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Ohio University Training Project Grant in Occupational Safety

Closeout Report

T03OH009841

Start Date: July 1, 2015

End Date: June 30, 2020

Date of Report: September 28, 2020

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List of Abbreviations

American Society of Safety Professionals	(ASSP)
Industrial and Systems Engineering	(ISE)
Institute of Industrial Engineers	(IISE)
Masters	(MS)
Occupational Safety	(OS)
Society of Women Engineers	(SWE)
Training Project Grant	(TPG)

Abstract:

For the last eight years, the Ohio University Training Project Grant in Occupational Safety (TPG, OS) has trained students to become successful safety professionals. This TPG addresses the shortage of well-trained practitioners in a traditionally underserved area of Southeastern Ohio and the Ohio River Valley. The program is run within the Department of Industrial and Systems Engineering (ISE) in the Russ College of Engineering and Technology. Students are enrolled in the Masters (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 Administration, Systems Safety, and Six Sigma. Students then take elective courses in the Russ College or other colleges at Ohio University to complete their degree requirements. Faculty for the program are well-qualified in this area as well as in the component areas of occupational safety research and field practice. The focus areas for this TPG are: aging workers, data analysis, new technologies, and the integration of safety with process improvement.

Students in this program have come from a variety of undergraduate degrees and, based on their training, have been successful in obtaining employment as skilled practitioners. During the program students participate a variety of academic and professional activities. The students have a student chapter of the American Society of Safety Professionals (ASSP) and they regularly attend Central Ohio ASSP meetings. During the year they host guest speakers, participate in plant tours, and attend conferences. As part of their degree, students may complete a project or thesis. Student projects/theses have included lab, field, and data analysis studies on such topics as: using machine learning to determine drivers of exoskeleton use, studying patient acuity and fatigue, the develop of a cost calculator that integrates safety, productivity and quality, and testing training methods for the millennial workforce. Students have presented their work at conferences and published conference papers as well as journal articles. Current graduates are serving in both industry and government positions.

Significant Results / Impact (*5 page limit for each funded program*):

At the end of the last reporting period (June 20, 2020), the OHIO TPG in Occupational Safety finished its eight year. We accomplished everything set forth in our original grant application. A summary of our accomplishments is listed below:

- The OHIO TPG was at full capacity by the end of the reporting period
- We leveraged other funding sources (grant funding)
- Students have had successful industry internships
- Our student ASSP Chapter is active, networks with the Columbus Chapter, and attends the national conference
- Our students have won ASSP awards and our chapter has successfully submitted the outstanding student section award three times (this means that we met all the requirements for a successful student ASSP chapter)
- All of the 14/17 students who have graduated have obtained employment. Two of the others are employed but will graduate in December 2020, the other student will graduate in Spring 2020 (that is Adda Ashcraft and she already has a job offer for a safety position with Davey Tree)
- Ten of the seventeen students who were funded during this period and are now working are in roles that are either predominately safety or have safety as part of their function. The other graduates have roles in quality/process improvement that may occasionally include safety. One student who was funded has not graduated but has an offer for a safety position.
- Yearly, the OHIO TPG trainees attend the University of Cincinnati PRP symposium and Dr. Schwerha just finished a research project with Professors who are part of the Virginia Tech TPG
- Concentration areas are: older workers, integration of safety with process improvement, new technologies, healthcare and data analysis methods

Table 1 lists all of the students who were funding during the reporting period, along with their graduation dates, prior institutions, source of funding, research mentor and research topic.

