Ohio University Training Project Grant in Occupational Safety

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P.I.: Diana J. Schwerha, PhD
Co-P.I.: Gary Weckman, PhD

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Contact Information:

Diana J. Schwerha, PhD
Associate Professor
Department of Industrial and Systems Engineering
Russ College of Engineering and Technology
Ohio University

278 Stocker Center
Ohio University
Athens, OH 45701

740.277.3788
schwerha@ohio.edu

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List of Terms and Abbreviations

Industrial and Systems Engineering, ISE
Master of Science, MS
Training Project Grant, TPG

Abstract

The Ohio University Training Project Grant in Occupational Safety addresses the shortage of well-trained practitioners in a traditionally underserved area of Southeastern Ohio and the Ohio River Valley. The program is managed within the Department of Industrial and Systems Engineering (ISE) in the Russ College of Engineering and Technology. Students are enrolled in the Master of Science (MS) program in ISE.

Key elements of the program include: six core courses, two mandatory internships, two mandatory seminars in writing and research, and participation in plant tours and professional activities. The six core classes are: Human Factors Engineering, Industrial Ergonomics, Occupational Hygiene Sampling and Analysis, Occupational Safety and Health, Systems Safety, and Six Sigma. Students will then take elective courses in the Russ College, the College of Health Sciences and Professions, and/or other colleges at Ohio University in order to complete the requirements for the MS in ISE. Students have been recruited from a variety of majors including, but not limited to, industrial engineering, psychology, mathematics, and plastics engineering.

Students enrolled in the program participate in a part-time internship in the Ohio University Department of Safety during their first year, and they are employed in industry internships in between their first and second years. During the academic year, students participate in industry tours, programs for guest speakers, symposia and conferences. Ohio University has a student chapter of the American Society of Safety Engineers and our students hold offices in that group. A specific academic focus for this project is older workers and advanced data analysis methods. Faculty for the program are well-qualified in this area as well as in the component areas of occupational safety research and field practice.

Section I

Significant (Key) Findings

The Ohio University TPG in Occupational Safety has completed three years. We have accomplished everything set forth in our original grant application. The following bullets highlight our successes:

- We were at full capacity during the final year of the grant;
- We have graduated students and they are working as safety professionals;
- We are meeting our curricular goals (in terms of coursework and extra-curricular activities, such as our ASSE student chapter);
- Our students are getting professional experiences that provide needed out-of-the-classroom activities that aid in training them for their future careers.

Student Recruiting: During the first three years we recruited ten students who are either in the program or who have graduated. We have had five females and five males in the program. One of our students is from Appalachia (Southern Ohio).

Our students have come from diverse academic backgrounds and we have recruited from southeastern Ohio. Students have come from the following majors: mathematics, industrial and systems engineering, electrical engineering, mechanical engineering, plastics engineering, applied management, psychology, occupational hygiene, and telecommunications. Students have attended Ohio University Athens, Ohio University Lancaster or Shawnee State University. Shawnee State University is in southeastern Ohio and represents our ability to recruit from there demonstrates our recruiting from Appalachia, an *under-represented* area.

On Campus Internship: All of our first year students have participated in an on-campus, part-time internship with the Ohio University Safety Department. Students participate in the internship an average of 4 hours per week for both semesters during their first year. During this internship, they participate in safety activities on campus. This on-campus internship is valuable because it gives students (who have had no safety work experience) professional experience that they can place on their resumes and allows them a glimpse into working in the safety world. The on-campus internship serves as a benefit when they are applying for their summer, industry internship.

Industry Internship: The industry internship is required in between year 1 and year 2 of the program. Students have been placed in internships that represent a variety of possible career choices for students (e.g., government, manufacturing, and hospitals).

Coursework: Our TPG requires students to meet the requirements of the MS in ISE, but in that process they have to take the six core courses: Occupational Safety and Health, Occupational Hygiene Sampling and Analysis, Human Factors Engineering, Industrial Ergonomics, Six Sigma, and Systems Safety. We believe that by including required courses that relate to process improvement and cost justification (six sigma and

industrial ergonomics) we are meeting our goals of training students to become safety engineers who can speak both the language of safety and of business. This is integral to being a successful safety practitioner.

