Including PtD into the Education of Safety Engineers

UAB’s Master of Engineering in Advanced Safety Engineering and Management

Martha W. Bidez, Ph.D.
Professor and Graduate Program Director
University of Alabama at Birmingham
MEng – Advanced Safety Engineering and Management

- Concept presented to Dean Linda Lucas 10/09
- Approved by Board of Trustees 4/9/10
- Launched: August 2010
- No GRE required; engineering undergraduate desired, but not required
- Five years minimum safety experience required
- Totally online program
- 33 hrs required; completion in ≥18 months
- Est. $22K total program cost (plus books & standards)
Technical Core (18 Hours)

- EGR 610 Introduction to System Safety – Prevention through Design
- EGR 611 Hazard Analysis and Waste Elimination
- EGR 612 Engineering Risk: Assessment, Reduction and Liability
- EGR 613 Human Performance and Engineering Design
- EGR 619 Capstone Project – Advanced Safety Engineering and Management Plan
# What is Acceptable Risk?

## Severity of Injury or Illness Consequence and Remedial Action

<table>
<thead>
<tr>
<th>Likelihood of occurrence or exposure</th>
<th>CATASTROPHIC</th>
<th>CRITICAL</th>
<th>MARGINAL</th>
<th>NEGLIGIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>for selected unit of time or activity</td>
<td>Death or permanent total disability</td>
<td>Disability in excess of 3 months</td>
<td>Minor injury, lost workday accident</td>
<td>First aid or minor medical treatment</td>
</tr>
<tr>
<td>Frequent</td>
<td>HIGH</td>
<td>HIGH</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Likely to occur repeatedly</td>
<td>Operation not permissible</td>
<td>Operation not permissible</td>
<td>High priority remedial action</td>
<td>Take remedial action at appropriate time</td>
</tr>
<tr>
<td>Probable</td>
<td>HIGH</td>
<td>HIGH</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Likely to occur several times</td>
<td>Operation not permissible</td>
<td>Operation not permissible</td>
<td>High priority remedial action</td>
<td>Take remedial action at appropriate time</td>
</tr>
<tr>
<td>Occasional</td>
<td>HIGH</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>Likely to occur sometime</td>
<td>Operation not permissible</td>
<td>High priority remedial action</td>
<td>Take remedial action at appropriate time</td>
<td>Risk acceptable: remedial action discretionary</td>
</tr>
<tr>
<td>Remote</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>Not likely to occur</td>
<td>High priority remedial action</td>
<td>Take remedial action at appropriate time</td>
<td>Take remedial action at appropriate time</td>
<td>Risk acceptable: remedial action discretionary</td>
</tr>
<tr>
<td>Improbable</td>
<td>MEDIUM</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td>Very unlikely – may assume exposure will not happen</td>
<td>Take remedial action at appropriate time</td>
<td>Risk acceptable: remedial action discretionary</td>
<td>Risk acceptable: remedial action discretionary</td>
<td>Risk acceptable: remedial action discretionary</td>
</tr>
</tbody>
</table>

ANSI/AIHA Z10-2005
Leadership/Management Core (15 Hours)

- EGR 614  Cross Road: Engineering Ethics and Acceptable Risk
- EGR 615  Leading through Climates of Change
- EGR 616  Policy Issues in Prevention through Design
- EGR 617  Crisis Leadership and Safety-Critical Design
- EGR 618  Intrapreneurship and Calculated Risk Taking
Delivery Format

MEng in Advanced Safety Engineering and Management

Faculty and Wise Colleagues
Get to know your faculty and colleagues

Discussion Board
A weekly forum for follow-up discussion of learning module subject matter. Moderated and graded by Drs. Rieder and Shivers

Media Library
Podcasts, Videos, Animations & Learning Module Narrations

Reflections on our first week

Learning Modules 1-10
Archived live classrooms and all supporting material for each learning module are available for download here.
EGR 615: Learning Module 1
Introductory Concepts

Martha Warren Bidez, Ph.D.
Professor and Director, Advanced Safety Engineering and Management
mbidez@uab.edu

Textbook:
Resilience Engineering
Erik Hollnagel, David D. Woods and Nancy Leveson

Other Recommended Books (by John Kotter)
• “The Heart of Change: Real-Life Stories of How People Change Their Organizations”
• “Buy-In: Saving Your Good Idea from Getting Shot Down”
Wimba CLASSROOM

Bring Class to Life

A student’s engaged expression. The lilt of an instructors knowing voice. That brief flash in time when a breakthrough learning moment occurs. It’s about people interacting, and Wimba Classroom supports student success by bringing the traditional classroom to life in the networked learning environment.
<table>
<thead>
<tr>
<th>A</th>
<th>System: ISOM Unit System/Function: Startup Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>ISOM Unit fails to start</td>
</tr>
<tr>
<td>C</td>
<td>Causes</td>
</tr>
<tr>
<td></td>
<td>Control system software error; hardware error; human error</td>
</tr>
<tr>
<td>D</td>
<td>ISOM Unit starts after startup initiated</td>
</tr>
<tr>
<td>E</td>
<td>ISOM Unit inadvertently starts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>Preliminary Hazard Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Mode</td>
</tr>
<tr>
<td>H</td>
<td>Startup</td>
</tr>
<tr>
<td>I</td>
<td>Injury/Fatality</td>
</tr>
<tr>
<td>J</td>
<td>Loss of productivity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K</th>
<th>1IC</th>
<th>1B</th>
<th>1D</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Engineer pump to 5X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1) Design unlike (both software and hardware)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2) Redundant shutoff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>3) Systems to initiate start</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Cortez Tolbert says "no" feedback guys, "Yeah, Landers says "Thanks for the feedback guys."
Identify one or more examples of controls that have been introduced into your organization within the last year to reduce serious injuries AND describe which one (or more) of Haddon’s unwanted energy release concepts helped the organization identify the problem.
Our inaugural class and faculty are stellar!

