in the preparation of work schedules.
2. Developing cost estimates of work to be completed.
3. Setting up and maintaining monitoring equipment to obtain samples, measurements and other data.
4. Conducting preliminary inspections to assure standards are being met.
5. Performing various other duties such as filing plans and prints, answering questions and directing appropriate work to operators and other workers.

Other job titles for people trained in civil engineering technology include:

- Chemical Technician
- Drafter
- Electrical/Electronics Technician
- Metallurgical Technician
- Petroleum Technician
- Mechanical Engineering Technician
- Industrial Engineering Technician
- Robotics Technician

Calculus-based coursework and further formal education is usually required in order for a civil engineer technician to advance to a position as a civil engineer. Degree programs for civil engineer technicians require technical math and science courses which are not calculus-based.

Relation of Proposed Program to College Mission

The Civil Engineering Technology program relates to the College mission in that OCC will maintain a curriculum responsive to the changing educational needs of the residents of the district. The range of learning experiences provided will include theory, practical application and real life situation (Mission Goal C--Flexible Curriculum). OCC will continue to search for creative, innovative and, when appropriate, risk-taking strategies that will meet the needs of the ethnically, racially and economically diverse populations and institutions within OCC's urban, suburban and rural communities (Goal 2, Objective C--Program Development).

Methodology

An examination of the literature focused on two specific areas pertinent to civil engineering technology: first, industry needs and second, the job market. The literature review dealt primarily with civil engineering; however, it is most often the case that civil engineer technicians are hired by the same firms and that employ civil engineers. Civil engineer technicians are also most often supervised by civil engineers.

Additional information subsequent to the literature review was warranted, to gather information about local area employer's hiring practices and needs for civil engineering technicians. A survey was designed and sent to local area engineering firms (see Appendix A) to assist in the civil engineering technology program assessment.

TABLE 1
 Michigan Employment Outlook for
 Civil Engineering Technicians

Region	Number Employed		Percent Growth
	1985	1995	
Detroit Metro	1640		10
Kent County	50		10.5
Flint	250		29.3
Lansing	125		10.4
Washtenaw Area	125		12.6
Saginaw Bay, Midland	75		8.7
Kalamazoo	25		39.9
Upper Peninsula	25		25.7
Jackson	50		10.2
Berrien, Cass, VanBuren	25		18.4
Ottawa-Allegan	25		20
Battle Creek	25		14
N.W. Lower Peninsula	25		30.6
Muskegon	25		25

**From MOIS transcript #403

Methods of Data Collection

In order to gauge the need for a civil engineering technology program and how the college could meet these needs, survey questionnaires were sent to seventy-five local engineering firms that employ civil engineers and civil engineering technicians. The survey addressed three areas:

1. employment demands
2. employment benefits
3. career preparation

Survey questions about employment demands included inquiries about current employment of civil engineering technicians, and future employment needs, such as needs to retrain current employees, and the need to increase civil engineering technology staff. Survey questions concerning employment benefits included inquiries about salary levels, advancement opportunities, and other reasons for choosing civil engineering technology as a career. Survey questions focusing on career preparation included requests for identifying needed skills and credentials, comments on the adequacy of currently available training, and assurances about the availability of training at the engineering firm for potential Oakland Community College students.

Methods of Data Analysis

Seventy six percent (76%) of the surveyed engineering firms returned the completed survey. Data were analyzed by means of frequency distributions and content analysis of narrative responses.

Analysis

Employment

In 1985, there were approximately 2,550 civil engineer technicians employed in Michigan, most working in urban areas. Projected growth in major regions of the state is ten to thirty percent within a ten year period. An annual average of 90 openings is expected with 60 due to replacement and 30 due to natural growth. Table 1 (below) represents employment projections in fourteen major geographic regions in Michigan by 1995.

****INSERT TABLE 1****

TABLE 2
 SURVEY RESULTS ON PROJECTED HIRING OF CIVIL ENGINEER TECHNICIANS
 FROM 0 TO 10 YEARS

CIVIL ENGINEERING FIRMS CURRENTLY HIRING
 CIVIL ENGINEERING TECHNICIANS

CURRENTLY HIRING	31.5%
NOT HIRING	68.5%

CIVIL ENGINEERING FIRMS ESTIMATES OF HOW MANY NEW CIVIL ENGINEERING TECH
 WILL BE HIRED WITHIN THE NEXT 5 YEARS

NUMBER HIRING	PERCENTAGE
0	27.8
1	16.7
2	14.8
3	9.3
4	5.6
5	9.3
6	1.9
9	1.9
10	1.9
15	1.9
20	3.7
25	3.7
60	1.9

TABLE 3
MOST LIKELY REASONS CIVIL ENGINEERING FIRMS LISTED
FOR HIRING NEW CIVIL ENGINEERING TECHNOLOGISTS
WITHIN THE NEXT 5 YEARS

