FINAL PERFORMANCE REPORT

East Carolina University
School of Industrial Technology
Greenville, NC 27858

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East Carolina University Occupational Safety and Health Consortium

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ABSTRACT

The Occupational Safety and Health Consortium at East Carolina University is an intra-university group consisting of representatives from the Schools of Industry and Technology, Medicine, and Allied Health Sciences. Collaboration also takes place with the Schools of Business and Nursing. The Consortium provided the initiative to start a master of science concentration in occupational safety within the industrial technology department at East Carolina University. It also provides support for a number of outreach initiatives to the business and industrial community as well as to the safety profession in general. As a result of Consortium efforts, eastern North Carolina, the rest of the state, and even other parts of the United States are receiving a wide variety of safety and health services in the forms of education, training, consulting, and other programming needs.

SIGNIFICANT FINDINGS

During the period of July, 1994-July, 1996, the following significant advances have been made at East Carolina University:

1. Requested and received authorization from the North Carolina Board of Regents to plan a new degree program in occupational safety at the M.S. level at East Carolina University. This will move the current academic concentration to full program status once received.

2. Added a second faculty member whose primary responsibilities are in the area of industrial hygiene.

3. Graduated twenty-five students in the occupational safety concentration and provided stipend and tuition assistance to many of those.

4. Offered courses by interactive television at two remote locations in North Carolina.

5. Developed and offered courses by interactive computer on the Internet.

6. Began offering a full range of training, consulting, and medical services to regional industry by the Occupational Safety and Health Consortium.

7. Offered training and consulting via continuing education programs on campus, and through a regional safety school for industry.

8. Offered training and consulting on-site for local industry.

9. Increased level of safety research at ECU.

PROGRESS REPORT

1. Background

Before the establishment of the Occupational Safety and Health Consortium at East Carolina University, no public entity was providing safety and health training in eastern North Carolina, aside from the minor training already occurring at East Carolina University (ECU). Industry people attended an occasional 10-hour construction safety program and there were a handful of industrial hygiene students from the public health program in Allied Health Sciences. The need for systematic, on-going training offered regularly in the region (and in the state for that matter) has been and continues to be extensive. The reasons for the need are obvious.

In eastern North Carolina (east of I-95), there are 35,452 industries. This includes 1,789 manufacturers with 114,996 manufacturing employees. In Pitt County (the location of ECU) alone, there are 34,918 employees reported with an additional 81,599 reported employees in the adjacent counties. Greenville, North Carolina is projected to be the fastest growing city in North Carolina and the tenth fastest growing city in the nation in the decade of 1996-2006. The Global TransPark alone, which is to be located about twenty miles from Greenville is expected to attract over fifty thousand employees upon completion.

As previously mentioned, there is no public agency or university offering safety and heath training in the region and there is very little that has been done by the private sector. No other institution in the state is offering a graduate degree in occupational safety. The only undergraduate degrees are offered by St. Augustine's College and North Carolina A&T. Neither are accredited by the American Society of Safety Engineers.

When the Consortium was established, the major goal was to bring together faculty at East Carolina University into a cohesive working unit that would recruit more students into the field and provide occupational safety and training courses for many different disciplines. The occupational safety and health initiative would occur in three ways. First of all, the industrial hygiene academic program would be continued with additional courses offered and a new professor added to the program. Secondly, additional occupational medical personnel in the Department of Prospective Health would work along side the faculty members in the Schools of Allied Health Sciences and Industrial Technology. Thirdly, a safety program would be established in the School of Industry and Technology. All of these activities would be coordinated under the leadership of the Director of the Occupational Safety and Health Consortium, partially funded by the NIOSH grant. One of the major goals of the Consortium is to cross departmental and school lines to offer academic and continuing education training to the area by utilizing resources from across the campus. Departmental demarcations were to be minimized. Progress to date on these activities has been steady.

In 1993, Dr. Mark Friend was hired to direct the Consortium and to initiate a program in occupational safety. The occupational safety option was established in the School of Industry and Technology in January, 1994. At this writing, there are approximately fifty students pursuing a Master of Science in Industrial Technology with an emphasis in Occupational Safety.

