BOSTON UNIVERSITY

Course Development and Implementation Assessment of Theatre Health and Safety

Written by
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This thesis is submitted in partial fulfillment for the degree of Master of Fine Arts in Production Management at Boston University College of Fine Arts School of Theatre – May 2022

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This thesis was created with the observation and guidance of the following committee members:

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Executive Summary

Health and safety is an increasingly relevant topic within theatre and entertainment, especially as many productions begin to advance and push the limits from anything that we have seen to date. Developing and implementing a theatre health and safety course over the past few years has been an educational journey that helped the students and myself discover many additional facets of safety within standards set forth by the Occupational Safety and Health Administration, the National Fire Protection Association, and other industry practices and recommendations from multiple texts by William J. Reynolds, Monona Rossol, and Peter Wynn-Moylan. This course explored the use of different learning techniques, such as Case-Based, Discussion-Based, Interactive, and Project-Based Learning. These techniques helped interpret the extensive and arid amount of material presented to the students. Each lecture given during the course highlighted the need for possible adjustments, considerable edits, and the need for additional material to help better support future classes. The feedback received by the students via course surveys expressed that the course itself had a valuable and significant role in the students' academic curriculum at Boston University. The result from the students and my personal recommendation would be that this course stands as a regular and individualized course taught yearly, which would widely benefit students within the technical production, production management, and stage management pathways, especially those individuals who are unfamiliar or new to theatre.

Introduction

Theatre has been present within society since its first portrayal in ancient Greece between 384-322 BCE, according to Aristotle (National Theatre). Alongside theatre, there has always been a sense of safety concern whether we have taken notice in a year like 1613 when the Globe Theatre fire burnt down the entire playhouse, or even currently in the twenty-first century where advancements in technology often are creating new potential for safety issues. The overarching issue of occupational hazards are widely variable within the theatre and entertainment field, and often include safety issues pertaining to the work setting, activities, and to an enormous variety of toxic materials. "The drive to create new techniques and effects for the theatre means that understanding occupational exposures for theatre workers will continue to be a challenge. Detailed exposure histories are particularly important in this continually expanding field" (Hinkamp, David and Rossol, Monona). We often take many things for granted in life, including safety. Whether it be for us, or for those we are granted the responsibility to protect within the work we perform almost daily.

Safety has been a major part of my studies for quite a long period in my life, starting with my first Occupational Safety and Health Administration 10-Hour as part of my studies within my undergraduate degree. Since then, I have focused a lot of my time exploring the interactions of the Occupational Safety and Health Administration guidelines and the connections within entertainment. In 2018, I was able to join Royal Caribbean Cruises, LTD., entering as the Head of Technical Stage Staff. Within this role, I oversaw the safety protocols, in collaboration with the stage managers, for the stage staff, underwater support divers, water performers, ice skaters, aerialists, and dancers for an average of thirty production shows per week in the main theatres, ice black box theatre, and aqua dive theatre. I worked closely with the first officer of safety to identify

and eliminate potential safety issues by implementing daily and monthly rigging inspections, proper emergency procedures for performers and staff, audience evacuation guidelines, and adding similar Occupational Safety and Health Administration standards for staff to adhere by as they continued their work. While working with an international team, many did not understand some of the regulations, thus I would teach and train the teams to help understand proper protocols for items such as Personal Protection Equipment, harness usage, material handling, some fire safety (pyrotechnics), and record keeping. This ability to teach my team was thrilling, as it gave me the chance to create an opportunity to collectively create a well-rounded understanding of the protocols within the team, which I believe helped make the productions a safer working environment.

Since then, I have seen many individuals neglect proper safety and healthy working protocols, including some students here at Boston University. This, I believed, was due in part of the students' ignorance of potential dangers that surround them in the theatre. This sparked an idea, to create and teach safe practices that outline the Occupational Safety and Health Administration safety guidelines and other safety organization protocols that would be beneficial to the students in their theatre academic studies.

In late April of 2020, I started to create a course that would be called "Theatre Health and Safety," which was offered in the Fall semester of 2021. These beginning processes included gathering information about how to offer OSHA 10-hour in a university course, what kind of safety information would be beneficial to students in theatre, and how the university's process worked when developing a new class to offer students. Through many days of research, I determined that my overall goals and expectations for the course would be to offer the students a chance to receive an OSHA 10-Hour, while also helping the students understand different types of potential safety

issues, protocols, and safety documents that would be helpful to reference in the field of theatre and entertainment.

Development

Creating a course for theatre health and safety was going to be challenging, as the learning outcomes were going to be very specific for the class, especially since a large amount of the material for the course stems from government and other agency regulations. Before creating anything, I decided to take a few extra Occupational Safety and Health Administration courses to help me brush-up on knowledge and gain new understandings for specific areas. The plan was to take OSHA 7105 for Evacuation Preparedness and OSHA 511, which is equivalent to OSHA 30-Hour General Industry. The 511 course is a prerequisite for the OSHA 501 General Industry instructor course. This instructor course would have given me the opportunity to become an authorized outreach instructor, which in turn, would have given me the ability to educate individuals to receive their OSHA 10-Hour. However, after consultation with the regional director of the OSHA program at Keene State College, it became clear that I was not going to be able to enroll in the instructor course. Although this changed things, I was able to alter the course layout, giving the opportunity to not fully adhere to the OSHA 10-Hour course requirements, which would have been more of a strict guideline approach to the course layout.

While starting to create the course, I decided to work on the syllabus and course schedule to begin analyzing what topics I would need to research more in-depth. When we compare my first pass (*Appendix A*), and my final pass (*Appendix B*), there are major differences. My thought process in the beginning was trying to fill the class with as much information as I could that related to theatre and entertainment. However, once I began to take classes, read articles and books, and research the material from each of these topics, it became clear that the students would have been overwhelmed with the amount of information.