EXPANSION OF FIRM	23.1
INCREASED VOLUM OF BUSINESS	51.3
RETIREMENT OF CURRENT EMPLOYEES	20.5
OTHER	5.1

Of the responding engineering firms surveyed, over 67% answered that they currently employ civil engineering technicians. However, as shown in Table 2 (below), almost 69% responded that they were not currently hiring new civil engineering technicians, but over 72% anticipated hiring additional civil engineering technicians between 1991 and 1995. As shown in Table 3 (below) over 50% of the respondents who said that they would be hiring more civil engineering technicians in the future, said that their most likely reason for doing so would be because the firm was expanding. Over 73% of respondents reported that they believed there was a growing need for civil engineering technicians in the industry.

INSERT TABLE 2*

INSERT TABLE 3*

Employment statistics from the Michigan Occupational Information System (MOIS) were obtained for civil engineer technicians and civil engineers. An informal survey of four local civil engineering firms was conducted. The four civil engineering firms contacted were Barton-Malow, Professional Engineers Associates, Black and Veatch and Brown, Mason and Son, Inc. Only Barton-Malow did not hire civil engineering technicians. The other three firms hired civil engineering technicians whose job duties included general drafting, use of CAD (Computer Aided Design), surveying, data reduction, field work and other detailed tasks delegated by civil engineers.

As of 1985, there were approximately 5,050 civil engineers employed in Michigan. They worked for highway and building construction firms, government agencies, consulting firms and manufacturing companies (MOIS, 1989). Employment for civil engineers in Michigan is expected to increase faster than the average for all occupations in the 1990s. Expected increases are based upon public concern for protection of the environment, redevelopment of urban areas and road work for new residential areas.

A growing market for civil engineers involves the problems of hazardous or toxic waste dumping and growing societal concern to correct the unsafe practices of the past. New federal regulations will require the use of highly trained specialists in this field especially as it relates to health and safety (Brown, 1989; Engineering News Record, 1988).

Infrastructure repair is another growing concern in many states. An Engineering News Record survey indicated that Michigan is ranked thirteenth out of twenty states with the largest road and bridge market in the United States (Hannan, 1990). In addition, many cities on the East coast and Midwest need to repair or replace deteriorating roads, bridges and sewer/water lines (Ichniowski, 1990).

A weakened economy has affected the construction industry in the area of single-family housing. As a result, the industry is

looking towards nonresidential markets in commercial and industrial construction. In addition, building construction by government and educational institutions is expected to increase (Hannan, 1990).

In the area of wastewater management, there is a projected ten billion dollars of work needed in several California cities within the next ten years (Civil Engineering, 1989). Other points of concern include the conservation of water and wastewater management in the desert Southwest. In the Detroit Metropolitan area, employers are hiring civil engineers to work in the area of environmental control which includes wastewater management.

The literature in all major journals reviewed suggest that there is a serious shortage of civil engineer technicians and civil engineers. Retraining in new technology is needed to combat a growing market dealing with hazardous waste and other environmental issues. In addition, there are not enough trained manpower to meet the demand for infrastructure repair as states seek government and local funding to start construction (Merwin, 1990).

A common theme cited in the literature is that professionals in the field of civil engineering are looking to develop new manpower sources, especially women and minorities, since white males are leaving the field. Women have been reluctant to enter the field due to a lack of mentors (Engineering News Record, 1988). In addition, women perceive the field to be low tech, a perception that is also shared by the general public (Engineering News Record, 1988).

Minorities tend to associate construction work with common labor. However, as education levels increase, minorities are increasingly entering the more prestigious engineering fields (Engineering News Record, 1988). The National Action Council for Minorities in Engineering (NACME), the American Consulting Engineers Council (ACEC), the American Society of Civil Engineers' (ASCE) and the National Science Foundation (NSF) are actively encouraging minorities to enter the field by providing financial incentives to facilitate their education. Nevertheless, a Fall 1989 report from the Engineering Manpower Commission indicated that from 1988 to 1989, the total female undergraduate population in engineering had decreased, but the female population in graduate school programs had increased. The representation of Black undergraduates in engineering had increased by 712 by 1989 and Hispanics had increased by 557.

