Program: Bachelor of Science in Occupational Safety & Health

Faculty input into the Assessment Process:

- Dr. Wayne D. Jones – Wrote course assessment profiles and program evaluation.

Date Filed: 24 August 2011

Number of Students Assessed: 1305 (Unduplicated students in SFTY courses=1123; General Survey= 99; Senior Seminar-fall, 2010 = 39; Spring/Summer, 2011 = 44).

Alumni Assessed: 18
Employers Assessed: 10

Program Goals & Objectives:

Program Goal

The goal of the department of occupational safety and health is to provide graduates with the knowledge, skills, situational learning experiences, instruction and assessment that will prepare them for successful careers in the field of occupational safety and health.
Program Objectives

The objectives were developed by the American Society of Safety Engineers (ASSE) and the American Board of Engineering Technology (ABET) and will be used in the accreditation process of the safety degree program beginning approximately 2011. The Occupational Safety and Health Department will utilize these nationally developed outcomes and modify as necessary in future program development. In addition, personalized objectives unique to the SOSU Occupational Safety & Health Department were created to address the individual needs of corporate and governmental employers of Southeastern graduates.

A student completing the B.S. degree in Occupational Safety & Health shall be able to:

1. Demonstrate an ability to analyze and interpret data by understanding fundamental mathematical concepts and to apply those concepts to practical situations in industry. Specifically, Southeastern graduates will be able to formulate and compile safety data and statistics necessary for Job Safety Analysis, Industrial and Insurance Hazard Assessments, and Fault Tree Analysis programs in insurance and industry.

A. Assessment methods

- Number of students participating in the assessment: 1123
- How were students selected to participate in the assessment? All students enrolled in SFTY core classes during the fall, 2010 – summer 2011 semesters plus the senior exit exam.
- What is the make-up of the sample? All students enrolled in occupational safety core classes during the fall, 2010 – summer, 2011 academic period plus the senior exit exam.
- What work was evaluated? Class exams, presentations, reports, and group projects in courses pertinent to the objective were studied. In addition, all graduating seniors were required to take, and satisfactorily complete, a senior exit exam that included questions regarding statistical presentation and analysis were included.
- How was work evaluated? By individual professors and/or the department chair.
- What data resulted from the assessment? Individual exam scores, project group scores, and presentation scores.

B. Results of the assessments

- Senior exit exam results were sufficient to graduate all seniors from the program in the fall 2010 and spring/summer 2011 classes. The average score was 74.50% for both semesters. The scores are consistent with regard to previous semester. Exit exam is a cold exam with no formal
review. Anything in the four-year course of the program is subject to an exam question and the exams are standardized for semester to semester comparison. Students in the 2010-2011 academic year scored one-percent less than in previous academic years and may be due to changes in personnel teaching the courses.

- Individual courses within the program reported average letter grades of sufficient strength to enable professors to determine that successful students understood the principles of statistical analysis and basic math functions. Classes in Safety Program Management; Legal Issues and Liability; Acoustics-Noise-Vibration; Systems; Industrial Hygiene; and HAZMAT were successfully completed by over 96% of the students who attempted them. The courses included group presentations, individual presentations, and exams which included statistical analysis and interpretation.

- **SFTY-4143:** Safety Program Management is generally the last course occupational safety seniors take at the end of their degree plans. The course is designed to incorporate knowledge from other occupational safety courses into a cohesive and functional occupational safety entry-level safety professional. Exam scores in the spring 2011 section of Safety Program Management averaged 85% on the midterm exam. These scores indicated that over 90% of the class comprehended statistical measures and insurance rates well enough to interpret and present the statistics at a professional level. In addition, Safety Program Management students must complete a functional *Fault Tree Analysis* to the department chairs satisfaction indicating capability of tracing an accident from its occurrence back to its primary fault. Students must also perform a JSA – *Job Safety Analysis* tracing a potential accident causing fault to a satisfactory mitigation end result before an accident has opportunity to occur. Students begin this process from the first occupational safety course (Introduction to Occupational Safety), through Systems Safety, and then in a final form in Safety Program Management. All occupational safety students must be able to perform these processes for successful program completion. Safety Program Management, Fall 2010 had a total of 45 students, spring 2011 had 37 students, and summer 2011 had 26 students completing the course with a mean GPA average of 3.0. This course addresses safety program organization, administration and management. The principles of the development and management of an effective safety program will be studied in this course. The philosophy and historical development of major concepts are examined, with particular emphasis on areas of special concern in organizational accident prevention. (Jones)
• SFTY 4163: Fundamentals of Human Factors Engineering/Ergonomics
   (Only Data Available for Assessment Period)
   FALL, 2010 MEAN GRADE: 70%
   SPRING, 2011 MEAN GRADE: 85%

   Rationale for Difference:
   The instructional methodologies utilized between the two semesters—the
   only semesters that I have taught the course recently—only included minor
differentiations in activities (certain films, etc). The vast difference in
scores between these two semesters seems to be attributable to the types of
students enrolled in each course.

• SFTY 3553: Construction Safety
   FALL, 2010 MEAN GRADE: 84%
   SPRING, 2011 MEAN GRADE: 82%

   Rationale for Difference:
   The instructional methodologies utilized between the two semesters—the
   only semesters that I have taught the course recently—only included minor
differentiations in activities (certain films, etc). The vast difference in
scores between these two semesters seems to be attributable to completely
different types of students enrolled in each course.

• SFTY 4003: Systems Approach to Hazard Control  (Only Data Available
   for Assessment Period)
   SPRING, 2010 MEAN GRADE: 79%
   SPRING, 2011 MEAN GRADE: 82%

   Rationale for Difference:
   The instructional methodologies utilized between the two semesters did
   not differentiate in any way. The vast difference in scores between these
two semesters seems to be attributable to completely different types of
students enrolled in each course.

• SFTY 4173: Legislation in Occupational Safety and Health

   FALL, 2010 MEAN GRADE: 73%
   SPRING, 2011 MEAN GRADE: 82%

   Rationale for Difference:
   The instructional methodologies utilized between the two semesters
differentiated only by textbook. The vast difference in scores between
these two semesters seems to be attributable to completely different types
of students enrolled in each course. Beginning in the Summer, 2010
Semester, a new textbook-- the second edition of the currently required
course text Legal Liabilities in Safety and Loss Prevention—A Practical
Job Safety Analysis:
This topic was addressed in-depth during my tenure of teaching Systems Approach to Hazard Control by utilizing an exercise designed by Dr. Nichols entitled the “Levi-Strauss Denim Roll Changeover Exercise.” In this exercise, students were divided into groups and given the task of writing (in its entirety) a complete JSA for the changeover of a 500 lb. roll of denim on a production line in an imaginary Levi-Strauss, Inc. factory. Forklifts, hand tools, and signals for the changeover process were some of the topics students were asked to organize and address. Scores on this exercise were generally very high, and student participation was always 90% or more. This activity was worth 15 points, and was averaged into each student’s final “Activity Grade” for the course. Dr. Braley enhanced JSA student knowledge using his experience as a consultant for the United States Mine Safety and Health Administration (MSHA) wherein he provided JSA presentations to mine-site employees in the State of Oklahoma (1992-1993). Using MSHA JSA literature and JSA Job Safety Instruction (JSI) information, the students in Systems Approach to Hazard Control now construct a JSA for a series of tasks inherent in a work goal, and were taught to evaluate JSA’s as a supervisor. Furthermore, JSA content is now linked to JSI creation. The points assigned to the JSA sequence of learning is approximately 30 points. (Nichols and Braley)