After a few different passes of the syllabus schedule, I was able to create a well-rounded final version which distilled and combined some topics, like "Introduction to OSHA one and two", pressing it into one day of "Introduction of OSHA" (*Figure 1-a*). It eliminated some topics that were not fully necessary, such as HVAC systems. The final pass even added a brand-new topic that I did not think about in the beginning, which was crowd management. By being able to lock in a course schedule, it gave an opportunity to dive deep into research for each one of these specific topics.

Figure 1-a: Schedule First Pass vs. Final Pass

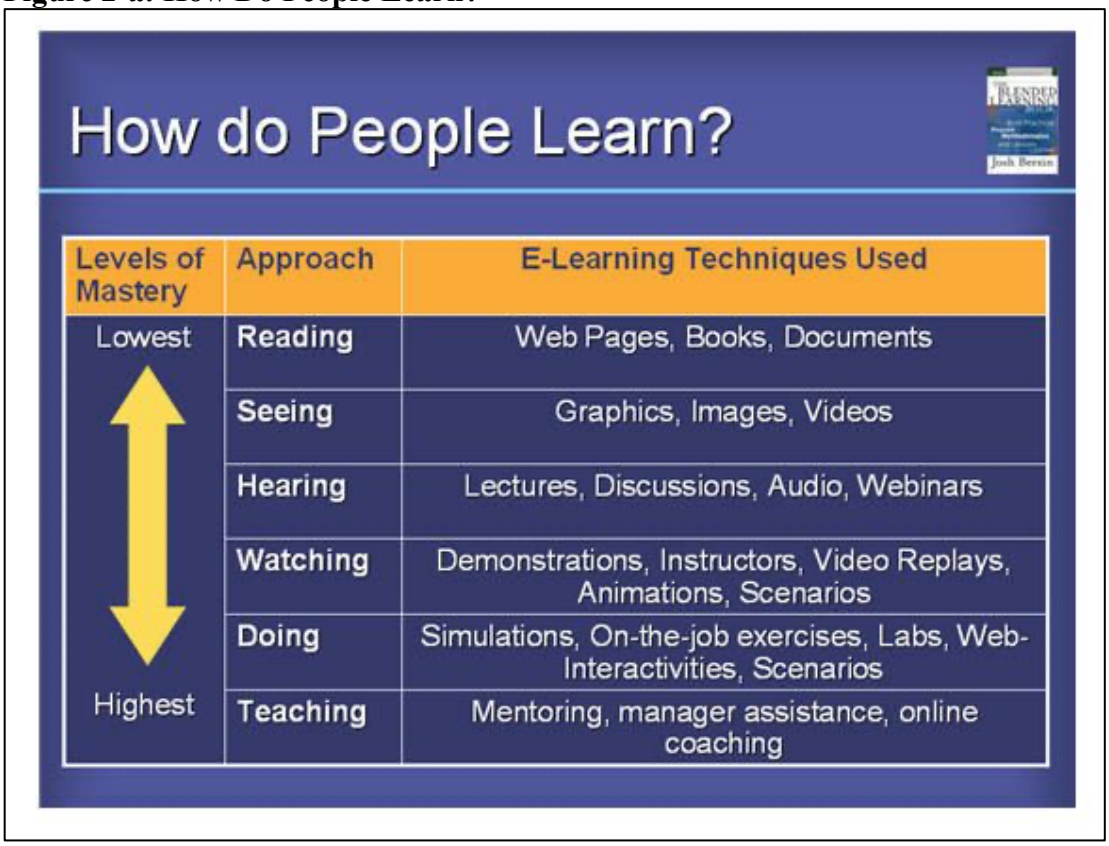
Date	Agenda	Due	Optional Reading	29 CFR
Day 1	• Class Overview • Intro. to OSHA Part 1		Chpt. 2, The Health & Safety Guide Chpt. 4, Safety and Health for the Stage	1903 and 1910.1-1910.9
Day 2	• Intro. to OSHA Part 2 • Long Term Health in The Arts			Continued
Day 3	• Safety and Health Programs		Chpt. 3, Safety and Health for the Stage	
Day 4	• Personal Protective Equipment (PPE) • HVAC, Ventilation, & Respirators • In-Class Respirator Training		Chpt. 3 & 7-10, The Health & Safety Guide	1910.94-.98, and .132-.140
Day 5	• Hazardous Communications • Safety Data Sheets (SDS) In-Class Activity *(Graded)* *Assign: SDS Project*		Chpt. 5, The Health & Safety Guide	1910.101-.126, and .176-.184

Date	Agenda	Due	Optional Reading	29 CFR
Class 1 9/3/21	• Class Overview • Introduction to OSHA		Chpt. 2 - The Health & Safety Guide Chpt. 4 - Safety & Health for the Stage	1903 and 1910.1-1910.9
Class 2 9/10/21	• Ergonomics • Health within the industry			
Class 3 9/17/21	• OSHA Safety and Health Programs • Risk Management (JHA) *Assign: Health and Safety Program Research*		Chpt. 3 & 7 - Safety & Health for the Stage	
Class 4 9/24/21	• Walking Working Surfaces • Fall Protection			1910.21-.30 1910.140
Class 5 10/1/21	• Personal Protective Equipment (PPE) • Understanding Bloodborne Pathogens	*H & S Program*	Chpt. 3 & 7-10, The Health & Safety Guide	1910.94-.98, and .132-.140

Note: Moats, Ricky. *Syllabus Schedule Comparison*. Theatre Health and Safety. Boston University. 2021

To help convey this information and support my in-class lectures each week, I gained inspiration from a presentation slide from one of my OSHA courses that I thought was an excellent way of conveying exactly how people learn via e-learning, but I thought it was also applicable for in-person learning (*Figure 2-a*). It states that some of the lowest level of mastery within a subject is through reading material on web pages, books, and documents. The middle level of mastery within a subject is hearing and watching through lectures, discussions, and videos. The highest level of mastery within a subject is through activities and real scenarios. All three of these mastery levels made created the realization that it was needed to incorporate different types of learning approaches.