Employment Benefits

Based on education, work experience and areas of specialization, civil engineer technicians, on a national level, earn an average annual salary of \$17,879 to \$34,742. There is a potential for advancement in the field with additional college education and work experience. The average annual salary for a Michigan graduate with an associate's degree is between \$9,360 and \$18,000. In Oakland County, civil engineer technicians employed by

government earn between \$16,205 and \$28,289 annually. In Michigan, civil engineer technicians are not required to be certified, but some employers may require certification in specialized areas. Employers may hire individuals with related backgrounds, but they prefer to hire graduates of a formal Civil Engineer Technician program (MOIS). The survey of local area engineering firms supports the MOIS information on salaries.

Survey respondents provided information regarding employment benefits, such as salary and advancement opportunities. The ranges in annual salaries that area engineering firms presently offer to civil engineering technicians are as follows:

	LOW	HIGH
ENTRY LEVEL	\$10,000	\$34,729
UPPER LEVEL	\$10,000	\$52,000

The salary range from entry level to upper level showed that civil engineering technicians have much room for economic advancement within their field.

In the area of career advancement, many firms reported a variety of different job positions and titles that would be possible for an experienced civil engineering technician to advance to over time. These titles and positions included: project manager, registered surveyor, program manager, CADD supervisor, plant engineer, Jr/Intermediate Engineer, designer, inspector, survey crew, materials technician, civil engineer assistant, assistant estimator, estimator, chief estimator, draftsman in charge, expeditor, office supervisor, lead technician, and supervisor of field or laboratory supervision. Many firms also reported offering on the job training to their employees to help enable them to advance to such positions.

Over 76% of those firms that responded reported that it was not possible to advance to a position as a civil engineer without further coursework, specific. It was generally agreed that a civil engineering technician would need to obtain a bachelors degree in civil engineering in order to advance to such a position. A civil engineering bachelors degree program would require much calculus and math-based coursework that is not present in standard civil engineering technology programs.

Career Preparation

According to the literature search, a total of six institutions of higher education in Michigan currently offer programs in civil engineering technology or civil technology. Each institution is listed below along with a brief description of their program.

Alpena Community College: Offers an Associate of Applied

TABLE 4

Michigan Colleges and Universities*
Offering Two Year Transfer Degrees/Advanced Degrees
in Civil Engineering
(*Community College unless otherwise specified)

Bay De Noc	Mid-Michigan
Charles Stewart Mott	Montcalm
Detroit Business Institute	Muskegon
Glen Oaks	Northern Michigan University
Gogebic	Northwestern Michigan College
Jackson	Saginaw Valley State University
Kalamazoo Valley	Schoolcraft College
Kellogg	St. Clair County
Kirtland	Southwestern Michigan College
Lake Michigan College	University of Detroit
Lansing	University of Michigan
Lawrence Technological University	Washtenaw
Madonna College	Wayne State University
Michigan State University	

Science degree in Concrete Technology which covers aspects of concrete manufacturing and building construction. The degree requires 58 credit hours for completion. The College also offers an associate's for transfer in civil engineering.

Delta College: Offers a 42 credit hour certificate in Residential Construction geared toward the housing and business industry. With an additional 25 credit hours, a student can earn an Associate of Applied Science degree in this field.

Ferris State University: Offers an Associate of Applied Science degree in Construction Technology which includes road work, building construction, airport construction and railroads. The degree requires 99 quarter credit hours for completion.

Grand Rapids Junior College: Offers an Associate in Civil Engineering Technology for transfer and an Associate of Applied Science degree in Water Purification Technology. Water Purification Technology trains individuals to work with water quality and treatment. This degree requires 66 credit hours for completion.

Macomb Community College: Offers a 62 credit hour Associate in Applied Science degree and a 30 credit hour certificate in Civil Technology geared toward construction and water/waste water systems. In addition, MCC offers an Associate degree of Applied Science in Construction for mid-managers.

Michigan Technological University: Offers a 102 quarter credit hour program in Civil Engineering Technology for an Associate in Applied Science. This program provides training in surveying, drafting, soil technology, computer applications and construction.

Table 4 lists Michigan colleges and universities offering two year transfer degrees or advanced degrees (bachelor's, master's, doctorates), in civil engineering.