Fault Tree Analysis:
This topic was also addressed in-depth during my tenure of teaching Systems Approach to Hazard Control by utilizing an exercise designed by Dr. Nichols entitled “Apollo 13 Fault Tree Analysis.” In this exercise, students were provided with the background of the Apollo 13 accident, divided into groups, and asked to complete a simplified fault tree based on the event (the exercise was simplified due to the constraints of time, and the fact that the actual NASA fault tree for the complete accident was over 32 individual, unassembled pages in length). At the end of the exercise, students compared their fault trees to a simplified fault tree “key” constructed by Dr. Nichols, and all of these fault trees were then compared to an assembled version of the final NASA fault tree. Scores on the exercise itself were generally in the middle to high range, and student participation was always 90% or more. This activity was worth 20 points, and was averaged into each student’s final “Activity Grade” for the course.
Dr. Braley has added to Fault Tree Analysis (FTA) comprehension by adding Boolean Logic to the System Approach to Hazard Control class. The Boolean Logic components include a fundamental understanding of the difference between binary arithmetic and Boolean Logic; Truth Tables inherent in identifying interventions in a sequence of events leading to catastrophic failure of a manufactured or fabricated product; Boolean Equation creation from a Truth Table using up to four identified component failures; the AND, OR and INVERTER logic processes; and the symbols used to depict logic gates and logic equations from a Truth Table. Students are shown how to analyze existing Boolean Failure Mode and Effect Analysis (FMEA) with complex intervention strategies to minimize the catastrophic failure profile of manufactured products. Students complete the FMEA sequence of learning by creating an FTA from the FMEA, including Truth Tables, Logic Gates, and Boolean Equation, for a product of Dr. Braley’s choosing. Dr. Braley has also added the fundamental concepts of Feed Forward and Feed Back Processes, with mention of the Process Safety Management Program (OSHA) such that students now “place” hazard identification, from all courses, into manufacturing (feedback) or chemical process (feed forward) industries. Industrial Operations Management Boards are identified with the inclusion of risks, hazards, threats, part inventory, movement of parts from receiving to inventory, from inventory to the production or assembly lines, and multiple vendor requirements of new vendor product quality assurance testing mandates. The FTA exercises are valued at approximately 100 points. (Nichols and Braley)

Industrial and Insurance Hazard Assessments
This topic was addressed through both lectures and activities in Systems Approach to Hazard Control (especially during our studies in fault tree analysis for this course; insurance hazard analysis was referred to extensively in these particular class lectures), Introduction to Occupational Safety and Health, (during our studies of various safety program management practices and an accident investigation exercise) and in Construction Safety (at various points throughout the course). Specifically, industrial hazard assessment was addressed in-depth by utilizing interactive learning modules (in DVD format) produced by J. J. Keller & Associates, Inc. In Systems Approach to Hazard Control, concepts in industrial hazard assessment were specifically studied through the utilization of the Keller “Forklift Hazard Perception Challenge” module, in which students were shown different scenarios of forklifts (complex, mechanical systems) in operation in industry, and then asked to identify specific hazards on answer sheets included with the learning module. In Construction Safety, concepts in industrial (specifically, the construction industry) hazard assessment were studied through the utilization of the Keller “Construction Hazard Perception Challenge” module. In this module, students were shown different scenarios on different construction
sites, and asked to identify specific hazards in each scenario on answer sheets included with the learning module. Scores on these exercises were generally in the high ranges, and student participation was always 95% or more. Each of these activities was worth 20 points, and was averaged in to each student’s final “Activity Grade” for the course. (Nichols)

• SFTY 4113.1

FALL 2010, MEAN GRADE: 85.60%
SPRING 2011, MEAN GRADE: 91.25%

Dr. Braley continued the methodology of having students perform multiple presentations (one group and one individual) in the class. Added to the course are Myers-Briggs Type Indicator™ fundamentals such that students must align presentation techniques to personality temperaments; an analysis of proprietary training materials with the students gaining comprehension in creating documentation prior to purchasing training materials; enhancement of the knowledge base for in-house, fabricated training devices (with cost analysis and need-to-maintain concepts), and online training fundamentals wherein the students complete a basic presentation of how to utilize “print screens” to provide prospective trainees with the knowledge of how to access corporate training web sites. Presentation of those additional competencies matured in Spring 2011 and in lieu of accepting partially completed group or individual training materials, Dr. Braley would return those materials and not accept them until they met the quality indicators in the grading rubrics.

• SFTY 4163.1 87.6, 81.8, 83,3, 79.9, 80.5 – There is a drop in the average of Summer classes over Spring/Fall classes. This is likely the result of the quality of students in the class. Generally, students taking summer classes are more motivated than other students. If one compares the top grades in both classes the grades are nearly identical. It would be necessary to collect more data on classes in the Fall and Spring to be able to draw any conclusions. While there is still not sufficient data to draw conclusions, Summer session student have continued to outperform regular semester students. This may in part be due to the format of teaching in the summer sessions that allows reinforcing of the lecture material with activities and video on a more timely basis than with a standard format. This trend may also be the result of more motivated students as noted previously.

C. Analysis and interpretation

• Graduates of the department of occupational safety & health are capable of interpretation of statistical and mathematical concepts and are able to present and defend their findings. They are able to analyze logic diagrams
used for inventory flow, assembly line, production line and fabrication line analyses of risks, hazards and threats. They can create a Boolean Truth Table and author a basic AND, OR and INVERTER equation statement which identifies hazards inherent in specific product actions or specific employee work tasks. They are competent in using the National Institute for Standards and Technology (NIST) CCC-MOT matrix to analyze Policy, Procedures and Products inherent in a safe working environment. They are capable presenting Fault Tree Analysis and Job Safety Analysis as exhibited by their presentation in SFTY-4143 (Safety Program Management) and in SFTY-4003 (Systems Safety). They are further capable of presenting and defending insurance statistics and able to understand and present insurance statistical methods upon successful completion of the prescribed course of study. They are as capable this year as they have been in the past five years as demonstrated by the department’s continuous placement record (by 90-days after graduation) and the number of repeat companies recruiting from the department each semester. Over 100 positions were advertised on the occupational safety job board last year for a total of 79 graduates. This is down from an average of 135+ companies posting with SOSU in years past but can be directly attributed to the slowing economy rather than to a decrease in OSH graduates.

2. **Anticipate, identify, and evaluate hazardous safety and health conditions and practices through use of JSA, FTA, ISO9000, and OSHA specs programs utilized in SFTY-4113, 4163, 4154, 3173, and 4143 courses.**

A. **Assessment methods**

- Number of students participating in the assessment: 583
- How were students selected to participate in the assessment? All students enrolled in select (SFTY-4113, 4163, 4154, 3173, and 4143) occupational safety core classes during the fall, 2010 – summer, 2011 academic period plus the senior exit exam.
- What is the make-up of the sample? All students enrolled in select (SFTY-4113, 4163, 4154, 3173, and 4143) occupational safety core classes during the fall, 2010 – summer, 2011 academic period plus the senior exit exam.
- What work was evaluated? Class exams, presentations, reports, and group projects in courses pertinent to the objective were studied. In addition, all graduating seniors were required to take, and satisfactorily complete, a senior exam that included questions regarding statistical presentation and analysis were included.
- How was work evaluated? By individual professors and/or the department chair.
- What data resulted from the assessment? Individual exam scores, project group scores, and presentation scores.
B. Results of the assessments

- Senior exit exam results were sufficient to graduate all seniors from the program in the fall, 2010 and spring/summer, 2011 classes. The average score was 74.5% for both semesters.

- Individual courses within the program reported average letter grades of sufficient strength to enable professors to determine that successful students understood the principles of hazardous materials and unsafe conditions. Classes in Safety Program Management; Legal Issues and Liability; Acoustics-Noise-Vibration; Systems; Industrial Hygiene; and HAZMAT were successfully completed by over 90% of the students who attempted them. The courses included group presentations, individual presentations, and exams which included hazardous materials identification and evaluation.

- As in objective #1, Safety Program Management students must complete a functional Fault Tree Analysis to the department chairs satisfaction indicating capability of tracing an accident from its occurrence back to its primary fault. Students must also perform a JSA – Job Safety Analysis tracing a potential accident causing fault to a satisfactorily mitigated end result before an accident has opportunity to occur. Students begin this process from the first occupational safety course (Introduction to Occupational Safety), through Systems Safety, and then in a final form in Safety Program Management. All occupational safety students must be able to perform these processes for successful program completion.