Figure 2-a: How Do People Learn?



Note: Bersin, Josh. *The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned*. Jossey-Bass, 2004.

The four major learning techniques that are utilized in the course were Case-Based, Discussion-Based, Interactive, and Project-Based learning. Case-based learning uses stories as a teaching tool that gives individuals the idea of the application of a theory or concept in connection to a real situation (Boston University). Being able to include stories of personal experience and stories of real-life theatrical incidents helped support this type of learning technique throughout the entire semester. A similar technique was Discussion-Based learning, where questions connected to safety regulations, stories, and different articles challenged the students to critically think about how safety topics can be related to theatre. These discussions had the ability to tie into case-based learning, as students would have the opportunity to share their own real-life stories that they used to support their own discussions. The course utilized Interactive learning strategies that helped support and promote students' participation by using hands-on activities, problem-solving tasks, information gathering, and reflection-based tasks. This technique emphasized the importance of building connection between one's prior knowledge and new experiences and concepts (Boston University). Similarly, Project-Based learning that I used within the development of the course involved the students designing, developing, and constructing hands-on assignments that could be used throughout the individual's future career. These two learning techniques carried the mastery level of learning at a higher rate, having the probability for students to retain more information from the entire course.

Each class lecture would then be created using visual lecture presentations, videos, and a class discussion of the topic. Depending on the week, the class would also be given individual assignments that would take the lectures discussed and turn them into an active, real-life scenario, which I believe boosted the learning outcome beyond what the in-class lectures taught. They also had two in-class activities to gain a more hands-on approach to safety. I constantly used

Blackboard as a learning resource for students where I would provide additional information through handouts, readings, videos, and statistical data that I thought were interesting, and would also be a key factor for helping support my in-class lectures each week. I was very clear that these were optional, especially since the level of mastery for these types of documents is low, but I believe some individuals used them to their advantage to help support them as they completed their individual assignments. I also made sure that I was creating an equal learning opportunity for everyone in the class by providing scanned copies of the optional readings, so that the students would not have to purchase any materials.

The finalized course objective and description in the syllabus explained that the "course is to familiarize students with health and safety practices within the field of entertainment. Students will be able to analyze personal health and safety practices, understand the connection between the entertainment industry and the OSHA General Industry Code, and understand the approach of being a risk and safety manager. Students will achieve knowledge and be able to confidently research the organizations that set specific codes which are commonly related and used within the industry" (Moats). The syllabus also continued with the learning outcomes of "analyze and practice safety within the theatrical and entertainment industry," "be able to explain specific regulations and code," "communicate the need and the reasons why we follow specific codes and safety regulations," and "apply knowledge to all future entertainment and non-entertainment applications" (Moats). These objectives and learning outcomes were created based on the amount of information being taught, the projects given to students, and in-class activities.

When developing the course to include all of this information, I needed to account for the length of time needed to fit the material, while keeping the timeframe within the university's set time blocks and limits for the amount of credits the course was set at, which was one credit. The

course length was established to be one hour and forty-five minutes once a week on Friday afternoons. The student population in this course included seven students in total, which were comprised of five production management graduate students, one sound design graduate student, and one management undergraduate.

Individual Class Analysis

Throughout each week, I was able to adjust my teaching practices to help better aid the class and how everyone learned as a whole. I believe that these small weekly changes helped keep the class engaged within the lectures, class activities, as well as their own individual assignments. The following pages will analyze the week-by-week lectures and discuss how each class went, my approach for certain sections, along with what I would change, if I were to reteach this class again.

Class One

The following is a brief list stating the different elements that were documents, discussions, and presentations which supported the student's learning outcome for the first lecture:

- **Topic:** Class Overview and Introduction to OSHA
- **Optional Readings:** Chapter 2 from *The Health and Safety Guide* by Monona Rossol; and Chapter 4 from Safety and Health for the Stage by William J. Reynolds.
- **OSHA 29 CFR:** 1903 and 1910.1-1910.9
- **Blackboard Material:**
    - OSHA Student Handout Packet which includes an abundance amount of information for first time OSHA students.
    - An OSHA 300 Sample Log
    - Workers' rights under the OSH Act Pamphlet.
    - NYTimes Article: *Broadway Theater Owner Cited by OSHA in Stagehand's Fatal Fall*
    - A Public Announcement: *US Department of Labor's OSHA cites Spider-Man Broadway Musical.*
    - Wicked Local Kingston Article: *Wollaston Theatre wall collapse*
- **Assignments:** No Assignments were given during this lecture.
- **Assignment Due:** Read Syllabus

The first day of the class was such an exciting, yet nerve-racking day, especially since it was my first time teaching a course in this capacity. Leading up to this day, I fully prepared myself by re-reading my presentation, lecture notes, and any other material that I thought would be helpful to convey how the Occupational Safety and Health Administration is relevant to everyone. I started the class off with the question "why safety?" I wanted to start with an open discussion to analyze what others may be thinking, and what backgrounds everyone in the class comes from when discussing safety. Throughout the length of the discussion, the students shared a wide spectrum of stories that were related to safety in theatre. I believe that by hearing some stories of safety issues

or potential issues from myself and from students in the class, it gave everyone a perspective that safety is not just a singular outcome, but often varies from case to case.