In the fall of 1994, Dr. James Kohn was hired, under the Consortium umbrella, in the School of Industry and Technology to teach industrial hygiene, ergonomics and safety. Since coming to East Carolina, he has also been active in industrial training in occupational safety and health in this region. Dr. Kohn is very active at the national level in the affairs of the American Society of Safety Engineers.

Another full-time faculty member is scheduled to be added in the fall semester of 1997 to aid with the coordination of student practicums, consulting, and continuing education.

In addition to academic programs, the Consortium has also been active in offering continuing education programs and consulting in occupational safety to members of an historically underserved business and industrial community. In 1997, the headquarters of the Occupational Safety and Health Consortium will be moved to the Greenville/Pitt County Business Institute Center.

2. Training Program and Objectives

The Department of Industrial Technology offers the MS degree in Industrial Technology with an emphasis in Occupational Safety. This degree consists of thirty-seven semester hours and takes approximately four full-time semesters to complete. All students who are not working professionals are also required to take the Industrial Safety course. This is determined on a case-by-case basis.

Individual safety courses are being offered by Internet and are now available throughout the United States. Prior to January 1997, it has been limited to North Carolina, but now enrollment will be open to all eligible students. Full-time safety professionals who want advanced degrees can avail themselves of the opportunity to take classes through distance learning. At least one course will be offered per semester. Students will be required to travel to campus for some courses for intensive, week-end lab experiences.

The Master of Science in Industrial Technology with an emphasis in Occupational Safety is designed to:

- offer a degree program that will prepare safety professionals by providing them with the necessary technical and managerial skills to develop, implement, evaluate, and manage programs aimed at reducing occupational injuries and illnesses. Graduates are prepared to function as leaders, resource specialists, and consultants in a wide variety of production, construction, and service industries and organizations. They are also

prepared to take the first part of the Certified Safety Professional (CSP) examination to become an Associate Safety Professional (ASP). Certification is being sought for the program so that they will be qualified to sit for it in the last semester prior to graduation.

- make the courses available during the evening hours so that working professionals have the opportunity to take them. The earliest classes in occupational safety begin at 4 PM.

- make courses available in non-traditional, extended classroom formats, so that individuals who are unable to attend courses in their own geographic location can take advantage of distance-learning formats. Asynchronous learning systems are being experimented with to permit students to study and learn on their own schedules. On-line help is offered during semi-weekly, on-line chat sessions.

3. Curriculum Development

The feasibility of also offering an undergraduate degree in Occupational Safety is now being explored. This program would consist of 128 semester hours and take approximately eight full-time semesters to complete. Graduates of the program will be qualified to work as safety professionals. Every effort was made to develop curricula which comply with the requirements of the American Society of Safety Engineers. Once accreditation is obtained for each program, graduates will be qualified to sit for the Board of Certified Safety Professionals (BCSP) Associated Safety Professional exam for ASP designation. Accreditation will be sought in the 1997-98 school year for the MS program. Discussions are now underway with the American Society of Safety Engineers and other universities to explore the possibilities of providing coursework eventually leading to a doctorate in occupational safety. This will likely wind up being a combined effort of a number of universities. Currently, the Department of Industrial Technology at East Carolina Universities is joining forces with six other universities to provide doctoral-level education in a number of related areas. Safety will likely be a concentration that will be offered with courses originating at this university through the efforts of Consortium members.

One of the major problems encountered when the program was first devised was the development of new courses for the core part of the master's program. Funding permitted and encouraged the development of the following which, of course, became the core of the M.S. concentration in occupational safety.

Core Curriculum Content in M.S. Program

a. Occupational Ergonomics

This course addresses the study of the dimensions of occupational ergonomics practice and applications intended to reduce worker/hardware/ environmental interface problems in order to enhance worker performance while minimizing adverse physiological effects. Topics such as anthropometrics and biomechanics are discussed to better understand the relationship between human and machine interaction. Ergonomic intervention methods such as engineering controls, administrative controls, PPE, and training are discussed. Discussion of CTD's and other ergonomic workplace problems is a focus of this course. Students are required to do ergonomic case studies in real industry situations. The course culminates with the study of how to manage an ergonomics program.