- SFTY 4183 – “Hazardous Materials & Waste Management, Fall 2010 had 28 students that completed the course with a mean grade average of 2.96. During the Spring 2011 two sections were offered with section 2 having 25 students with a mean grade average of 2.44 The course covers legislation, handling, storage, transportation and emergency response. Students were required to compile data concerning various chemicals and to synthesize the data thereby allowing them to anticipate and identify the legal responsibilities, handling hazards, and transportation requirements. A complete plan for storing the chemicals, (special attention concerning incompatible chemicals), worker protection, methods and procedures for handling, and a written emergency program were also required. Their written communication skills were tested in their ability to compile the workbook with all information described and to make recommendations from the information gathered. The JJ Keller lab videos were utilized for additional training in spill response and transporting hazardous materials regulations with assessment upon completion of each video.” (Bradshaw)

- SFTY 4154 – Industrial Hygiene is the application of industrial hygiene methods of recognition, evaluation, and control of work place health
hazards. A lab is included for hands on use of instruments and practical measurements. Two sections are offered each semester to help keep classroom size to a minimum thus allowing more instructor/student interaction. Section 1 for the Fall 2010 semester had 24 students with a mean average of 2.42. Section 2 for the Fall 2010 semester had 24 students completing course with a mean grade average of 2.08. The Spring 2011 section 2 had 25 students complete the course with a mean grade average of 2.32. Section 1 had 23 students with a mean of 2.44. The ability to anticipate, recognize, evaluate, and control health hazards in the work place is the essence of Industrial Hygiene. Controlling exposures to different stressors in the work place are compared to not only OSHA standards but to the ACGIH threshold limit values and the NIOSH recommended exposure limits. Written communication skills are tested through a student’s ability to record completed labs in a scientific manner.” (Bradshaw & Poovey)

Classes with three data points or more:

- **SFTY 4113.2** 87.8, 83.8, 83.2, 84.0, 85.6

  FALL 2010, MEAN GRADE: 85.60%
  SPRING 2011, MEAN GRADE: 91.25%

  Dr. Braley continued the methodology of having students perform multiple presentations (one group and one individual) in the class. Added to the course are Myers-Briggs Type Indicator™ fundamentals such that students must align presentation techniques to personality temperaments; an analysis of proprietary training materials with the students gaining comprehension in creating documentation prior to purchasing training materials; enhancement of the knowledge base for in-house, fabricated training devices (with cost analysis and need-to-maintain concepts), and online training fundamentals wherein the students complete a basic presentation of how to utilize “print screens” to provide prospective trainees with the knowledge of how to access corporate training web sites. Presentation of those additional competencies matured in Spring 2011 and in lieu of accepting partially completed group or individual training materials, Dr. Braley would return those materials and not accept them until they met the quality indicators in the grading rubrics.

- **SFTY 4154.2** 78.3, 77.8, 79.7, 75.5, 81.5, 84.7, 73.0 – There does not appear to be any trend in this class. While the averages vary year to year the variation is not significant. No major changes have been made to this class in this timeframe. For some reason the Fall semester grades are consistently lower than the Spring semester grade. While this may not be significant it bears watching. Laboratory handouts were revised for 2010-11. Lab schedule was compressed in Spring of 2011 due to bad weather lost days. The compressed schedule may account for the lower grades in the Spring 2011 semester. Although the average for the year was
similar to past years with Fall being higher than historical average and Spring being lower.

- **SFTY 4183.2** 79.0, 80.4, 75.7, 83.4 74.5, 79.1 - While there appears to be a drop in class average for the Spring of 2009 it is not statistically significant at the \( a=0.01 \) (p =0.35). The apparent variation may be due to the small class size ~20. The ranges of the classes are very similar. Additional data would be needed to determine if there is a trend. A detailed grading rubric for the semester project was provided to the students for 2010-2011. Semester project was altered to stress importance of incompatible substances. There is no trend in the grades.

- **SFTY 4163.1** 87.6, 81.8, 83.3 79.9, 80.5, – There is a drop in the average of Summer classes over Spring/Fall classes. This is likely the result of the quality of students in the class. Generally, students taking summer classes are more motivated than other students. If one compares the top grades in both classes the grades are nearly identical. It would be necessary to collect more data on classes in the Fall and Spring to be able to draw any conclusions. While there is still not sufficient data to draw conclusions, Summer session student have continued to outperform regular semester students. This may in part be due to the format of teaching in the summer sessions that allows reinforcing of the lecture material with activities and video on a more timely basis than with a standard format. This trend may also be the result of more motivated students as noted previously. New class activities and video quizzes were added in 2010-2011. There is no trend in the grades.

Classes with two data points:

- **SFTY-4143:**
  Safety Program Management is the generally the last course occupational safety seniors take at the end of their degree plans. The course is designed to incorporate knowledge from other occupational safety courses into a cohesive and functional occupational safety entry-level safety professional. Exam scores in the spring 2010 section of Safety Program Management averaged 83% on the midterm exam. These scores indicated that over 90% of the class comprehended statistical measures and insurance rates well enough to interpret and present the statistics at a professional level. In addition, Safety Program Management students must complete a functional *Fault Tree Analysis* to the department chairs satisfaction indicating capability of tracing an accident from its occurrence back to its primary fault. Students must also perform a JSA – *Job Safety Analysis* tracing a potential accident causing fault to a satisfactory mitigation end result before an accident has opportunity to occur. Students begin this process from the first occupational safety course (Introduction to Occupational Safety), through Systems Safety, and then in
a final form in Safety Program Management. All occupational safety students must be able to perform these processes for successful program completion. Safety Program Management, Fall 2009 had a total of 41 students, spring 2010 had 37 students, and summer 2010 had 28 students completing the course with a mean GPA average of 3.1. This course addresses safety program organization, administration and management. The principles of the development and management of an effective safety program will be studied in this course. The philosophy and historical development of major concepts are examined, with particular emphasis on areas of special concern in organizational accident prevention. (Jones)

- SFTY 3173- “Acoustics, Vibrations, and Noise teaches the fundamentals of sound, vibration, and acoustics. The course covers the physical and psychological effects of noise on individuals, the measurement of sound, and the control of noise through the application of engineering principles and acoustics. Personal equipment for protection against noise and the legal and medical aspects of noise control are also covered. The Fall 2010 semester was completed by a total of 42 students with a mean grade of 3.12. Spring 2011 had 38 students completing the course with a mean grade of 2.92. This program is designed to give students the tools necessary in recognizing areas in the workplace that may cause noise induced hearing loss. The course also helps students develop the necessary skills to evaluate and control noise at the source, the pathway, and the receiver.” (Bradshaw)

<table>
<thead>
<tr>
<th>Course</th>
<th>Students</th>
<th>Mean</th>
<th>Course Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFTY 4163.1 Ergonomics</td>
<td>23</td>
<td>80.30 (0-96)</td>
<td>Exams, hands-on activities, Video quizzes</td>
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<tr>
<td>SFTY 4154.2 Industrial Hygiene</td>
<td>21</td>
<td>84.70 (60-97)</td>
<td>Laboratory write ups, exams, lab practical</td>
</tr>
<tr>
<td>SFTY 4163.1 Ergonomics</td>
<td>37</td>
<td>80.50 (51-98)</td>
<td>Exams, hands-on activities, Video quizzes</td>
</tr>
<tr>
<td>SFTY 4183.2 HazMat</td>
<td>31</td>
<td>75.40 (51-100)</td>
<td>Exams, Video quizzes; Term project</td>
</tr>
<tr>
<td>SFTY 4113. Section 2 Safety Training</td>
<td>33</td>
<td>85.60 (71-94)</td>
<td>Group presentations, group activities, projects (analysis of proprietary training materials and analysis of costs and risks associated with fabricating in-house training materials, development and use of an online presentation technique), exams</td>
</tr>
<tr>
<td>SFTY 4154.2</td>
<td>23</td>
<td>73.00</td>
<td>Laboratory write ups, exams, lab</td>
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### 2011

<table>
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<tr>
<th>Year</th>
<th>Program</th>
<th>Credits</th>
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<tr>
<td>2011</td>
<td>Industrial Hygiene</td>
<td>(25-96)</td>
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<tr>
<td></td>
<td>SFTY 4183.2 HazMat</td>
<td>23</td>
<td>79.10 (33-96)</td>
<td>Exams, Video quizzes; Term project</td>
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<tr>
<td></td>
<td>SFTY 4113.1 Safety Training</td>
<td>60</td>
<td>91.25</td>
<td>Group presentations, group activities, projects (analysis of proprietary training materials and analysis of costs and risks associated with fabricating in-house training materials, development and use of an online presentation technique), exams</td>
</tr>
</tbody>
</table>

### C. Analysis and interpretation

- Graduates of the department of occupational safety & health are capable of analysis of hazardous materials and unsafe conditions and are able to present and defend their findings. They are capable presenting Fault Tree Analysis, ISO9000, and Job Safety Analysis as exhibited by their presentations and examinations in SFTY-4143 (Safety Program Management), SFTY-4163 (Ergonomics), SFTY-4183 (HAZMAT), SFTY-4154 (Industrial Hygiene), and SFTY-4003 (Systems Safety).