Following this community discussion, some dumbfounding pictures were shown of safety issues to lighten the mood and engage everyone's attention back to the beginning of the lecture, which I often used as a reoccurring tactic throughout the semester to ensure that the students would not lose focus on the presentation. I immediately began discussing what OSHA was, while explaining their mission and how they were created through the OSH Act of 1970. We began to dive deeper within the content explaining differences in regulations, depending on whether the state you work in follows the Federal OSHA guidelines, or has its own state OSHA guidelines, which often can be stricter. Many of the students were not aware of federal vs state guidelines, so this was a topic that we spent more extra time on than planned to fully discuss the differences and better help them understand.

Continuing, we discussed the General Duty Clause, common standards that are found in theatre, which would later be discussed more thoroughly in separate lectures; Employer Responsibilities, Workers' Rights and Responsibilities, Inspections, Penalties, and Recordkeeping. The class seemed to understand many of these topics, and asked the appropriate questions related to each section. When I discussed Recordkeeping, I had the class view the OSHA Forms for Recording document (*Appendix C*) on the course Blackboard page to help them visually understand what exactly I was referring to about filling out an OSHA 300 Log. I did this because paperwork in this nature can often be very confusing, especially if you have never seen it before. This visual representation aided them to understand this topic more in-depth. This was also a good opportunity for them to actively explore more on the Blackboard site, as there would be an in-class activity following the lecture.

I began to discuss Whistleblower Protections, along with what the worker's rights were when refusing to work. I felt that the room was quiet when we got to this section, so it was hard to gauge whether they were absorbing the material as I planned. I did have them reference part of the OSHA Student Handout Packet (*Appendix D & E*), and I reiterated that these would be a great reference as they continue within the field, as you can never have too many resources.

Following the lecture, I had the class read a scenario practice from the OSHA Student Handout Packet (*Appendix F*). I began to ask them questions, such as "Has anyone been injured?", "How and when were workers exposed?", and "How long has the condition existed?". The overall goal was to get the class thinking as a safety manager by analyzing a situation for any safety issues and aspects connected. We switched to an article from the New York Times (*Appendix G*) using these same questions on a situation that happened in a Broadway Theatre, which gave me the ability to reiterate that OSHA is a very prevalent and needed part of our industry.

A few things that I would change for this lecture would be dedicating some extra time, readings, and handouts to create a better understanding between the differences of federal OSHA guidelines and state OSHA guidelines. I feel that giving a better detailed understanding of a state-based guideline, such as California, would help the students see the differences better. Adding additional questions to ask the class regarding the Whistleblower section of the lecture would also be beneficial, as it would help gauge their understanding and attention in the moment. Evaluating how and when theatre started implementing specific safety procedures would also be a great type of discussion for the class. It would also highlight past difficulty of implementing safety in the theatre. This would overall give the class some extra length, as we ended roughly forty minutes early. However, some of that I felt was my own nerves causing me to speak a bit faster, with it being my first class.

Class Two

- **Topic:** Ergonomics and Health within the Industry (theatre/entertainment)
- **Optional Readings:** None.
- **OSHA 29 CFR:** N/A
- **Blackboard Material:**
  - Back Talks (Ergonomics) – Info and Stretching Guide
  - Physical Hazards and Control
  - Reproductive Hazards in the Arts and Crafts
  - Workplace Violence Spectrum
  - Mental Health in the Workplace
  - Optional Article - *Painting While Pregnant - Reproductive Hazards in the Scenic and Props Artist's Workplace*
  - Optional Handout - 2018 Survey of Occupational Injuries and Illnesses
- **Assignments:** No Assignments were given during this lecture.
- **Assignment Due:** None.

Ergonomics! Following lecture one, I felt more prepared and excited to continue the course. As I did the previous week, I reviewed all the lecture materials and handouts for the upcoming lecture. I started the course off by asking the class what ergonomics was; giving them the chance to discuss anything that they might have already known. Many of the students had an idea of what ergonomics might be, which helped me gauge where everyone was in relation to the subject. It was also interesting to see how everyone began to sit up straight as we continued the discussion. We analyzed Musculoskeletal Disorder, which is often caused by poor ergonomics within the workplace.

We transitioned in discussing how ergonomics influences the theatre world, along with what departments of the theatre where ergonomics play a frequent role in. The overall feedback was great, as everyone was listing one to two departments. At the end of that discussion, I noted that ergonomics plays a role in every department, whether we notice it easily or not. From there,

we went along through the lecture discussing examples of risk factors found in entertainment, such as leaning or bending down while walking under a platform or stage, reaching high, awkward grips, lifting objects, and localized pressure on the body.

When discussing the hierarchy of control, I believe I ran into a roadblock when I was explaining how to reduce ergonomic risks; some individuals were slightly confused on the topic. This, I believe, was my fault. I had not yet talked about hierarchy of control, which was slated to be in the following week's lecture. I tried to outline the aspects of hierarchy of control to help ease the confusion that some students were in. Once everyone had a good understanding of the topics of the lecture, I transitioned by explaining how individuals can get involved both as either the employee and the employer by correcting these issues in the workplace and implementing change. I often reiterated that by implementing changes in the workplace, it can benefit you (the individual) and the theatre by increasing savings though heightened productivity and morale, and not having to pay for people out of work to recover from any health-related issue. These changes may lead to a healthier and more active work environment.