INSERT TABLE 4*

In 1988, the Engineering News Record reported that recruitment of students into civil engineering programs was increasing at the college level. However, a September 1989 report in Chemical Engineering indicated that recruitment activity in civil engineering programs was low compared to the previous year, but enrollments were expected to remain steady. However, when the department chairs of five major universities (Michigan Technological University, University of Detroit, Michigan State University, Wayne State University and the University of Michigan-Ann Arbor) were contacted for information regarding their Civil Engineering program, all five chairpersons indicated that

traditionally, average enrollment in civil engineering was lower than any other engineering program. In addition, they indicated that placement rates for civil engineer graduates of their schools is 100%. They also reported that graduates are more likely to be hired by local, state and federal governments, while fewer are hired by private engineering firms.

Some universities such as Lawrence Technological University and Michigan Technological University offer bachelor's degrees in Civil Engineering and Civil Engineering Technology. The objectives and course work associated with these programs are very different such that accreditation standards do not permit the exchange of courses between the two programs. The curriculum for civil engineering is calculus-based, while civil engineering technology courses are not. All five chairpersons contacted, indicated that they do not accept Civil Engineering Technology Associate degrees for transfer into their Civil Engineering program. However, they do accept the current Oakland Community College pre-engineering course work for transfer into their Civil Engineering degree program.

Over 88% of survey respondents shared information believed that there is a need for more training/associates degree program in civil engineering technology. Over 43% of respondents said that they would be interested and willing to have an Oakland Community College student work as an intern at their firm during their college training, and a further 31% felt that they might be willing to have an intern under certain circumstances (see Appendix B).

Summary

Based on this initial assessment there appears to be evidence that supports the notion of future economic growth and productivity in the field of civil engineering. Demand in Michigan and other states primarily concerns the areas of road construction and repair, wastewater management, industrial construction and hazardous waste disposal management. Employers currently report a shortage of manpower in civil engineers and technicians. Furthermore, as construction projects and federal dollars increase in the 1990s to address growing concerns over infrastructure repair and environmentally related issues, the shortage of trained technicians and engineers to fulfill the demand will continue to grow. From our survey, it does seem that local area employers are optimistic of the growing future for civil engineering technicians. Further, there does seem to be a wide variety of advancement opportunities for civil engineering technicians, although becoming a civil engineer does require more formal education and a heavier emphasis on math related coursework.

**OAKLAND COMMUNITY COLLEGE
CIVIL ENGINEERING TECHNOLOGY PROGRAM
NEEDS ASSESSMENT SURVEY**

Instructions: Please respond to each of the following questions based on your knowledge of the current and future status of Civil Engineering Technology in your firm. When finished, place the completed survey in the pre-addressed, postage-paid envelope and mail. Thank you for your help.

1. How many Civil Engineering Technologists does your firm currently employ?

Full time
 Part time

2. Are you currently hiring more Civil Engineering Technologists?

Yes
 No

3. How many new Civil Engineering Technologists do you anticipate hiring between now and 1995?

4. PLEASE RANK ORDER FROM 1 (MOST LIKELY REASON) TO 4 (LEAST LIKELY REASON) the following possible reasons for hiring new Civil Engineering Technologists in your firm within the next five years:

Expansion of firm
 Increased volume of business
 Retirement of current Civil Engineering Technologists
 Other, please explain: _____

5. How would you rate Civil Engineering Technology as a career to enter currently?

Excellent
 Good
 Fair
 Poor

6. What percent of Civil Engineering Technologists that your firm currently employs will need formal (classroom) upgrading of their skills on an annual basis?

_____%

7. Do you feel there is a growing need for Civil Engineering Technologists?

Yes
 No

8. What specific skills and /or prior-training do prospective Civil Engineering Technology employees need before being hired? (PLEASE CHECK ALL THAT APPLY)

Drafting
 Surveying
 Graphics
 Technical writing
 Advanced mathematics, please explain: _____
 Computer training, please explain: _____
 Other, please explain: _____

9. What is the annual Civil Engineering Technologist salary range at your firm?

Entry level \$ _____ to \$ _____
Upper level \$ _____ to \$ _____

OVER

APPENDIX A

10. What related advancement opportunities are available to Civil Engineering Technologists?

Please give examples of job titles: _____

11. Is it possible for Civil Engineering Technologists to advance to a Civil Engineering position without additional academic work and/or degrees?