### 3. Develop safety and health hazard control designs, methods, procedures, and programs including homeland security and emergency program management. Southeastern students should be able to complete FEMA basic knowledge coursework upon completion of SFTY-4154, 4183, and 4143 courses.

### A. Assessment methods

- Number of students participating in the assessment: 331
- How were students selected to participate in the assessment? All students enrolled in occupational safety core classes during the fall, 2010 – summer, 2011 academic period plus senior exit exam.
- What is the make-up of the sample? All students enrolled in occupational safety core classes during the fall, 2010 – summer, 2011 academic period plus senior exit exam.
- What work was evaluated? Class exams, presentations, reports, and group projects in courses pertinent to the objective were studied. In addition, all graduating seniors were required to take, and satisfactorily complete, a senior exam that included questions regarding statistical presentation and analysis were included.
- How was work evaluated? By individual professors and/or the department chair.
• What data resulted from the assessment? Individual exam scores, project group scores, and presentation scores.

• The department has added “extra credit” opportunities to specific courses which consist of the completion of FEMA NIMS online training modules the faculty identified as having a “goodness-of-fit” for their courses.

B. Results of the assessments

• Senior exit exam results were sufficient to graduate all seniors from the program in the fall, 2010 and spring/summer, 2011 classes. The average score was 74.5% for both. The scores are consistent with regard to semester and is a cold exam with no formal review of what will be on the examination. Anything in the four-year course of the program is subject to an exam question and the exams are standardized for semester to semester comparison. Students in the 2010-2011 academic year scored tone-percent less than in previous academic years and may be due to changes in personnel teaching the courses.

• SFTY-4143: Safety Program Management is the generally the last course occupational safety seniors take at the end of their degree plans. The course is designed to incorporate knowledge from other occupational safety courses into a cohesive and functional occupational safety entry-level safety professional. Exam scores in the spring 2011 section of Safety Program Management averaged 85% on the midterm exam. These scores indicated that over 90% of the class comprehended statistical measures and insurance rates well enough to interpret and present the statistics at a professional level. In addition, Safety Program Management students must complete a functional Fault Tree Analysis to the department chairs satisfaction indicating capability of tracing an accident from its occurrence back to its primary fault. Students must also perform a JSA – Job Safety Analysis tracing a potential accident causing fault to a satisfactory mitigation end result before an accident has opportunity to occur. Students begin this process from the first occupational safety course (Introduction to Occupational Safety), through Systems Safety, and then in a final form in Safety Program Management. All occupational safety students must be able to perform these processes for successful program completion. Safety Program Management, Fall 2010 had a total of 45 students, spring 2011 had 37 students, and summer 2011 had 26 students completing the course with a mean GPA average of 3.0. This course addresses safety program organization, administration and management. The principles of the development and management of an effective safety
program will be studied in this course. The philosophy and historical development of major concepts are examined, with particular emphasis on areas of special concern in organizational accident prevention. (Jones)

- SFTY 4183 – “Hazardous Materials & Waste Management, Fall 2010” had 28 students that completed the course with a mean grade average of 2.96. During the Spring 2011 two sections were offered with section 2 having 25 students with a mean grade average of 2.44. The course covers legislation, handling, storage, transportation and emergency response. Students were required to compile data concerning various chemicals and to synthesize the data thereby allowing them to anticipate and identify the legal responsibilities, handling hazards, and transportation requirements. A complete plan for storing the chemicals, (special attention concerning incompatible chemicals), worker protection, methods and procedures for handling, and a written emergency program were also required. Their written communication skills were tested in their ability to compile the workbook with all information described and to make recommendations from the information gathered. The JJ Keller lab videos were utilized for additional training in spill response and transporting hazardous materials regulations with assessment upon completion of each video.” (Bradshaw)

Dr. Braley added to the Hazardous Materials and Waste Management course the matrix from the National Institute for Standards and Technology (NIST)—CCC/MOT—wherein students can “place” the purposes of a standard into the Managerial Policy column, place a task or series of tasks necessary to comply with Policy into the Operational Procedures column, and place a required safety component or Personal Protective Equipment (PPE) into the Technological Products column. Students are taught the use of the CCC categories and must place the proper policies, procedures and products in the proper row: Control (to control the work environment such that safety is preeminent); Containment (to contain a hazard, risk or threat that has caused a work environment to lose control); and Correction (usually referred to as Recovery) such that students place policies, procedures and products that must be available for a work environment to recover from a hazard, risk or threat, to a preset level of acceptable, safe operations. (Bradshaw and Braley)

- SFTY 4154 – Industrial Hygiene is the application of industrial hygiene methods of recognition, evaluation, and control of work place health hazards. A lab is included for hands on use of instruments and practical measurements. Two sections are offered each semester to help keep class room size to a minimum thus allowing more instructor/student interaction. Section 1 for the Fall 2010 semester had 24 students with a mean average of 2.42. Section 2 for the Fall 2010 semester had 24 students completing course with a mean grade average of 2.08. The Spring 2011 section 2 had
25 students complete the course with a mean grade average of 2.32. Section 1 had 23 students with a mean of 2.44. The ability to anticipate, recognize, evaluate, and control health hazards in the workplace is the essence of Industrial Hygiene. Controlling exposures to different stressors in the workplace are compared to not only OSHA standards but to the ACGIH threshold limit values and the NIOSH recommended exposure limits. Written communication skills are tested through a student’s ability to record completed labs in a scientific manner.” (Bradshaw & Poovey)

Classes with three or more data points:

- **SFTY 4113.1**
  
  FALL 2010, MEAN GRADE: 85.60%
  SPRING 2011, MEAN GRADE: 91.25%

  Dr. Braley continued the methodology of having students perform multiple presentations (one group and one individual) in the class. Added to the course are Myers-Briggs Type Indicator™ fundamentals such that students must align presentation techniques to personality temperaments; an analysis of proprietary training materials with the students gaining comprehension in creating documentation prior to purchasing training materials; enhancement of the knowledge base for in-house, fabricated training devices (with cost analysis and need-to-maintain concepts), and online training fundamentals wherein the students complete a basic presentation of how to utilize “print screens” to provide prospective trainees with the knowledge of how to access corporate training web sites. Presentation of those additional competencies matured in Spring 2011 and in lieu of accepting partially completed group or individual training materials, Dr. Braley would return those materials and not accept them until they met the quality indicators in the grading rubrics.

  SFTY 4154.2 78.3, 77.8, 79.7, 75.5, 81.5, 84.7, 73.0 – There does not appear to be any trend in this class. While the averages vary year to year the variation is not significant. No major changes have been made to this class in this timeframe. For some reason the Fall semester grades are consistently lower than the Spring semester grade. While this may not be significant it bears watching. Laboratory handouts were revised for 2010-11. Lab schedule was compressed in Spring of 2011 due to bad weather lost days. The compressed schedule may account for the lower grades in the Spring 2011 semester. Although the average for the year was similar to past years with Fall being higher than historical average and Spring being lower.

- **SFTY 4183.2 79.0, 80.4, 75.7, 83.4 74.5, 79.1** - While there appears to be a drop in class average for the Spring of 2009 it is not statistically significant at the
The apparent variation may be due to the small class size ~20. The ranges of the classes are very similar. Additional data would be needed to determine if there is a trend. A detailed grading rubric for the semester project was provided to the students for 2010-2011. Semester project was altered to stress importance of incompatible substances. There is no trend in the grades.

- SFTY 4163.1 87.6, 81.8, 83.3 79.9, 80.5, – There is a drop in the average from Summer of 2008 to Spring of 2009. This is likely the result of the quality of students in the class. Generally, students taking summer classes are more motivated than other students. If one compares the top 26 grades in both classes the grades are nearly identical. It would be necessary to collect more data on classes in the Fall and Spring to be able to draw any conclusions. While there is still not sufficient data to draw conclusions, Summer session student have continued to outperform regular semester students. This may in part be due to the format of teaching in the summer sessions that allows reinforcing of the lecture material with activities and video on a more timely basis than with a standard format. This trend may also be the result of more motivated students as noted previously. New class activities and video quizzes were added in 2010-2011. There is no trend in the grades.