Research: Our students have the ability to participate in research during their academic program (as independent research) and they have the option of completing a masters' thesis or a problem report. Thesis topics have included such topics as developing leading indicators and studying the cause of injuries in the automotive industry.

Tours: As part of our program, we provide tours to various facilities/operations to examine safety procedures, programs and interventions. During the last two years, tours have been made to manufacturing facilities and distribution centers. Additionally, for two years students monthly toured the dorm building project that was done by Elford Construction. These tours have been extremely valuable because the students saw the various safety challenges along the course of a construction project.

Conferences: As part of our program, students attend both regional and national conferences. We believe that this is a valuable experience because it allows the students to interact with their future colleagues and learn what is current in the field.

Evaluations: Students complete course evaluations, provide feedback during the year, and complete a voluntary survey at the end of the year. Evaluations are also provided by the advisory board during our mid-year conference calls and annual face to face meeting.

Advisory Board: We have had the same advisory board as stated in our original application. The board consists of members from industry as well as Ohio University and provides recommendations to improve the program. The board also makes suggestions on how to ensure that the students are up to date on contemporary topics.

Translation of Findings

This program is a training program. Students have completed research as part of their degree requirements and this has been shared through conference presentations. In addition, several theses are being edited to submit to journals.

Outcomes/Impact

The purpose of this project is to train students in discipline of Occupational Safety and then have them employed in the field. Our students who have graduated so far are employed in the safety field as safety engineers (in private industry) or as field consultants with the Ohio Bureau of Workers Compensation. As such, we are accomplishing our goal of training individuals to fill the need for safety professionals in the area.

Section II

Scientific Report

Background

The Ohio University TPG in Occupational Safety started in the fall of 2012. The program has been successful for three years and graduated all three students who were in the first cohort by the end of 2014. The key elements of the Ohio University TPG are: 1) students earn an MS in Industrial and Systems Engineering while taking six core courses related to Occupational Safety, 2) students participate in a part-time on campus internship in the OHIO Safety Department during year one, 3) students participate in an industry internship between year one and two, 4) students participate in a variety of extracurricular activities, such as guest speakers, construction tours, plant tours, and regional and national conferences, and 5) students may complete either a masters' thesis or problem report. The program has successfully recruited a diverse group of trainees.

The Ohio University Training Project Grant in Occupational Safety was premised on the result of research completed during 2011 that demonstrated the need for a graduate program in Southeastern Ohio that would produce practitioners trained in occupational safety. Southeastern Ohio industry centers on the chemical and manufacturing facilities along the Ohio River that runs from West Virginia, through Ohio and into Kentucky. Southeastern Ohio industry also focuses on emerging health care centers, food service, and mining. We anticipated that our graduates would be fulfilling labor shortages in the Ohio, Western Pennsylvania, West Virginia, and the Eastern Kentucky general area.

In 2011, in order to determine the need we looked at both national and regional workforce statistics. The Bureau of Labor Statistics Data (BLS) indicated that employment of Health and Safety Engineers would increase ten percent over the period from 2008-2018. The BLS also states that, "Although manufacturing and construction companies will still be among the leading users of their services, health and safety engineers are being employed in new areas to prevent costly accidents involving people and equipment." Companies will consistently be in need of Occupational Safety specialists who will ensure the safety of employees while maintaining costs in this competitive era. Interviews with companies have indicated to us that safety engineering, risk analysis, exposure assessment, and communications skills (written and oral) are important skills that employers are looking for in safety new hires.

In addition to the need for Health and Safety Engineers in Ohio, the workforce is getting older and there is a need for safety engineers who can utilize new injury analysis methods in order to design work environments that will allow older workers to remain on

the job. In order to address this, our Training Project Grant has emphases data analysis methods and worker demographics that align with NIOSH's goals in two areas: Productive Aging and Work and Total Worker Health. In addition, two of the National Occupational Research Agenda (NORA) sectors, healthcare and social assistance, and manufacturing, are two industries that will be targeted through this program. In addition, faculty specialization and thus course electives will focus on the following NIOSH priority areas for research: Musculoskeletal Disorders of the Upper Extremities, Traumatic Injuries, Emerging Technologies, Special Populations at Risk, Risk Assessment Methods, and Surveillance Research Methods.