_____ Yes; please skip to question 13
_____ No; please answer question 12

12. If you answered NO to question 11, please explain what additional academic work and/or degrees are necessary for a Civil Engineering Technologist to advance to a Civil Engineering position:

13. Are Civil Engineering Technologist positions available to persons with disabilities?

_____ Yes
_____ No, please explain: _____

14. What credentials are required by your firm for Civil Engineering Technologists? (Check all that apply)

_____ No prior related work experience or education
_____ Prior related work experience
_____ Prior work experience as a Civil Engineering Technologist
_____ Associate's Degree in Civil Engineering Technology
_____ Bachelors Degree, please list acceptable fields: _____

_____ Other, please explain: _____

15. Do you feel that the new (non-experienced) Civil Engineering Technologists you hire are adequately prepared for the job?

_____ Almost always prepared
_____ Sometimes prepared
_____ Usually not prepared

16. Is there a need for community college Civil Engineering Technology training programs?

_____ Yes
_____ No

17. Would your firm be willing to have an Oakland Community College student work as an intern during their academic training?

_____ Yes
_____ No
_____ Uncertain, please explain: _____

In case we have follow-up questions after reviewing your responses, would you please provide your name and phone number where you can be contacted during regular office hours? Thank you.

Name: _____ Phone: _____ Office Hours: _____
Name of Firm: _____

The information you provided in this survey will help OCC determine the future of the Civil Engineering Technology program. Please place the completed survey in the pre-addressed, postage-paid envelope and drop it in the mail today. Thank you.

OCC, Office of Institutional Research, 27055 Orchard Lake Rd. Farmington Hills, MI 48334

APPENDIX B

CIVIL ENGINEERING FIRMS

WILLING TO HAVE AN OAKLAND COMMUNITY COLLEGE STUDENT
WORK AS AN INTERN DURING THEIR ACADEMIC TRAINING*

(*THE FOLLOWING ARE FIRMS WHO ANSWERED 'YES' TO WILLINGNESS; THERE
ARE ALSO OTHER FIRMS WHO ANSWERED 'UNCERTAIN', WHOSE NAMES CAN BE FOUND
IN THE ORIGINAL SURVEY DATA)

Ramji Patel
Somat Engineering, Inc.
313-946-4966

Howard Pickens
Betty Eaton
Michigan Department of Transportation
313-569-3993
517-335-2260

Lawrence Mislinski
Harley, Ellington, Pierce Yee Associates, Inc.
313-262-1500

John Barber
Cummins & Barnard, Inc.
313-761-9130

Ray Tadgerson
Capital Consultants, Inc.
517-371-1200

Charles Biegun
Giffels-Webster Engineers, Inc.
313-852-3100

Darwin McLead, P.E.
Boldt, McLead & Johnson, Inc.
313-989-5596

Sherri Fountain
Frank A. Henderson
Soil & Materials Engineers Inc.
313-525-0310

Alonzo Harris, Jr.
Madison Madison International of Michigan, Inc.
313-963-6110

Neall Schroeder
City of Tory
313-524-3383

Donald McCormack
Hubbell, Roth & Clark, Inc.
313-338-9241

Isaac Sheppard, Jr.
Sheppard Engineering, Inc.
313-585-4240

Rick P. Harding
GZA
313-462-0207

Ralph Knop
Wade-Trim/Edmands
517-686-3100

William Otwell
City of Farmington Hills
313-473-9594

Carolyn C. Palmer
Ellis/Naeyaert/Genheimer Associates, Inc.
313-649-2000

D. Bodouinor
Testing Engineers and Consultants, Inc.
313-588-6200

Robert Northrup
City of Southfield
313-354-5755

David Henri
West Bloomfield Township Engineering Department
313-683-0824

Janis Bobrin
Washtenaw Co. Drain Commission
313-994-2525

Gerald Holmberg
Road Commission for Oakland Country
313-645-2000

James Latham
Black and Veatch
313-259-5300

David Bino
ETS
313-453-7900

T.L. Gilmore
Thomas L. Gilmore R.L.S.
313-471-5253

H.T. Wong
US Army Corps of Engineers, Detroit District
313-226-6793

John B. Stadnicar
Professional Service Industries, Inc.
313-255-4200

Richard Shepler
City of Berkley
313-546-2430

Dick Cob
City of Royal Oak, Engineering Department
313-544-6636

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**From MOIS transcript #403

TABLE 2
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Gogebic	Northwestern Michigan College
Jackson	Saginaw Valley State University
Kalamazoo Valley	Schoolcraft College
Kellogg	St. Clair County
Kirtland	Southwestern Michigan College
Lake Michigan College	University of Detroit
Lansing	University of Michigan
Lawrence Technological University	Washtenaw
Madonna College	Wayne State University
Michigan State University	