- Individual courses within the program reported average letter grades of sufficient strength to enable professors to determine that successful students understood the principles of FEMA, homeland security and emergency program management. Classes in Safety Program Management; Legal Issues and Liability; Acoustics-Noise-Vibration; Systems; Industrial Hygiene; and HAZMAT were successfully completed by over 90% of the students who attempted them. The courses included group presentations, individual presentations, and exams which included hazardous materials identification and evaluation.

- Drs. Braley, Poovey, Bradshaw, Nichols and Jones have added “extra credit” FEMA online training to several courses in the safety program. FEMA individual training courses were analyzed and the faculty collaborated on which FEMA courses had the best goodness-of-fit to some of the safety courses. Emergency response is an issue in all courses and the United States has prepared FEMA training modules for specific areas of employment, or work environments, that facilitate student comprehension of the breadth and depth of the impact naturally occurring or man-made catastrophic events have on those work and community environments.

C. Analysis and interpretation

- Graduates of the department of occupational safety & health are capable of understanding FEMA, homeland security and emergency program
management and are able to present and defend their findings as exhibited by their presentations and examinations in SFTY-4143 (Safety Program Management), SFTY-4183 (HAZMAT), and SFTY-4154 (Industrial Hygiene).

- Based on assessment result, the only changes or additions to the program we made was the addition additional math requirements in the occupational safety core classes and the addition of HAZWOPER 40-hour, and General Industry and Construction 30-hour, and Confined Space 10-hour OSHA certification courses.

- The department has added “extra credit” opportunities to specific courses which consist of the completion of FEMA NIMS online training modules the faculty identified as having a “goodness-of-fit” for their courses.

4. Evaluate and utilize appropriate technology and library resources in occupational safety & health situations and training opportunities through extensive use of SOSU occupational safety & health computer lab programs and OSHA and ASSE training online programs.

A. Assessment methods

- Number of students participating in the assessment: 1,305
- How were students selected to participate in the assessment? All students enrolled in occupational safety classes during the fall, 2010 – summer, 2011 academic period.
- What is the make-up of the sample? All students enrolled in occupational safety classes during the fall, 2010 – summer, 2011 academic period.
- What work was evaluated? Class presentations, reports, and group projects in courses pertinent to the objective were studied which required use of the departmental student computer lab.
- How was work evaluated? By individual professors and/or the department chair.
- What data resulted from the assessment? Individual and group project and presentation scores.

B. Results of the assessments

- Individual courses within the program reported average letter grades of sufficient strength to enable professors to determine that successful students understood the usage of the occupational safety student computer lab and all OSHA and ASSE online programs.

- **SOSU OSH Computer Lab Programs**
Dr. Nichols utilized the SOSU OSH computer labs extensively throughout the Fall 2010 and Spring 2011 semesters. Utilizing films from both the departmental safety film library, from J. J. Keller and Associates, Inc. and from the SOSU Bennett Library, Dr. Nichols asked students to answer numerous questions as they reviewed DVD’s in the SOSU OSH computer lab. DVD exercises containing questions for films covering topics such as materials handling, job safety analysis, construction safety orientation, various industrial engineering disasters, confined space entry procedures and several other safety topics were provided to students throughout the semester (approximately 6-8 DVD activities per class) for the following courses: SFTY 4003 and SFTY 3553. Scores on these exercises were generally in the middle to high ranges, and student participation was always 70-80% or more. These activities were worth various point values, the lowest of which was 10 points, and the highest of which was 30 points. All activities were averaged in to each student’s final “Activity Grade” for the course. (Nichols)

Students are now required to create a GANTT Chart for a sub-system of their choosing in System Approach to Hazard Control, using MS-Project software. The GANTT Chart is an industry standard for identifying work to be performed to accomplish a complex series of tasks that make up a work environment, from which risks, hazards and threats can be predicted and training, permitting, and work flow are determined. (Braley)

C. Analysis and interpretation

- Graduates of the department of occupational safety & health are capable of understanding and using OSHA, NIOSH, FEMA, J.J. Keller, and ASSE online programs. The Keller Lab was enlarged to include 16 computers.

5. Manifest oral and written communication skills in presentation of occupational safety and health training situations through required courses in Safety Training and Instructional Techniques and Industrial Safety Program Management courses.

A. Assessment methods

- Number of students participating in the assessment: 236
- How were students selected to participate in the assessment? All students enrolled in Safety Training and Instructional Techniques and Industrial Safety Program Management courses during the fall, 2010 – summer, 2011 academic period.
- What is the make-up of the sample? All students enrolled in Safety Training and Instructional Techniques and Industrial Safety Program
Management courses during the fall, 2010 – summer, 2011 academic period.

• What work was evaluated? Presentations, reports, and group projects in courses pertinent to the objective were studied.
• How was work evaluated? By individual professors and/or the department chair.
• What data resulted from the assessment? Individual and group project and presentation scores.

B. Results of the assessments

• Presentation and group project scores in Safety Program Management and Safety Training and Instructional Techniques indicated that students were capable of presentation and demonstration skills necessary for a successful career in occupational safety and health. The presentations were of sufficient caliber to warrant extra praise from the professors. In particular, the presentations in Safety program Management were professional, concise, easy to understand, interesting (in some cases entertaining) and were the best I’ve watched in 10+ years of teaching the course. (Jones)

• Oral and Written Communication Skills in Presentations
  This topic is addressed in-depth when Dr. Nichols teaches SFTY 4003-Systems Approach to Hazard Control, and SFTY 3553-Construction Safety. In SFTY 4003, students are asked to write and present a class essay covering a piece of equipment, system, or major event dealing with system safety. Students are then assigned an “Essay Grade,” and a “Presentation Grade,” both of which are combined into a final “Project Grade.” This “Presentation Grade” is then averaged into each student’s overall score for the entire class. Scores on these exercises were generally in the middle to high ranges, and student participation was always 100% (due to the fact that this was a required exercise for the course, and the point value on the exercise was so high). In Construction Safety, students are required to build a “scale model” construction site. This site is required to physically illustrate to the class a total of five construction safety violation (or compliance) issues on a given construction site. Students select their topic (and subsequent site) from a list provided to them by Dr. Nichols. This list includes topics such as fall protection for construction, electrical safety in construction, and concrete safety for construction, to name but a few. Students are subsequently graded on both their presentation of their “scale model” to the class, and the construction of the model itself. These scores are then combined into a “Project Grade” similar to the process enumerated above for the presentation and essay required in SFTY 4003. In both processes, students are graded on quality of their oral presentation, and project completion. Scores on these exercises were generally in the middle to high ranges, and student participation was always 95% of more (due to the fact that this was a
required exercise for the course, and the point value on the exercise was so high).

A significant risk assessment written exercise as the semester project has been added to the System Approach to Hazard Management class. Students must identify and receive approval of a system with two to four sub-systems, prepare background information about their chosen system, perform a Risk Assessment and assign Risk Assessment Codes (RACs) to each sub-system, perform a NIST: CCC-MOT analysis, Failure Mode and Effect Analysis (FMEA), Fault Tree Analysis (FTA), and MORT (Management Oversight Risk Tree). The document is valued at 20% of the total points available for the class and provides graduates with a document to use during employment interviews. In the Safety Training and Instructional Techniques class a fundamental understanding of personality temperaments—wherein students identify specific Myers-Briggs Type Indicator™ personality characteristics and link those characteristics with different types of training methods and media—has been added. Also added is a process for evaluating proprietary training materials—videos, devices and simulators—and the decision making process for constructing training devices (including hazard analysis and cost factors) is now included in the course. Students must evaluate such items with the additional requirement to articulate a recommendation for either procurement or non-procurement. Students create a present a group safety presentation and an individual training presentation. Dr. Braley intends to infuse into the course a fundamental appreciation for the JSA as a foundation for a JSI (Job Safety Instruction). JSAs without JSIs are only partially valuable to an organization. (Nichols and Braley)

C. Analysis and interpretation

- Presentation and group project scores in Safety Program Management and Safety Training and Instructional Techniques indicated that students were capable of presentation and demonstration skills necessary for a successful career in occupational safety and health.