b. Environmental Operations and Hazardous Materials

This course aims to provide students with a background in environmental operations and hazard control measures applicable to handling, storage, and transportation of hazardous materials and disposal of waste. The course discusses the legal basis of hazardous material safety (EPA, OSHA, DOT, SARA Title IV, etc.) and emphasizes the six steps to incident management: Hazard identification, Action plan, Zoning, Managing the Incident, Assistance, and Termination. This course also deals with basic toxicology, hazard recognition and control, and emergency and disaster management. The student upon successfully completing the course receive 40-hour hazmat certification.

c. Occupational Safety Monitoring and Controls

This course is a study of harmful agents in the workplace including their discovery, recognition, monitoring, and control. It covers the principles of industrial hygiene and discusses such topics as TLVs, PELs, BEIs, ionizing and non-ionizing radiation, noise pollution, ventilation, environmental stressors, as well as many more harmful workplace agents. This course emphasizes evaluating and controlling the work environment in order to resolve occupational health problems.

d. Occupational Safety and Health Law

This course was developed to help students understand the major legislation impacting the occupational safety and health profession including major acts, contracts, liability, and organizational law. Students gain knowledge of the Occupational Safety and Health Act of 1970, the promulgation and structure of the Federal Regulations, State/Federal Record keeping requirements, recent legislation, and standards as part of a Safety and Health Management Program.

e. Technical Aspects of Occupational Safety and Health

This course concentrates on the study of the engineering of safety into design, construction, and maintenance of industrial facilities. Specific engineering practices and techniques are discussed with the emphasis on compliance to specific standards, codes and regulations. Students are required to inspect a local company and formulate an OSHA inspection checklist as well as a written report to be submitted to upper management. The course strives to achieve an understanding of OSHA regulations and focuses on General Industry standards (29CFR1910).

f. Fire Protection and Prevention

This course revolves around the study of the prevention of and control of fires through building construction, life safety code compliance, detection and alarm, and extinguishing methods. Occupancy types and fuels will be also examined. Students are required to do a fire inspection of a local company and develop fire and emergency action plans for the business. This course covers such topics as characteristics and behavior of fire, building fire safety/life safety codes, industrial protection and prevention programs, and extinguishing systems and equipment.

g. Systems Safety Analysis

This course is an applications oriented study of the recognition and evaluation of hazards in the industrial environment and the formulation of control systems for the alleviation of work-related accidents and injuries. The course covers such topics as incident investigation methods, job safety analysis, risk management, and hazard analysis. The course incorporates statistical analysis of systems in series and parallel to determine probabilities of success and failure in systems.

In nearly every individual safety course, students are required to complete a project in a company that utilizes the information learned in the course. They participate in groups and are responsible for making a presentation to management and to the class on their findings and results.

Minor curriculum improvements are planned for the 1997-98 academic year. The anticipated changes will broaden student requirements by adding undergraduate prerequisites to the program.

4. Need for Study

As outlined above, very little training or education is being offered in Eastern North Carolina. East Carolina University has been virtually the only resource. With NIOSH funds to build on, the university has been able to:

- establish a concentration at the M.S. level in occupational safety

- provide an opportunity for industry representatives to have their training needs met
- provide education to specific students through stipends and tuition assistance
- upgrade professional training of faculty
- offer training and consulting services to Eastern North Carolina business and industry
- offer courses through a distance learning format to students throughout the country
- and put together the physical resources necessary to adequately equip those who are being trained.

The Project Training Grant not only permits these activities to continue, but acts as a base to accomplish additional activities within the university. By utilizing the funds provided, members of the Consortium have been able to leverage those monies against industry and university resources to greatly enhance the program. Monies for personnel were used as a base (one at a time) to hire the two new faculty members now on board. Monies for travel have been utilized for professional development, whereby the faculty members involved have been able to present papers at national conferences. Additional, university resources were pulled in also. Equipment and supply monies were used as negotiation tools with industry to buy equipment at or even far below cost. SCBAs which normally cost over $2,000 each were purchased for from $600 - $900 per unit. Industrial hygiene equipment was purchased at a fraction of the cost. Had the NIOSH funds not been available, the equipment to do a good job would not have been available either. Nearly every dollar provided has been used as a base to attract additional resources to the profession from the university or outside sources. It is money well spent. Current funds for this year have been used to purchase a laptop computer for use in consulting and training projects. It is loaded with a multi-thousand question OSHA inspection form and report generator as well as with prototype written programs. This software is used by graduate students and faculty to aid industry in OSHA compliance and management activities. Funds have also been used to purchase equipment used by graduate students in their internship/practicum projects. In one case, a company is adding 20% to the amount paid the students to help recoup the cost of the equipment. These funds will be used to expand the laboratory holdings.