OFFICE OF INSTITUTIONAL RESEARCH
 CIVIL ENGINEERING TECHNOLOGY PROGRAM
 NEEDS ASSESSMENT
 CODE BOOK

Variable	Description/Code	Column
ID	Survey ID (Actual 3 digit number)	1-3
FULLTIME	1. How many Civil Engineering Technologists does your firm currently employ ? A.Full-Time (Actual number) 999= No Response/Unknown	4-6
PARTTIME	B.Part-Time (Actual number) 99= No Response/Unknown	7-8
HIRING	2. Are you currently hiring more Civil Engineering Technologists? 1= Yes 5= No 9= No Response/Unknown	9
NEWCET	3. How many new Civil Engineering Technologists do you anticipate hiring between now and 1995? (Actual number) 99= No Response/Unknown	10 -11
EXPAND	4. PLEASE RANK ORDER FROM 1 (MOST LIKELY REASONS TO 4 (LEAST LIKELY REASON) the following possible reasons for hiring new Civil Engineering Technologists in your firm within the next five years: a.Expansion of firm 1= Most likely reasons 2= 3= 4= Least likely reasons 9= No Response/Unknown	12

VOLUME	b.Increased volume of business (Same as Q.4a)	13
RETIRE	c.Retirement of current Civil Engineering Technologies (Same as Q.4a)	14
OTHERA	d.Other (Same as Q.4a)	15
RATE	5. How would you rate Civil Engineering Technology as a career to enter currently? 1= Excellent 2= Good 3= Fair 4= Poor 9= No Response/Unknown	16
EMPLOY	6. What percent of Civil Engineering Technologists that your firm currently employs will need formal (classroom) upgrading of their skills on an annual basis? (Actual percent) 999= No Response/Unknown	17-19
NEED	7. Do you feel there is a growing need for Civil Engineering Technologies? 1= Yes 5= No 9= No Response/Unknown	20
	8. What specific skills and/or prior training do perspective Civil Engineering Technology employees need before being hired? (PLEASE CHECK ALL THAT APPLY)	
DRAFT	a.Drafting 1= Yes 5= No 9= No Response/Unknown	21
SURVEY	b.Surveying (Same as Q.8a)	22

GRAPH	c.Graphics (Same as Q.8a)	23
WRITE	d.Technical Writing (Same as Q.8a)	24
MATH	e.Advanced mathematics (Same as Q.8a)	25
COMPUTER	f.Computer training (Same as Q.8a)	26
OTHERB	g.Other (Same as Q.8a)	27
	9. What is the annual Civil Engineering Technologist salary range at your firm?	
ELOW	a.Entry level-Low (Actual amount) 99999= No Response/Unknown	28-32
EMAX	b.Entry level-Maximum (Same as Q.9a)	33-37
ULOW	c.Upper level-Low (Same as Q.9a)	38-42
UMAX	d.Upper level-Max (Same as Q.9a)	43-47
ADVANCE	11.Is it possible for Civil Engineering Technologists to advance to a Civil Engineering position without additional academic work and/or degrees? 1= Yes 5= No 9= No Response/Unknown	48
DISABLED	13.Are Civil Engineering Technologist positions available to persons with disabilities? 1= Yes 5= No 9= No Response/Unknown	49

	14.What credentials are required by your firm for Civil Engineering Technologists?	
CREDNA	a.No prior related work experience or education 1= Yes 5= No 9= No Response/Unknown	50
CREDENB	b.Prior related work experience (Same as Q.14a)	51
CREDENC	c.Prior work experience as a Civil Engineering Technologist (Same as Q.14a)	52
CREDEND	d.Associate's Degree in Civil Engineering Technologist (Same as Q.14a)	53
CREDENE	e.Bachelors Degree (Same as Q.14a)	54
CREDENF	f.Other (Same as Q.14a)	55
PREPARE	15.Do you feel that the new (non-experienced) Civil Engineering Technologists you hire are adequately prepared for the job? 1= Almost always prepared 2= Sometimes prepared 3= Usually not prepared 9= No Response/Unknown	56
TRAINING	16.Is there a need for community college Civil Engineering Technology training programs? 1= Yes 5= No 9= No Response/Unknown	57
INTERN	17.Would your firm be willing to have an Oakland Community College student work as an intern during their academic training ? 1= Yes 5= No 7= Uncertain 9= No Response/Unknown	58