6. Work independently in analyzing and solving problems in occupational safety & health through proper instruction and internship experience gained during the junior and senior years.

A. Assessment methods

- Number of students participating in the assessment: 94
- How were students selected to participate in the assessment? All graduating students in the program during the fall, 2010 – summer, 2011 academic period, especially those in internship positions.
• What is the make-up of the sample? All graduating students in the program during the fall, 2010 – summer, 2011 academic period, especially in internship positions.
• What work was evaluated? Weekly internship reports, and assignments in Senior Seminar class to include resumes, cover letters, interview skills, and presentations.
• How was work evaluated? By the department chair.
• What data resulted from the assessment? Successful completion of senior projects, internships, and job searches.

B. Results of the assessments

• Graduating seniors and those students in internship positions were able to demonstrate their ability to work independently through projects and assignments and put their 3+ years of occupational safety training into practice by guided performance on-the-job through internship opportunities. The number of successfully completed internships was the highest in the history of the department with more and more companies interested in pursuing an occupational safety intern or co-op situation.

• Many companies ultimately hire their interns or co-op students into full-time occupational safety positions at the conclusion of their programs.

C. Analysis and interpretation

• Graduates of the department of occupational safety & health are capable of independent thought, action, and presentation. They are as capable this year as they have been in the past five years as demonstrated by the department’s continuous 80% placement record and the number of repeat companies recruiting from the department each semester. Over 100 positions were advertised on the occupational safety job board last year for a total of 83 graduates. This with internship or co-op experience fair particularly well with their employment coming twice as fast as those students not pursuing internship or co-op experience.

7. Obtain an entry-level position in occupational safety & health or be admitted to an accredited graduate school in occupational safety & health or industrial hygiene.

A. Assessment methods

• Number of students participating in the assessment: 83
• How were students selected to participate in the assessment? All graduating students in the program during the fall, 2010 – summer, 2011 academic period.
• What is the make-up of the sample? All graduating students in the program during the fall, 2010 – summer, 2011 academic period.
• What work was evaluated? Successful job placement or graduate school acceptance.
• How was work evaluated? By the department chair.
• What data resulted from the assessment? Percentage of successful job search or graduate school acceptance.

B. Results of the assessments

• Graduating seniors who successfully participated in internship positions were able to find employment faster than those who did not. Successful intern students were also able to command higher starting salaries than those without internship experience. Placement rates were still over 80% 90-days after graduation.

C. Analysis and interpretation

• Graduates of the department of occupational safety & health are capable of finding jobs within the career field. They are as capable this year as they have been in the past five years as demonstrated by the department’s continuous 90% placement record and the number of repeat companies recruiting from the department each semester. Over 100 positions were advertised on the occupational safety job board last year for a total of 83 Occupational Safety & Health graduates.

• Based on assessment result, changes or additions to the program we made were the addition of the Master of Science degree beginning fall, 2007 and the addition of the HAZWOPER 40-Hour, General Industry 30-Hour, Confined Space 10-Hour, Construction 10 and 30 Hour courses, and CPR/First Aid Certification courses.

• Beginning with the Fall, 2011 semester, College Algebra or Algebra for the Sciences will be required to successfully complete the Occupational Safety & health program and must be completed prior to taking Industrial Hygiene.

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Types of Assessment Used:

1. SUMMA student evaluations   Addresses Program Goal
2. Senior Seminar evaluation surveys   Addresses Objectives 1, 2, 4, 5, & 6
3. IETV evaluations   Addresses Program Goal
4. Individual course evaluations
   Addresses Objectives 1, 2, 4, 5, & 6
5. Faculty observations
   Addresses Objectives 1 - 6
6. Senior exit interview with department chair
   Addresses Objectives 1 - 6
7. Alumni surveys
   Addresses Objective 7
8. Employer surveys
   Addresses Objectives 1 – 7
9. Senior Exit Examination
   Addresses Objectives 1, 2, 4, 5, & 6
10. ASP and CSP Examinations
    Addresses Objectives 1 – 7

Summary of Quantitative and Qualitative Data:

1. SUMMA student evaluations were conducted for spring, 2009 for the five-year program review so were not conducted during this academic year.

2. Senior Seminar evaluations again indicated strong satisfaction with the department and with individual instructors. Seniors were critical of some professors this year but overall comments echoed years past and favorable comments abounded with regard to general safety faculty. As with last year’s assessment favorable comments were included with regard to facilities and equipment. Again, comments such as ”totally cares whether or not we are learning,” “related course to real life,” “obviously loves his students,” “very knowledgeable,” “great source of information,” “the only way you didn’t learn in this class is if you were asleep,” “great network contact for the future,” “great respect for students” and “a real people person” were cited in 2006 – 2007, 2007 – 2008, 2008-2009, 2009-2010, and 2010 -2011 student evaluations with regard to faculty members. As with the Seniors graduating during the fall, 2010 semester, spring/summer, 2011 graduates made comments such as “about time, finally, and now we’re on the same playing field as other safety programs.” Seniors were especially well pleased with the number of outside safety professionals speaking on campus and with the large number of potential employers posted on the departmental job boards this past semester. Based on the number of repeat recruiting trips and comments by the recruiters, employers are pleased with the type of comprehensive occupational safety education and experience the students are receiving in the department.

3. IETV standardized evaluations were again not rated as highly as in-class or on-campus evaluations. Once again, while 60%+ of the students rated the instructors above average with regard to proper use of instructional time and/or use of equipment, less than 30% indicated that they would take additional IETV courses, if offered, in their major. The majority of students indicated a preference of “live” instructors over IETV. The higher education centers continue to express interest in making the occupational safety degree a permanent component of their on-site course offerings.

4. Individual course evaluations (including course assessments such as exams, projects, papers, and presentations) were derived from 1,305 students enrolled in
occupational safety courses (including students enrolled in more than one safety course), 83 senior evaluations and approximately 10 individual student evaluations by the department chair. Once again, the evaluations were dependent on the course and professor involved but as with previous years, students rated satisfaction with the occupational safety courses higher than average with 85%+ of the students being “very satisfied or satisfied” with the program. As in past years, by a two to one margin, students rated courses such as construction safety; acoustics, noise & vibration; hazardous materials; industrial hygiene; legal liabilities; ergonomics; and safety program management higher than introduction to occupation; basic fire systems; drugs in society; and training and development. As usual, those courses directly involved with the profession were rated higher than those courses serving an introductory function.

5. Faculty observations of classes and students, gathered informally during faculty and student meetings, rated 90%+ of the currently enrolled students and graduates with high esteem. High esteem meaning that the students were well prepared and qualified to be successful in the occupational safety profession. Professors observed that, as expected, some students were more highly qualified than others to begin their first occupational safety position. Factors attributed to this “preparedness” were credited to the large number of students from rural areas i.e. farms and ranches, thereby having a better working knowledge of large machinery, equipment, and construction. However, the faculty agreed that, based on success rates of graduates in occupational safety positions, 95% were qualified to enter the occupational safety workforce and were capable of achieving objectives 1 – 6. As was previously stated, some students, due to pre-college work and life experience, had significant experience in welding, construction, farming & ranching equipment, and general industry before they entered college thus creating students possessing significant internship quality experience before class work began. As stated earlier, the large number of national recognized construction companies continually recruiting from the occupational safety department would support this observation.

6. Many seniors participated in an exit interview with the department chair. These interviews supported the information obtained on the senior seminar evaluations indicating satisfaction with the curriculum, faculty, placement, and leadership. Graduating seniors felt that they were prepared to enter the occupational safety workforce and that they were in a position to successfully compete with graduates from other occupational safety programs. In previous assessments, the senior seminar evaluations students were not as complimentary of the facilities and industrial hygiene lab and used statements such as “dated” and “over crowded” in their descriptions. After the 2006-2007 renovation this complaint was corrected with the incorporation of the former auto lab into industrial hygiene and construction safety labs. Equipment issues are still being addressed with several companies and entities making substantial donations to the department during the 2008 – 2009 academic year.
7. Surveys (written and oral) of alumni (approximately 18) indicate general satisfaction with the program (with only a few of suggestions for improvement) but overwhelming suggested renovations to some areas that were addressed with the renovation. Additionally, of the approximately 18 alumni contacted, all were pleased with placement efforts by the department and the university. This particular evaluation group continues the historical precedent of good placement upon graduation (within 90 days after graduation). With increased graduation rates (83 graduates in 2010-2011) and a faltering economy the placement rates have slipped a little in the past year but alumni continue to be extremely satisfied with the program and made such statements as ”the best safety program around,” “a leader in our field,” “wonderful new facilities,” “provided real world experience,” “faculty covered all areas of safety,” “great general knowledge program,” “helps students hit the ground running,” “great resources,” “safety professors go out of their way to guide, educate, and provide students with the information.….”, “well programmed”, “top notch faculty,” “rewarding” and “affirming” when discussing their college experiences and the impact of their major on their lives.