Table 1. Progress Report Table for the Reporting Period

Progress Report Table					
Ohio University Training Project Grant in Occupational Safety (9841) - Diana J. Schwerha, PI					
Student Name	**Year of Entry/ Grad Date (est)**	**Prior Institution and Degree**	**Source of Support During Training**	**Name of Research Mentor**	**Research Topic**
Adda Ashcraft	F 2019-S 2021	OHIO, ISE	NIOSH	Schwerha	Ergonomics for Tree Trimmers
Nathan McNamara	F 2018-F 2020	OHIO, ISE	NIOSH, BWC	Schwerha	Machine Learning to Inform Drivers of Exoskeleton Use
John Mollica	F 2018-S 2020	OHIO, ISE	NIOSH	Schwerha	Nurse Fatigue and Patient Acuity
Aaron Doudna	S 2018-F 2019	OHIO, ETM	NIOSH	Schwerha	Examining Adverse Patient Outcomes: The Role of Task Demand and Fatigue
Derek Stephens	F 2018-S 2020	OHIO, ETM	NIOSH	Schwerha	Development and Analysis of a Cost Calculator for Ergonomic, Process and Quality Improvement
Samantha Haning	S 2018-F 2019	OHIO, ETM	NIOSH	Schwerha	Exoskeletons and Women: A laboratory study of usability of passive occupational exoskeletons for women
Andrew Stanczuk	S 2018-F 2020 (est)	OHIO, ETM	NIOSH	Schwerha	A cost study of implementing exoskeletons vs. workplace modifications
Justin Marcheskie	S 2018-S 2019	OHIO, ETM	NIOSH and ISE Dept	Schwerha	Analyzing Campus Safety: A Survey of Perceived Risk, Crime and Outdoor Lighting levels
Jeremy Paravano	F 2016-S 2018	OHIO, ISE	NIOSH	Schwerha	Development of an Engaging Safety Training Method for the Younger Workforce
Geoffrey Mitchell	F 2016-SU 2018	OHIO, ISE	NIOSH	Schwerha	Development of a Training Module on the Health and Safety Hazards of Blue Light
Ali Weaver Liles	F 2016-S 2018	SSU, ETPL	NIOSH	Schwerha	Development of a Rubric for Safety, Accessibility, and Education in Children's Museums
Tyler Clark	F 2016-S 2018	OHIO, PSY	NIOSH	Schwerha	Millennial Preferences in Training Messages: The Testing of Three Safety Presentations
Vince Guinsler	S 2016-F 2017	MSU, COM	NIOSH	Schwerha	An Examination of the Musculoskeletal Impact of Residential Solar Panel Installation

Marie Hayden	F 2014-S 2016	OHIO, OHS	NIOSH	Schwerha	Engaging Users through the Application of Value Stream Mapping to Streamline the Procurement Process for Office Equipment
Brittany Crall	F 2014-S 2016	SSU, ETPL	NIOSH	Schwerha	Usability of Just-in-Time Training for Treestand Safety Among Age Diverse Populations
Ryan Hoover	F 2014-S 2016	OHIO, ISE	NIOSH	Schwerha	Determining the Preferred Location for Toilet Paper Dispenser Output in Americans with Disabilities Act (ADA) Compliant Restrooms
Travis Reed	S 2014-S 2016	OHIO, ME	NIOSH	Weckman	How Software Prompting can Improve Worker Habits

During the five years of this grant, the OHIO TPG has supported 17 trainees. Note that projects can focus on student interest or focus areas for the TPG.

Recruitment:

Student Recruiting: Students have come from Industrial and Systems Engineering, Engineering Technology and Management, Industrial Hygiene, Psychology, Mechanical Engineering, Telecommunications, and Plastics Engineering. Although we strive to recruit a diverse group of students, most students currently have obtained their undergraduate degrees from Ohio University. Other students have come from Michigan State, and Shawnee State Universities.

Minority Recruitment: Shawnee State University is in Southeastern Ohio, and our ability to recruit from there demonstrates recruitment success from Appalachia, an *under-represented* area. As in the past, we will continue to recruit on campus from student organizations, such as the Society of Women Engineers (SWE), the American Society of Safety Professionals (ASSP), and the National Society of Black Engineers (NSBE). Dr. Schwerha currently serves as the faculty advisor for ASSP.

Outputs of Trainees:

On Campus Internship: All of the first-year students have participated in an on-campus, part-time internship with the Ohio University Safety Department. They are mentored by the Ohio University Director of Safety (currently Brent Mattox, PhD), who also serves on our Advisory Board. 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. While these activities change from semester to semester, they have included activities such as: documenting lighting levels on campus and developing benchmarks and metrics for the safety department.

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 gives them a benefit when they are applying for their summer, industry internship. Additionally, one of our graduates said that the on-campus internship has been very interesting to employers during interviews.