- 11 states and 2 continents (North America and Africa)
- 14 different industry sectors
- 20 different, accredited undergraduate degrees
- Experience ranging from 5-30 years with a median of 14 years
- Companies, ranging from sole proprietorships to multinational, multi-billion dollar corporations
- Military and NGOs also represented
17 States & 4 Countries

• Alabama
• Arizona
• California
• Florida
• Georgia
• Indiana
• Louisiana
• Maryland
• Michigan

• Missouri
• New Hampshire
• North Carolina
• North Dakota
• Ohio
• South Carolina
• Texas
• Virginia
20 Industry Sectors

- Aerospace
- Automotive
- Biotechnology
- Chemical Processing
- Construction
- Government
- Academic Research
- Manufacturing
- Maritime
- Medical Device
- Military
- Mining
- Pharmaceuticals
- Professional Services
- Retail
- Utilities
  - Electric
  - Oil
  - Gas
  - Water
33 Different Degree Backgrounds

- Applied & Natural Science
- Applied Physics
- Biochemistry
- Business Administration
- Chemistry
- Communications
- Computer Integrated Mfg.
- Computer Science
- Disaster Management
- Electrical Engr. Technology
- Engineering (all disciplines)
- Environmental Science
- Forest Science
- Geology
- Human Resource Mgmt
- Industrial Hygiene
- Industrial Management
- Industrial Technology
- Mgmt of Human Resources
- Marine Transportation
- Molecular Biology
- OS&H
- Physics
- Psychology
Students from 26 Companies with Revenues >$1B

- ABS Consulting
- Addax Petroleum
- AMEC International Limited
- American Electric Power
- Bastion Technologies
- CH2M
- Chevron
- Clean Harbors
- Covidien
- Dolphin Energy
- Dow Corning Corp.
- EMR Associates
- ESAB Cutting & Welding
- Home Depot
- Jacobs Technology
- J.M. Huber Corp.
- Liberty Mutual
- Merck
- Rexnord Industries
- Roche Molecular
- Shell Exploration
- Toyota
- Walter Minerals
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  - Managing Partner, White Arnold & Dowd
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  - Group President of Strategy & External Relations, TVA
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  - Owner and Principal, Operations & Safety Solutions
- Donna Heidel, MS, CIH
  - Coordinator, Prevention through Design National Initiative (NIOSH)
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- **James R. Pratt, III, Esq.**
  - Partner, Hare Wynn Newell and Newton
- **Charles A. Shaw, PE**
  - Corporate Safety and Health Manager, Alabama Power Co.
- **Philip C. Zicarelli, PE, PSL**
  - Director of Proposals and Sales Administration, KBR Power & Industrial
Practitioner Scholars

- Mr. Van Richey
  - President and CEO, American Cast Iron Pipe Company

- Dr. Roger Sublett
  - President, Union Institute and University

- Mr. Taylor Abel, P.E.
  - Assistant Vice President, Safety; Mosaic Fertilizer

- Dr. Mark Rosenberg
  - President, Task Force for Global Health

- Ms. Penny Manuel
  - Executive Vice President, Southern Company

- and others...
Advanced Safety Engineering and Management
UABASEM's Channel

Why We Chose UAB ASEM - The Williams Brothers
From: UABASEM | Jul 6, 2011 | 39 views
Ryan Williams works for Home Depot and his twin brother, Brian Williams, works for J.M. Huber Corporation. Both are members of the inaugural class of the UAB Master of Engineering Program in Advanced Safety Engineering and Management.

View comments, related videos, and more
Barriers & Challenges

• ABET and BCSP Silos
  – Not eligible for ABET Engineering Division because undergraduate engineering degree not required
  – Not eligible for other ABET divisions because degree has engineering in name
  – BCSP requires ABET accreditation for recognition as a “Qualified Academic Program”

• Global time zones (Nigeria to Guam)

• Controlled growth
Advanced Safety Engineering and Management (ASEM)

UAB ASEM • The Power of Peer-to-Peer Learning
by UABASEM

"NEXT APPLICATION DEADLINE: NOVEMBER 1, 2011"

The new, Master of Engineering track in Advanced Safety Engineering and Management (ASEM) will advance today’s Safety, Health and Environment (SH&E) professional like no other program available.

This is the first and only Master’s Degree with a safety emphasis offered online! Make a difference in just 18 months. Five semesters, Two courses per semester. Realize your potential!
THANK YOU

Martha W. Bidez, Ph.D.
mbidez@uab.edu

www.uab.edu/engineering/professional-programs/asem