8. Employer evaluations (approximately 10) were very complimentary with some program suggestions and comments (to be discussed in the following section). One employer comments year-after-year that the department is the best organized of any he had recruited from. Employers rated the program high in basic skills and very high in areas of decision-making skills and presentation skills of technical data. The strong work ethic of our alumni was noted by several employers, as was common sense among our alumni. Due to employer and alumni recommendations, courses such as emergency program management, air quality control, construction safety and noise and vibration were added to the curriculum with great effect. In addition, the Master of Science degree was added in 2007 with over 100 students having been accepted into the program.

Repeatedly, employers commented that graduates were even better suited for their jobs after graduating with the new required courses. Due to employer and alumni demand additional courses in workers compensation, airborne contaminants, and a second construction safety course was offered fall, 2007. An OSHA representative commented that Southeastern Occupational Safety undergraduate students were “comparable to masters’ degreed students from other institutions.” Two employers described the graduates from the occupational safety program as “exceptional” and “better organized” than those from other programs. Based on discussions with executive board members at the American Society of Safety Engineers (ASSE) student leadership committee in Chicago, the department should be very proud of the caliber of students sent into the workforce. The statement by one of the national leaders in the occupational safety field: “I would match your students against any student, from any university, in the nation” is an example of the quality of Southeastern occupational safety students.
9. Senior Exit Examination. After several months of working to compile questions from each of the major core classes, using professors to cull questions from their particular areas, and utilizing seniors to “test” the questions, this component became “required” with the fall, 2004 senior class and should be an effective method of assessing program effectiveness with regard to current industry requirements. Based on scores taken from the 83 students administered the examination during fall, 2010 and spring/summer, 2011, the program is still deficient in one area - mathematics. Students scored well in every other area. Continuous monitoring of the senior exam will be made by the department and questions will be added and deleted until a suitable program assessment tool is achieved.

Beginning with the Fall, 2011 semester, College Algebra or Algebra for the Sciences will be required to successfully complete the Occupational Safety & health program and must be completed prior to taking Industrial Hygiene.

10. Of the 18 alumni contacted many noted that they felt prepared to take the ASP (Associate Safety Professional) examination upon graduation even though they were not allowed to sit for the examination until they had accumulated one-year (ASP) of related work experience after gaining the degree. A study to determine success rates for Southeastern graduates on those two examinations is in progress and is being monitored by the department chair.

Comparative Group Data vs. National Normed Data:

There are currently no national exams or nationally normed data files for academic programs in occupational safety & health. The only examinations of that type are the Associate Safety Professional (ASP) and Certified Safety Professional (CSP) examination administered by the Board of Certified Safety Professionals of the American Society of Safety Engineers (ASSE). Alumni are not permitted to sit for the ASP or CSP examination until they have completed one year (ASP) and three years (CSP) of on-the-job experience thereby making any comparison between current students or graduating seniors inappropriate. As was earlier stated, a study will be conducted to determine success rates of three-year Southeastern occupational safety graduates to determine program effectiveness in foundational preparation for the exams.

Strengths and Weaknesses of the Program as Indicated by the Data:

Strengths

1. Data would indicate that students, alumni, and employers have positive feelings toward the Southeastern program as a whole. The overall enrollment has grown from 85 majors and 20 minors in 1997 to approximately 350 undergraduate and graduate majors and 50+ minors in 2011 with over 100 new master of science in
occupational safety & health graduate students having been admitted to the SOSU graduate school since the fall, 2007 semester. Approximately 1,305 individual students took at least one occupational safety course during the fall 2010 – summer 2011 academic year. The placement rate is averaging over 50% at graduation and 70% by 90 days after graduation for those students willing to move to job locations. Starting salaries are averaging over $50,000 and many employers are recruiting from Southeastern semester after semester. Large corporations and government agencies such as General Motors, Raytheon, Baylor Health Care, BP, Martin-Marietta, Lockheed, Toyota, OSHA, Alcoa, NASA, Hartford Insurance, Wal-Mart, McNeilus, Granite Construction, Garney Construction, and Kiewit Construction repeatedly hire Southeastern occupational safety students.

2. Students are being taught the fundamentals of occupational safety & health in a variety of areas. Basic information such as introduction to occupational safety and introduction to fire systems, accompanied by basic drugs and alcohol education and general safety provide a foundation for the core courses that follow. While students are not particularly fond of the basic introductory courses, they are necessary to familiarize students with basic occupational safety concepts before core courses are attempted. The basic courses are a strength in the program.

3. Data suggest that students, alumni, and employers have positive perceptions of the core courses. Those core courses include training and development; systems; hazardous materials; industrial hygiene; ergonomics; legal issues and liability; and safety program management. New courses in construction safety and acoustics, noise, & vibration have been very successful (enrollment over 40 each semester offered) and, according to alumni and employers, very beneficial to students upon graduation. Additional courses in statistics, workers compensation, and a second course in construction safety are planned. Also, due to increased interest, online courses in fire science, hazmat, and basic occupational safety management are being offered.

4. Data also suggest, and the recent program reviewer confirmed, that the primary strength of the department is the faculty. Program review materials, individual classroom evaluations, and the senior exit survey and interview indicate strong student support of the faculty. With 85% of the faculty having strong outside experience in the field of occupational safety and/or aviation safety, real world applications are available to accompany the theory presented in class. Students and employers seem to appreciate this. The addition of a faculty member in January, 2008 with expertise in industrial hygiene strengthened that section of the curriculum by allowing for smaller classes and labs. The additional faculty member, combined with the new academic building, allowed for the Master of Science degree to finally become a reality beginning with the fall, 2007 semester. Yet another faculty member was added in 2010 with expertise in systems safety and statistics.
5. Substantial growth has been achieved at the Tinker Air Force Base campus with over 100 students now enrolled in the aviation with occupational safety emphasis program. It is anticipated that the recent expansion to Oklahoma City Community College will eventually increase the number of minors to over 100. The addition of additional adjunct faculty members and increased instructional space have been instrumental to the success of this program. Student evaluations continue to rate both the overall program and individual faculty members highly.

6. Departmental Exit Examination. A quality exit examination has been created to indicate program effectiveness through sufficient course offerings, instruction, and lab requirements in the field of occupational safety & health. Testing began with the fall, 2004 graduating class and has yielded positive and significant results. Based on exam results, the department is meeting or exceeding course quality expectancy in all areas of the program with the exception of math skills. The successful completion rate of the senior exit exam is over 90% on the first attempt.

7. With the recent renovation and addition of space in the occupational safety & health building the department is finally in a state of the art facility. New labs in Industrial Hygiene, Ergonomics/Construction, and Noise and Vibration have been added. In addition, a new 17 computer occupational safety student computer lab, renovation of all classrooms to be “smart” classrooms, a new full functional conference room, and two new faculty offices have made our building on the best on campus.

8. Due to alumni and market demand, and with the recent renovation of the occupational safety & health building, a new online Master of Science degree in occupational safety & health became a reality with the fall, 2007 semester. Over 100 students have been admitted to the graduate school for this program. Due to its online format the students will be taking classes from locations all across the United States and around the world.

9. The reviewer strongly disagrees with the concept that SCH is not a valid indicator of program quality. Occupational Safety is a value driven degree and has no required general education or teacher education courses. In the business it is known as a survival program in that if we do not meet the students professional needs they will not come. In other words, if the program is not producing graduates capable of entering the OSH workforce with good placement and excellent starting salaries students will not enroll in the program. The consistently high SCH production of the department would indicate that students are satisfied that the program is one of value and an excellent career choice.
Weaknesses

While the program has made manifest improvement in objectives 1 – 7, and is stronger than it has ever been, there exists a need to improve the program in three areas:

1. Objective 1, math skills. Students are still deficient in this area and need additional coursework in algebra and statistics. A statistics class was added to the MS program to help in this area. Beginning with the Fall, 2011 semester, College Algebra or Algebra for the Sciences will be required to successfully complete the Occupational Safety & health program and must be completed prior to taking Industrial Hygiene.