The training program NIOSH is funding is not a simple, straightforward academic program, but a complex of education and training designed meet the needs of regional industry. This ultimate output occurs in the following ways:

- Graduate students are educated in the occupational safety curriculum in the School of Industry and Technology. At the current level of funding, we are attempting to stabilize graduate student enrollment. The feasibility of establishing an undergraduate program is now being explored.

- A full range of training, consulting, and medical services are being offered by the Occupational Safety and Health Consortium to regional industry. Although most of the emphasis has been on training, additional services are being added as companies

become aware of the services. Consulting is rapidly becoming more important to our clients.

- Student interns are being made available for use by local industry. Companies that have larger, longer-term needs are turning to the university for graduate students who can help them solve their problems or who can handle a project for approximately $10 per hour. The students are glad to have the work and small manufacturers are getting bargain-basement prices on needed services. Students in the period covered here have worked for a number of companies including Glaxo Wellcome, Greenville Utilities, Procter and Gamble, North American Fiberglass, Department of Labor, Fountain Powerboats, and others. Incidentally, one of our interns wrote the official booklet on PPE for North Carolina OSHA. This hundred-page-plus document will be printed in the spring of 1997.

4. Student Enrollment

Student enrollment has increased dramatically. Since NIOSH support began, over 60 students have enrolled in the MS program in Occupational Safety and Health. As of the fall of 1996, 29 students have graduated from the Industrial Technology MS program with a concentration in occupational safety. The outlook for the MS program in Occupational Safety and Health is very promising.

5. NIOSH trainees graduated

a. Ralph Dodge

Mr. Dodge entered the program in January of 1994. His master's project was entitled, "An Analysis of the Occupational Safety and Health Infrastructure in Sweden." Mr. Dodge graduated in May of 1996 with his MS degree. He has since been employed by IBM in Vermont.

b. Robin Duguid

Ms. Duguid entered the program in August of 1993. Her project was entitled, "The Development of a Site-Specific Fire Prevention Plan and Associated Training Materials for Weyerhauser's Plymouth, North Carolina Wood Products Facility." She received her MS degree in December of 1995. Ms. Duguid currently works as a Loss Control Representative for a lumber Company in Vancouver, BC.

c. Douglas Gaylord

Mr. Gaylord entered the program in January of 1994. His master's project was entitled, " The Functions and Authority of Safety Delegates and Safety Committees in Sweden." Mr. Gaylord graduated from the program in December of 1995 and is currently

working as a Safety and Environmental Manager for the Honda Power and Equipment Co. in Swepsonville, NC.

d. Darla Hinnant

Ms. Hinnant entered the program in August of 1994. Her project was entitled, "A Summary of Osier's Training Requirements and Use for 25 Industries in Greenville, North Carolina." Ms. Hinnant graduated from the program in August of 1996 and is currently working as a Safety Officer III for the NC Correction Enterprises in Raleigh, NC.

e. Barry Maxwell

Mr. Maxwell entered the program in August of 1994. His project was entitled, "An Analysis of the Swedish Government's Enforcement of the Work Environment Act." Mr. Maxwell graduated in May of 1996 and is currently working as the Safety and Security Manager for Lenoir Memorial Hospital in Kinston, NC.

f. Allen Tillet

Mr. Tillet entered the program in August of 1994. His master's project was entitled, "A Comparison of the Swedish Hazardous Communication Standard to the Equivalent Standards in the United States." Mr. Tillet graduated from the program in May of 1996 and is currently working as a Safety Engineer/Industrial Hygienist Technician for Glaxo Wellcome in Greenville, NC.

6. Faculty Developments

Several faculty developments have strengthened the program.