I paused the lecture halfway through to do an in-class activity for ergonomics. As a whole group, we did three separate ergonomic exercises and stretches that should be done daily to help release any tension or aching prior to any work performed. The exercises we did can be found in the "Back Talk, an owner's manual for backs" handout which I narrowed down to three short activities: the Knee Raises (*Appendix H*), Side Bending (*Appendix I*), and the Trunk Extension (*Appendix J*). The class seemed to love this activity, and it got everyone up and going, which obviously filled the room with more energy!

Following that adventure, I began to discuss the next topic which was health within the industry of entertainment, specifically in the subjects of reproductive hazards in connection to toxic substances, workplace violence, mental health, keeping healthy and active, and work / life balance. I believe that many were surprised about the reproductive hazards that can happen with different chemicals that theaters often use, without thinking of the long-term effects it can have on oneself. As a class, we analyzed which areas would cause such hazards, mainly being in the paint, prop, and scene shops.

The workplace violence section of the lecture did not surprise anyone. Some said that they have received training for this in other non-related entertainment fields. The mental health portion of the lecture engaged individuals to discuss experiences and thoughts that they have in connection with this subject. I often would highlight sections from one of the Blackboard handouts called "Mental Health in the Workplace" (*Appendix K*). I felt that this was a particularly well-rounded document that included statistical data, issues, solutions, success stories and more.

Another important topic that I wanted to discuss in the lecture was work and life balance. I started with asking the simple question, "who practices good work / life balance?" Not to my surprise, everyone was either not quick to answer or responded with something along the lines of "that's impossible to do in theatre." I then explained the benefits of good work / life balance, which is often similar to the benefits of good ergonomics; people are less fatigued, more productive, and healthier. I segued into keeping an active and healthy lifestyle, followed by giving the class a challenge of practicing work (and school) / life balance for the following weekend. This challenge will be further discussed in the next class describing how it went for everyone.

If I were to change a few things within this lecture, I would figure out how to discuss the hierarchy of control pyramid more in depth prior to this lecture. I feel that this would lessen the

confusion I had within that section. In the “Health within the Industry” section, I would add a topic that a student brought up, which was substance abuse. This topic could potentially connect to workplace safety and workplace violence, so I feel that this would be beneficial to discuss going forward with this class.

Class Three

- **Topic:** OSHA Health & Safety Programs and Risk Management
- **Article to Read for Beginning of Class Discussion:** https://www.wreg.com/send-breaking-news-email/biden-admin-will-use-osha-rule-to-impose-vaccine-mandates-on-businesses/

  Optional Readings: Chapter 3 & 7 from *Safety and Health for the Stage* by William J. Reynolds
- **OSHA 29 CFR:** N/A
- **Blackboard Material:**
  - 7 Core Elements of an Effective Safety and Health Program
  - Hazard Identification and Risk Assessment
  - Optional Handout – National Census of Fatal Occupational Injuries in 2019
- **Assignments:** Health and Safety Program in Entertainment Research
- **Assignment Due:** None.

The work and life balance challenge that I empowered the class to try following the last class seemed to have a mixed response. Many had said that they were too backed up to try and practice distancing themselves from the work they needed to accomplish, whereas others explained their ease at being able to distance themselves from work, since they did not have the same backed up issues as their peers. Overall, it was interesting to evaluate where individuals were on a work and life balance. I believe that it helped gauge where the students were outside of the classroom, which I would use to help alter my future in-class lectures making them inviting, lighter, engaging, and actively somewhat fun.

For the third lecture, we discussed Health and Safety Programs in the workplace, along with risk management and job hazard analysis. I started out with presenting some statistics that engaged some students to lean in and start a classroom discussion. The few individuals that carried the conversations could not believe that there were only 123 fatal occupational injuries in 2019

within the Arts, Design, Entertainment, Sports, and Media sector, as reported by the U.S. Department of Labor, Bureau of Labor Statistics. The overall goal of this discussion and presentation of statistics was to get the students engaged with the 'why' this number might have been so low. This led us to start discussing why health and safety programs might be beneficial within theatre and entertainment, along with what issues there may be if a program is not engaged within a workplace / theatre.

Following the discussions, we were able to start diving into the sections of a health and safety program that includes Management and Leadership Actions, Worker Participation Actions, Hazard Identification and Assessment, Hazard Prevention and Control, Education and Training, Program Evaluation and Improvement, and finally Multiemployer Worksites. I mentioned that there was a good example of a recommended program layout posted on Blackboard (*Appendix L*) to follow along with and would be a useful tool in the future. I hinted that this example will be beneficial for possible homework assignments in the future.

Throughout the beginning of the lecture there seemed to be less engagement, with little questions being asked. Luckily, I was able to change course ever-so-slightly, and I started to ask everyone specific questions on how each section relates to entertainment or theatre. I felt by asking these questions, I was able to draw in everyone's attention more on a topic that can be so dense. In the risk analysis section, as part of the Hazard Identification part of a health and safety program, I had already planned to play a little risk safety game to help pick up the mood halfway through the lecture. This game included showing some pictures and descriptions, while the students chose what level of risk the potential issue could be using the risk matrix. I believe that the students had some fun while enjoying having a break from the lecture. We ended the lecture with a summary discussion to ensure that everyone had a good understanding of the topics of the day. I restated the

statistics from the beginning of class, along with more questions on how all of this information relates to theatre. The general engagement showed that everyone had a good grasp of what a health and safety program entails, along with what and how risk management works. I handed out their first homework assignment which was to understand, analyze, and research health and safety programs within the industry, and to formulate a letter explaining why we should implement this program here at Boston University. I said that it is often difficult to persuade individuals in leadership roles on the need of creating and implementing a health and safety program, so this would be some good practice.