Specific Aims

The specific aim of this program is to train students to become safety professionals. With the aging baby boomer population, there will be an increasing need for safety professionals in Ohio. Our program addresses this need and our students who have graduated are employed as safety professionals.

Methodology

Our training program in Occupational Safety takes students four semesters to complete. Students are admitted into the Master's in Industrial and Systems Engineering Program (ISE) in the Department of Industrial and Systems Engineering in the Russ College of Engineering and Technology. Upon admission to the program, students will be advised by Dr. Schwerha (for their academic requirements; students may choose to work with another advisor for their thesis work). Students may be enrolled in non-thesis or thesis option in the Department of Industrial and Systems Engineering. We have funding to maintain five trainees in the program at any given time.

We train our students to anticipate, recognize, evaluate and control hazardous conditions that affect people, property and the environment. Through our curriculum, we train students in the core areas of occupational safety and then allow them to choose their electives in order to gain more generalized knowledge or knowledge in a more specialized area (e.g. older workers, advanced data analysis, or technology in the workplace). Dr. Schwerha's class on Human Factors and Aging is approved through the Gerontology Certificate Program. Students wishing to focus on Older Workers could take that class and others and earn a Graduate Certificate in Gerontology from Ohio University along with their master's degree. Students gain field experience through academic work (class projects, independent study, or thesis work) and through two mandatory internships. The first internship will be done during the first year through Ohio University Dept. of Environmental Safety and Health, and the second internship will be done in between the first and second year in industry. Students must complete the six required courses for the program (Occupational Safety and Health, Occupational Hygiene Sampling and Analysis, Human Factors Engineering, Industrial Ergonomics, Six Sigma, and Systems Safety) and meet the requirements of the MS in ISE program

in order to graduate. Students must participate in programmatic activities through the semesters, such as guest lecturers, safety tours, symposia and conferences.

Results and Discussion

The Ohio University Training Project Grant in Occupational Safety has met its goals in training students to become safety professionals. We believe the essential components of the program that provide our students with the necessary background to start their safety career include: two internships (on and off campus), a curriculum designed around meeting the learning objectives that NIOSH has promoted for safety professionals, the ability for students to do research in safety, and the inclusion of many professional activities that augment the academic curriculum. The program is designed to take students four semesters to complete.

During the past years, we have highlighted the need for new safety professionals to: 1) understand how to speak the business language, 2) utilize new analytical methods with the aim of reducing injuries, and 3) design work environments that are safe for all ages of employees. Students have taken courses and completed research in these areas.

In the future, we plan to continue our approach to training students. We utilize feedback from the students and our advisory board to constantly improve the program. Students participate in ASSE activities and are expanding their professional networks through these experiences.

Conclusions

This report summarizes three years of the Ohio University Training Project Grant in Occupational Safety. During the first three years, the program has met its objectives by recruiting and graduating students, providing excellent advising, providing professional activities to augment the academic curriculum, and by fostering a positive and encouraging learning environment.

Inclusion Enrollment Table: see attachment A

Publications

Journal Article: Both Adkins and Vanbibber are in the submission process

Thesis

Reynolds, Tiffany: [2014] Analysis of Occupational Safety Practices across Regional Campuses at Ohio University. M.S. Thesis, Ohio University.

Adkins, Ecstasy: [2014] An Investigation into Type, Severity, and Cost of Injuries in the Automotive Repair Sector: Overall and by Age. M.S. Thesis, Ohio University.

Vanbibber, Ashley: [2015] Monitoring Safety Process Performance with Leading Indicator Safety Audits. M.S. Thesis, Ohio University.

Inclusion of Gender and Minority Subjects N/A

Inclusion of Children, N/A

Materials Available for other investigators, N/A

Cumulative Inclusion Enrollment Report

This report format should NOT be used for collecting data from study participants.

Study Title: Ohio Unversity Training Project Grant in Occupational Safety

Comments: July 1, 2012 to June 30, 2015; this is for the students enrolled in the program

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/ Alaska Native										0
Asian										0
Native Hawaiian or Other Pacific Islander										0
Black or African American										0
White	5	5								10
More Than One Race										0
Unknown or Not Reported										0
Total	5	5	0	0	0	0	0	0	0	10