Dr. Friend has just been awarded tenure and a promotion to Professor. Dr. Friend has been named director of the Center for Applied Technology which offers university services to regional businesses. Dr. Kohn has recently been elected the region VI vice-president for the professional society of ASSE. Both Dr. Friend and Kohn have published numerous articles and books in their areas of expertise. Their Fundamentals of Occupational Safety and Health, published in the spring of 1996 is a best seller in the field. Dr. Friend and Dr. Kohn, through the Center for Applied Technology, sponsored an Occupational Safety and Health Educators' Conference in Las Vegas, NV which was planned in 1996 and executed in 1997. Over twenty-five universities and professional organizations sent representatives. Dr. Friend and Dr. Kohn also served as Safety School Board Members for the Eastern Carolina Safety and Health School through the NC Department of Labor. This was an initiative of the Consortium at East Carolina University. They work extensively with local industry in consulting and training projects.

7. Faculty and Student Research Projects

The Consortium has just incorporated a new program using students as resources for small businesses. Companies that could not afford the services of a full-time safety professional or even a consultant are hiring our students to help them on a short-term basis. This provides helpful details into the areas that are needed from the safety aspect in industries today. Students are also required to provide input to industry through class assignments that require the student to analyze specific areas of safety at businesses within the community. Many of these projects have the potential to become research projects for the students involved. Research projects in progress or at completion during the period of this report include but are not limited to the following:

Monitoring of Neonatal Noise Exposure in Pitt County Memorial Hospital's Neonatal Intensive Care Unit.

The Functions and Authority of Safety Delegates and Safety Committees in Sweden

A Summary of OSHA's Training Requirements and Use by 25 Industries in Greenville, NC

Analysis of How the North American Free Trade Agreement (NAFTA) is Influencing Air and Water Environmental and Safety Standards in Mexico.

An Assessment of Mexican-based US Companies Hazard Communication Efforts

Strategies for Monitoring Sound Levels in a Neonatal Intensive Care Unit

Comparison of OSHA and Swedish Safety Standards

A Comparison of the United States' and Sweden's Involvement with Violence in the Workplace

An Analysis of the Swedish Work Environment Legislation

Sound Attenuation Studies: Incubator Effect

Many of the aforementioned projects resulted from study trips that graduate students made to Sweden in 1995 and to the southwest United States and Mexico in 1996. A trip to the British Isles is planned for 1998.

8. Plans to Evaluate Program Impact On the Region

Impact of the program on the region is and will be determined in a number of ways. First of all, an advisory committee will be established to help guide the Consortium in all endeavors. Feedback will be sought on curriculum changes, student effectiveness, and graduates' abilities to meet employers demands. Following every program and class, feedback is requested from students and participants on the course and its effectiveness. Faculty stay in touch with graduates of the program to learn where they believe they need additional help or where the program needs improvement.

9. Program Contributions to the field of Occupational Safety and Health

Graduate students in the program are also used as resources for these small businesses. Companies that could not afford the services of a full-time safety professional or even a consultant are hiring our students to help them on a short-term basis. Students provide

input to industry through their classes as well. For example, during the Spring term four teams of fire students did audits in four different companies and submitted reports and suggested fire/emergency plans to their respective companies. In addition, a team of four students recently aided a local manufacturer who received a letter from OSHA on violations reported by a disgruntled employee. The students helped the manufacturer by suggesting corrective measures and ways to address each point in the letter. He then hired a student to perform a complete safety audit of his facility.

10. Conclusions

The NIOSH funding received at East Carolina University is making a tremendous impact on the region in a number of ways:

- providing tuition assistance to students who might otherwise be unable to attend East Carolina University.

- helping with equipment and supply purchases. Typically, these purchases are made by requesting assistance from the manufacturers. Monies used are leveraged with matches and other donations from suppliers to permit the dollars to be utilized to their maximum effectiveness.

- aiding in the professional development of faculty. With NIOSH funds and additional help from the university, faculty have been able to attend and participate in the National Safety Congress, the ASSE Professional Development Conference, the NC Statewide Safety Conference, the Eastern Carolina Safety and Health School and more.

- providing support that has helped in the overall development of professional and academic programs in safety and health in Eastern North Carolina.