If I could change a few things within this lecture, I would mainly focus on rearranging the density within the duration of the lecture. Originally, when creating this lecture, I found it quite hard determining the best way to distill some of the information, along with trying to keep the information engaging. By adding a video somewhere, it could offer some breakup within the material, however, this topic did not offer any well-rounded, educational videos that would have complimented the lecture. I would also explore how to shift the hierarchy of control discussed in this lecture, to the previous lecture.

Class Four

- **Topic:** Walking Working Surfaces & Fall Protection
- **Article to Read for Beginning of Class Discussion:** Boston Globe Article – *Rusted Staircase Death, Boston*

  Optional Readings: None.
- **OSHA 29 CFR:** 1910.21-.30 & 1910.140
- **Blackboard Material:**
  - Fact Sheet GI Walking- Working Surfaces and Fall Protection Standards
  - Article - Fall from Catwalk Kills Lighting Technician
  - Scaffold Information Packet
  - Fall Protection Safety Gear & Equipment
  - Full Body Harness Safety
  - Strategies for Theatrical Fall Protection
  - MA 521 CMR 27 - Stairs
- **Assignments:** No assignments were given during this lecture.
- **Assignment Due:** None.

I was able to receive some of the assignments submitted prior to the class, so I could read some and have a short discussion about what they thought was interesting and gauge how they enjoyed or disliked the project. From what the class had said, it seems that they were engaged in the research and had a good understanding of what I was asking in terms of the project. I did learn that a rubric would have been helpful to some, so I took note and created rubrics for future assignments. More than one individual seemed to gravitate towards one specific theatre health and safety program which was created for the University of California, at which they explored and targeted key pieces that should be implemented when developing a health and safety program at Boston University. (*Figure 3-a*)

Figure 3-a: Student Submitted Health and Safety Program Research

CFA TH535 Special Topic
Theatre Health and Safety
1 October 2021

Dear Ricky A. Moats,

The School of Theatre at Boston University is in dire need of a safety and health program. I highly recommend the Safety in the Performing Arts program by the University of California as a model. The University of California Performing Arts Safety Manual, https://www.ehs.ucsb.edu/files/docs/gs/UCPerformingArtsSafetyManual-VERS1-030314.pdf, outlines an exemplary program for faculty, staff, students, and patrons that would greatly benefit the SOT community and the University.

Following are a few keys reasons to adopt this program:

- The UC program is a comprehensive, detailed program covering all aspects of theatre, ranging from make-up application to rigging to audience safety. The plan encompasses all departments, workspaces, equipment and materials, venue type, and people involved.
- The plan includes an Injury and Illness Prevention Program that is compliant with the California Code of Regulations Title 8, Section 3203 (8 CCR 3203) https://www.dir.ca.gov/DOSHPol/P&PC-45A.pdf
- There is a risk assessment and management component, with assistive resources, to identify and manage risks which will help prevent injury occurrence.
- Inspection and maintenance protocols are outlined
- General safety, specific equipment, and material training are detailed, including best practice ergonomics.
- Emergency response procedures for all ranges of accidents/injuries are outlined.
- A comprehensive record-keeping system, with standardized forms, including safety inspection checklists for spaces, equipment, and training are provided.

The Boston University School of Theatre must provide the safest environment possible for artistic exploration within all areas of the performing arts by adopting a comprehensive health and safety program such as the University of California's program. Implementing such a plan would increase the community's awareness of best health and safety practices, hold the community accountable for training, maintenance and inspections, reduce injuries, and achieve the ultimate goal of preventing injuries before they happen.

Note: Student. *Health and Safety Program Research "Pitch"*. Theatre Health and Safety. Boston University. 2021.

Following the assignment feedback, we delved into walking working surfaces by conversing on a local article about a fatal incident that occurred at a Massachusetts Bay Transit Authority (MBTA) station involving a rusty staircase (*Appendix M*). I sent this article earlier in the week to get the students to read and think about walking working surfaces and major fatal falls that are possible. I thought that many students were super engaged in the conversation, since we were able to connect last week's lecture of risk assessment to explain where the state went wrong within their process of risk assessment, or lack thereof. We then discussed some theatre related incidents that involved slips, trips, and falls, including an article concerning a lighting technicians fall from a catwalk (*Appendix N*), along with a story about a major fall of an actor at the Olney Theatre in Maryland, from Renee E. Yancey, who was observing the class at the time, where she was working as the Production Manager. I felt that all of these examples helped stimulate the students while also highlighting possible incidents in the field.

We carried on with the lecture discussing the majority of general industry accidents: slips, trips, and falls. I showed an entertaining video to help explain some of the OSHA adjustments about how they were aligning the general industry and the construction industry regulations to match, to reduce confusion. This video also explained some of the regulations more in detail as an introduction to the topic, so that it was easier to go through some parts of the lecture following the video, since the students already gained a solid understanding. The 'ladder' section of the lecture brought a lot of engagement with stories of students' pasts, which included examples of dangerous practices and issues that they have experienced. Another portion of the lecture that brought similar engagement was the topic of hydraulic stages and platforms. I showed a video from the Madonna MDNA tour in 2012, that included a hydraulic stage that consisted of 24 separate panels spanning roughly 384 square-feet combined. While this video played, I discussed what was going on and

what safety protocols were taken into account for the safety of all dancers on stage, along with Madonna herself. This is where I also explained that "OSHA recognizes it is not appropriate to put guardrails at the edge of stages, theatrical employees need to be protected from all occupational safety and health hazards," a direct quote from the Director of the Office of General Industry Enforcement. I believe that the students were intrigued with all the information and safety protocols attached to this portion of the lecture.