Industry Internship: The industry internship is required in between years 1 and 2 of the program. We have been successful in placing all of our students in internships so far. Some of

the locations are Bellisio Foods, Oatey, Quidel, Honda of America, and Davey Tree. These locations represent a variety of possible career choices for students (manufacturing to tree-trimming).

Collaboration with other Groups: Our students regularly collaborate with the Ohio University Institute of Industrial and Systems Engineers (IISE). We have gone on plant tours together (e.g., Honda or Kenworth). Additionally, we have invited them to be guest speakers (e.g., Dan Wing, Safety Coordinator for Mahle McConnelsville). Students are also encouraged to attend College supported lectures (e.g., Russ Prize Lectures that occur every other year).

Coursework: Our TPG requires students to meet requirements of the MS in ISE, but in that process they have to take 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. We continue with the original proposed coursework, and the students benefit from taking courses both in the Russ College of Engineering and Technology as well as the College of Health Sciences and Professions. Students have taken additional electives in the Industrial and Systems Engineering Department and have done very well (also evidenced by the students who have been accepted into honorary societies, such as Alpha Pi Mu; Derek Stephens served as last year's President).

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. Many student projects require institutional review board approval. During this period, students have participated in the Ohio University Research Expo.

Honors and Awards:

Justin Marcheskie won best of his group in the 2019 Student Research and Creative Activity Expo at Ohio University.

Dr. Schwerha's class project on Adapting Electric Cars for Children with Disabilities was featured on the front cover of the 2018 Russ College of Engineering and Technology Ingenuity Magazine and a photo article was included within the magazine.

Dr. Schwerha has had students win national ASSE (now ASSP) awards for several years. During this reporting period Marie Hayden won one in 2016.

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 (e.g., Kenworth) and food processing (General Mills).

Collaboration with the American Society of Safety Professionals (ASSP): Students who are Ohio University trainees are all members of the ASSP. Important ASSP activities include the following:

- We have successfully submitted ASSP Outstanding Student Section Award 3 times and will submit again this year

- Our student group holds bi-monthly meetings and we have group social, professional and networking events
- Several of our students each year have attended the Future Safety Leaders Conference. It is sponsored by ASSP and held in early November each year.
- We attend the monthly ASSP Columbus meetings and the National ASSP meeting
- The Columbus ASSP chapter provides networking and support for our students

Conferences: Our students attend both regional and national conferences as part of their program. We believe that this is a valuable experience because it allows them to interact with their future colleagues and learn what is current in the field. Students typically attend the University of Cincinnati Pilot Research Symposium during the fall of their first year (this is part of the University of Cincinnati Educational Research Center). They then have the opportunity to attend the national conference of the ASSP (e.g., Safety 2020). Depending on their research interests, student may opt for a different national conference, such as the Human Factors and Ergonomics Society Annual Conference or WearACon. Students may also attend other regional and national conferences, from such organizations as the Institute for Industrial and Systems Engineers (IISE) or the Society of Women Engineers (SWE).

Publications:

Journal Articles:

Clark, T. and Schwerha, D. (2019). Millennial Preferences in Training Messages: The Role of Teamwork and Corporate Social Responsibility. Accepted in WORK for 2020.

Hayden, M. and Schwerha, D. (2019). Case Study: Value Stream Maps, Improving Procurement of Office Ergonomic Equipment. Professional Safety, May.

Conference Proceedings:

Haning, S. and Schwerha, D. (2019). Women and Exoskeletons: Design and its Effect on Fit and Comfort Proceedings of the The XXXIst Annual Occupational Ergonomics and Safety Conference New Orleans, LA, USA June 12-13, 2019.

Paravano, J. and Schwerha, D. (2019). Assessment of commonly used training techniques and their overall effectiveness on the younger workforce. Proceedings of the The XXXIst Annual Occupational Ergonomics and Safety Conference New Orleans, LA, USA June 12-13, 2019.

Guinsler, V. and Schwerha, D. (2018). An Examination of the Musculoskeletal Impact of Residential Solar Panel Installation. Proceedings of the The XXXth Annual Occupational Ergonomics and Safety Conference Pittsburgh, Pennsylvania, USA June 7-8, 2018.