2. Accreditation. The department is in need of accreditation by the Accreditation Board of Engineering Technology (ABET) and/or the American Society of Safety Engineers (ASSE). The department chair currently sits on two national boards with ASSE but the department itself remains unaccredited. As was previously mentioned, with the addition of another faculty member and the new academic building, it is possible that accreditation application may begin as early as spring, 2012.

3. Faculty. The department is again down two professor slots with the resignation of Mr. Lewis and the retirement of Dr. Cunningham. The addition of Dr. Braley (fall, 2010) will help significantly but there still exists a need for a construction safety specialist and additional CSP’s (Certified Safety Professionals) to aid in ABET accreditation. According to the recent program review (2010), the faculty situation is the single most significant weakness in the program. The enrollment is far outdistancing the number of full-time faculty to the point that, with the Spring, 2011 semester, over one-third (10-12 sections) of the occupational safety classes were being taught by adjunct faculty and the department chair was teaching five sections while advising 180 undergraduate and 50-60 graduate students. Additional faculty, or a reduction in student enrollment, is desperately needed if the program has any hope of achieving accreditation.

Modifications to be made as a Direct Result of Assessment Data:

1. OSHA 10 and 30 hour seminars in General Industry, Confined Space, and Construction Safety, a 40-hour HAZWOPER seminar, and certifications in CPR and First Aid were made permanent parts of the program due to an increase in demand for these options/certifications by industry and alumni.
2. As a direct result of alumni and employer assessment the courses *Construction Safety* and *Acoustics, Noise, and Vibration* became a mandatory part of the core program beginning with the fall, 2005 semester. In addition, courses such as *Indoor Air Quality, Emergency Program Management*, and a host of graduate level occupational safety courses have been added beginning with the fall, 2007 semester.

3. As a direct result of assessment (and thanks to substantial corporate donations from SOSU safety alumni) a state-of-the-art Confined Space Training Module was completed, scaffold training materials were purchased, and a substantial monetary gift was provided to equip a modern industrial hygiene and HAZMAT classroom and lab.

4. To address the deficiency in mathematics skills, Beginning with the Fall, 2011 semester, College Algebra or Algebra for the Sciences will be required to successfully complete the Occupational Safety & health program and must be completed prior to taking Industrial Hygiene. College algebra or Algebra for the Sciences would then be a required general education course for occupational safety students. In addition, students are being provided with substantial increases in mathematics in core courses such as industrial hygiene, HAZMAT, acoustics, noise & vibration; systems analysis of engineering design; and safety program management. In time, and as faculty allows, an additional course in occupational safety statistics will be required in the undergraduate program (as it already is in the graduate degree).

5. A renovation of the occupational safety & health building was completed in January, 2007 which included four new labs, two offices, and a conference room. The J.J. Keller occupational safety computer lab was expanded from four to 16 computers with the renovation.

6. With 75 students registered, and 50 enrolled in fall, 2011 classes, the new Master of Science in occupational safety & health has enjoyed a successful launch.

7. National accreditation of the program is needed but cannot be addressed until faculty, enrollment (class size), and budget issues are improved.

8. The senior exit examination is complete and currently being used. Based on scores taken from the 83 students administered the examination during fall, 2010 and spring/summer, 2011, the program is deficient in one area - mathematics. Continuous monitoring of the senior exam will be made by the department and questions will be added and deleted until a suitable program assessment tool is achieved.
AVERAGE SENIOR EXIT EXAMINATION SCORES

<table>
<thead>
<tr>
<th>Year</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>85%</td>
</tr>
<tr>
<td>2006</td>
<td>79%</td>
</tr>
<tr>
<td>2007</td>
<td>78%</td>
</tr>
<tr>
<td>2008</td>
<td>76%</td>
</tr>
<tr>
<td>2009</td>
<td>74%</td>
</tr>
<tr>
<td>2010</td>
<td>74.5%</td>
</tr>
<tr>
<td>2011</td>
<td>75%</td>
</tr>
</tbody>
</table>

Steps are being taken to address the 10% decrease in the average passing score of occupational safety students taking the senior exit exam. A revision of the exam to include new questions from the current faculty and a review to be provided to seniors should help.

How effective have modifications been in the past based on data?

- The basic modifications of the past (based on data) have been to improve the industrial hygiene lab; improve course offerings in construction safety, acoustics, noise, & vibration, safety training and instruction techniques, aviation safety, and legal issue and liabilities; and to hire a faculty member in area of construction safety and another in industrial hygiene.

- Course offerings have increased in the technical areas and data from alumni and employers suggests greater competency in those areas. Enrollments in the new core classes have exceeded 40 per course indicating sustained student interest. Course evaluations have been very positive and indicate student’s satisfaction with the courses themselves.

- Minors in environmental science, aviation management, and security have been added based on past data collected from alumni and employers. All of these programs have been hugely successful with over 50 students listed as minors or emphasis in the three areas.

- Increased marketing has been one of the major providers of the large enrollment figures. Based on data collected in years past, this initiative was especially needed (and been hugely successful) in the Dallas/Fort Worth Metroplex. The department has experienced a 100% increase in the number of Metroplex students since marketing began in 2000.

- Realignment of the SOSU occupational safety program with the Southwest (Dallas) and Fort Worth Chapter of the American Society of Safety Engineers rather than the Tulsa Chapter of ASSE. This realignment, completed in 2002 and repeated annually, has resulted in thousands of dollars in increased scholarship
funds, internships, and guest speakers to the ASSE student chapter and to the department as a whole.

- An additional modification (based on previous assessment of employers and higher education coordinators) has been the offering of the B.S. degree in occupational safety & health to the higher education centers at Ardmore, Idabel, and McAlester. The program is presented in an IETV and web-based format due to the shortage of professors and will be presented as a two class per semester option. The degree is being offered at the sites due to high demand from area industry and a request from the administration to explore the possibility of an off-campus program in the same format as the currently offered minor in occupational safety at Tinker AFB. In the past year, 30+ additional students have enrolled in the introductory level courses offered through the extension campuses with significant enough numbers declaring occupational safety as their major that additional courses at the off-campus centers is being explored. With the addition of the Oklahoma City Community College campus more adjunct faculty will be required in that area.

**IETV and web-based instruction Assessment**

The department currently has several web-based course offerings but is offering less than in semesters past due to the high demands of the online MS program and the fear that our graduates would be taking online courses for both the BS and MS OSH degrees and thereby losing the opportunity for face-to-face instruction and lab requirements. The department also provides three sections of IETV courses each academic year in three topic areas with a rotating course offering and, with the addition of the Master of Science degree in a primarily online format, the number of courses offered in that mode of instruction has increased to approximately eight per semester.

Course requirements for online sections were the same as for face-to-face sections. The same exams were used to standardize the grading process. If classroom assignments were required in the face-to-face sections they were also required in the online sections. Exam scores in the online sections of SFTY-2003 indicated that students taking the course online scored lower than those in face-to-face sections. This revelation is being studied. Online courses are evaluated using the Internet Course Survey, however, with only two students completing the instrument no substantive evaluation could be completed.

All IETV courses were taught as part of face-to-face sections and therefore had the same course requirements as students sitting in the Durant sections. There was no measurable difference in IETV or face-to-face student performance. IETV courses are evaluated using the SUMMA student survey and the IETV survey administered through the office of academic affairs. As stated previously, while the students are generally pleased (some students and administrators have asked for a greater numerical course offering) with the course offerings, some difficulties, such as overly large enrollment and weather related
technology issues, still exist in the delivery of the program itself. Students maintain their request for “live” professors at the off-campus sites but this may be impossible due to inadequate class size. Hybrid courses using a combination of online, IETV, and face-to-face instruction is being studied. Detailed course content and student performance criteria for all courses (face-to-face, online, or IETV) is described in sections 1 – 5 of the assessment document.

Wayne D. Jones

Dean, School of Arts & Sciences

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