We ended the class in the middle of the lecture where we would discuss fall protection the following week; with all these additional unplanned discussions, there was too much information packed into one lecture that we needed to carry over. In the future, I would adjust the syllabus to account for some additional time for prolonged discussions on this topic.

Class Five

In addition to the previous materials stated above for the first part of the lecture:

- **Topic:** Understanding Bloodborne Pathogens and Personal Protective Equipment
- **Article to Read for Beginning of Class Discussion:** None.
- **Optional Readings:** Chapter 3 & 7-10 from *The Health and Safety Guide* by Monona Rossol
- **OSHA 29 CFR:** 1910.94-.98 & 1910.132-.140
- **Blackboard Material:**
  - PPE Fact Sheet
  - Bloodborne Pathogens Fact Sheet
  - Common Bloodborne Pathogens Information
  - Understanding ANSI Z87
  - Soft Foam Earplugs
  - Cartridges and Filters Color Code
  - What is a HEPA filter?
  - Optional Article - Industrial Ventilation
  - Optional Article - Commercial Building HVAC Systems
- **Assignments:** No assignments were given during this lecture.
- **Assignment Due:** Health and Safety Program in Entertainment Research given in lecture three.

Picking up from lecture four, we had a quick recap to discuss any questions that may have come up from the previous class, in connection to walking working surfaces. I segued the to start discussing fall protection more in-depth, along with personal fall arrest systems. Many of the students, along with myself, were able to share some stories that allowed the other students the opportunity to hear about safety issues that have happened throughout the field.

Switching gears, I was able to get a harness and samples of connectors into the classroom to demonstrate the gear for a more hands-on teaching approach. We demonstrated the proper way of putting a harness on, checking and inspecting the harness, and how to inspect your connections. We did an activity to test what pieces of the harness the students could name, such as the D-rings,

the tongue-buckles and grommets, mating buckles, and bayonets. Once we were done with the demonstration on personal fall protection systems, we began to analyze what total fall distances mean and how to properly calculate the mathematics of different examples and possible scenarios. The class seemed to glaze over when we started talking the mathematics of the topic, so I took the opportunity to check-in on the students to see if everyone was comprehending the calculations. The census indicated that the class was making the connections, but the glazed eyes said otherwise.

We then moved on to aerialist and performer fall protection, gear, and safety practices for heights, which I thought helped bring more engagement back into the room. I shared personal stories of shows that I've worked on through Royal Caribbean. I was able to discuss the detail-oriented nature of aerialist gear inspections, type of paperwork and forms involved, and what safety protocols we had in place for the team. I also talked about how the crew had a warm-up routine prior to the shows as their positions or tracks were intensive on the body. I brought concepts from lecture two and connected it to the importance of a healthy body. This was a great moment to show a video about an aerialist accident with Cirque du Soleil's production of *"O"* in Las Vegas, Nevada. The students seemed to be intrigued since some started making connections on what could have been implemented through safety protocols, to have minimized the potential hazard at hand. This led us to analyze safety nets and what their purpose is, their ratings, and the structural integrity to have the ability to save someone's life.

As we completed the fourth lecture, we needed to move onto the next lecture, however it did not transition or flow well in the middle of a class with two separate subjects. I felt that everyone had their minds focused on the topic of fall protection, that the changeover created a challenge where it was hard to engage the students right away on the next topic. I started evaluating

their attention by asking some questions throughout the first few slides about what should be included in exposure plans and where exactly we would see exposure control within theatre or entertainment venues. The questions that I asked sparked a conversation about the location of such plans and how we might implement them. Before I broke each piece of equipment down, I made it a point to talk about the importance of personal protective equipment and restate the hierarchy of controls and where the topic lands within the pyramid, which is the very last resort.

As for head protection, eye and face protection, hearing protection, noise reduction rating, respirators and the proper cleaning of respirators, these topics all had good engagement, from the class, that produced stories and examples from several students. When we proceeded to the respirators section, I paused to visually show the students my personal double filter respirator and demonstrated how to perform a User Seal Check. I also had the students reference a color-coding chart for different filters that should be used based on the material that could be in a workspace. (*Figure 4-a*) I thought that the visualization of the physical respirator and demonstrating with it helped elaborate the presentation into reality for the student.

Figure 4-a: Respirator Cartridge Color Chart

CONTAMINATE		COLOR CODING ON CARTRIDGE/CANISTER
Acid gases		White
Hydrocyanic acid gas		White with 1/2 inch green stripe completely around the canister near the bottom
Chlorine gas		White with 1/2 inch yellow stripe completely around the canister near the bottom
Organic vapors		Black
Ammonia gas		Green
Acid gases and ammonia gas		Green with 1/2 inch white stripe completely around the canister near the bottom
Carbon monoxide		Blue
Acid gases and organic vapors		Yellow
Hydrocyanic acid gas and chloropicrin vapor		Yellow with 1/2 inch blue stripe completely around the canister near the bottom
Acid gases, organic vapors, and ammonia gases		Brown
Radioactive materials, except tritium and noble gases		Purple (magenta)
Pesticides		Organic vapor canister plus a particulate filter
Multi-Contaminant and CBRN agent		Olive
Any particulates – P100		Purple
Any particulates – P95, P99, R95, R99, R100		Orange
Any particulates free of oil – N95, N99, or N100		Teal

Note: Occupational Safety and Health Administration. (n.d.). Occupational Safety and Health Administration. Retrieved 2021

Unfortunately, time was not on our side, and we had to end the lecture at hand protection. I felt that the amount of information was sufficient and had the ability to fit in one class period, if it were not for the previous lecture overlapping this lecture. There was nothing noteworthy that I would have changed within this section, however, this week's lecture made me realize that I need to smooth out topic transitions for any lectures that may run over in the case that they may be two drastically different topics.

Class Six

- **Topic:** Hazardous Materials & Communication and Safety Data Sheets; In-Class Activity
- **Article to Read for Beginning of Class Discussion:** None.
- **Optional Readings:** Chapter 5 from *The Health and Safety Guide* by Monona Rossol
- **OSHA 29 CFR:** 1910.101-.126
- **Blackboard Material:**
    - HMIS Diagram
    - NFPA 704 Diagram
    - A Funny SDS Meme
    - OSHA SDS Information
    - SDS Terminology Sheet
- **Assignments:** HazCom Project
- **Assignment Due:** None.

Picking up from lecture five, we quickly had a recap and discussed the previous week's lecture to resolve any additional questions the students had lingering from the lecture. We got started with the remainder of personal protective equipment, particularly foot and leg protection, body protection, and proper training that is often connected to the equipment. Furthermore, we touched upon the requirements that is often the employer's responsibility to provide personal protective equipment to specific employees who are exposed to hazards. Some individuals were surprised to hear that there are many exceptions to what employers are required to provide employees. This sparked many conversations throughout the duration of this topic where students asked specific questions detailing many unique scenarios that I was not prepared for, yet I was able to answer the students to the best of my knowledge in that moment or taking note and found responses to give for the following class.

All this engagement made it, in some ways, easier to transition from personal protective equipment to hazardous materials and communication. Although the last class had a transition from one lecture to the other, this transition was easier since these two subjects can often go together. I started off the new subject by asking where we might see hazardous materials in the theatre, where many students listed the majority of departments in theatre. I followed this with questions gauging the student's past exposures, such as "has anyone used any hazardous chemical?", and "did anyone use proper personal protective equipment while using said hazardous chemicals?" It was apparent that even those within the class often ignored the simplest task like putting on gloves to protect them from immediate and long-term chemical exposure to hazards. This was a great opportunity to reiterate the ways individuals can be exposed to chemicals and the need for proper hazardous communication plans throughout the theatre. In theatre, we often tend to continue our work as we can be bound by time, trying to get the show open. We must keep in mind that selfcare and wellbeing is the most important aspect in life, not a show.

We continued onto sections of hazardous communication plans including what safety data sheets describe, along with what chemical labels include, such as pictograms, hazard statements, and precautionary statements. After getting through the majority of the presentation, I noticed that the engagement that was once there in the beginning of class was dwindling. I attempted to ask the class questions to see if anyone had any personal stories to talk about in connection to safety data sheets hoping it would help lighten the mood, but unfortunately the class had nothing to discuss. With no feedback from the class, I then continued through the remainder of the presentation discussing hazardous communication of NFPA 704, HMIS label information, and waste disposal to try to get to the end and then evaluate everyone's thoughts and/or feelings on the topic. There was some engagement when we got to the waste disposal section. I told some personal stories on

the topic to end off the lecture on a collective discussion but the student's reactions were not exactly what I anticipated.

Luckily, I referenced a safety data sheet activity from my previous education, using it as another effort to engage the class. I broke the class into small groups of two or three and gave each group five minutes to figure out what kind of chemical the sheets are depicting based on the context clues and chemical breakdowns, with a few caveats where the chemical name, company that makes it, and any nicknames listed were extracted (*Appendix O*). This activity was a success and brought fun and excitement back into the room in terms of safety data sheets. Following this activity, we recapped on their education of safety data sheets and I started to assign their homework, which would later have some good submissions the following week. To summarize this week's lecture, I would move the activity to the middle of the presentation, right after the safety data sheet portion. This activity placement would be a better fit, allowing the classes in the future to stay engaged throughout the presentation's entirety.

Mid-Semester Evaluations & Results

Following the sixth lecture which was the middle of the semester, I sent a link out to the students containing a mid-semester survey to measure the course as well as my teaching approaches. The feedback from the class was great, and I thought it helped me understand how the course was going from the student's perspective. Six out of seven students filled out the survey, and the course scored an average 8.33 out of 10. The main notes included that the lectures were very informative, but some of the lectures were very full of information, and areas were dense and boring. These notes were not surprising, as the material alone can be very heavy on material which can often be dry. It was helpful to see what might need to be changed for the next few lectures. I felt that the class population highlighted that the course was in good standing, but there needed to be some more engagement for the students throughout each lecture to soften the course material. I got the impression that most students were enlightened by the information thus far, which gave them the ability to think critically about theatre safety in the future. The following data was pulled from the survey given to the students:

Figure 5-a: Mid-Semester Course Evaluation Feedback

Average Overall Course Score:
8.33

What aspects of this course were most useful.
The lectures have been really informative, and the one assignment that we've done definitely helped solidify the topic we were talking about.
The addition support information posted on Blackboard is amazing
I appreciate that Mass specific laws/codes. It's very helpful, as not being from Mass.
I think understanding the fundamentals of safety was very useful. e.g. ppe being the last resort.
All of the information is useful.

What aspects of this course were not very useful.
Some of the lectures are a little full, and I wish we would do a bit more discussing in class.
While useful the information itself, by its nature is dense and boring.

Please share any other thoughts you have for the instructor on improvements or changes for the delivery of class materials or classroom learning environment.
Just a bit more discussion, and maybe a bit more time on topics.

Would you recommend taking this course to other students?
All Yes

Why did you choose this course?
Interest

If you had the option, would you rather have the course at a different day / time? When would you prefer?
No
Yes, same time on Mondays.

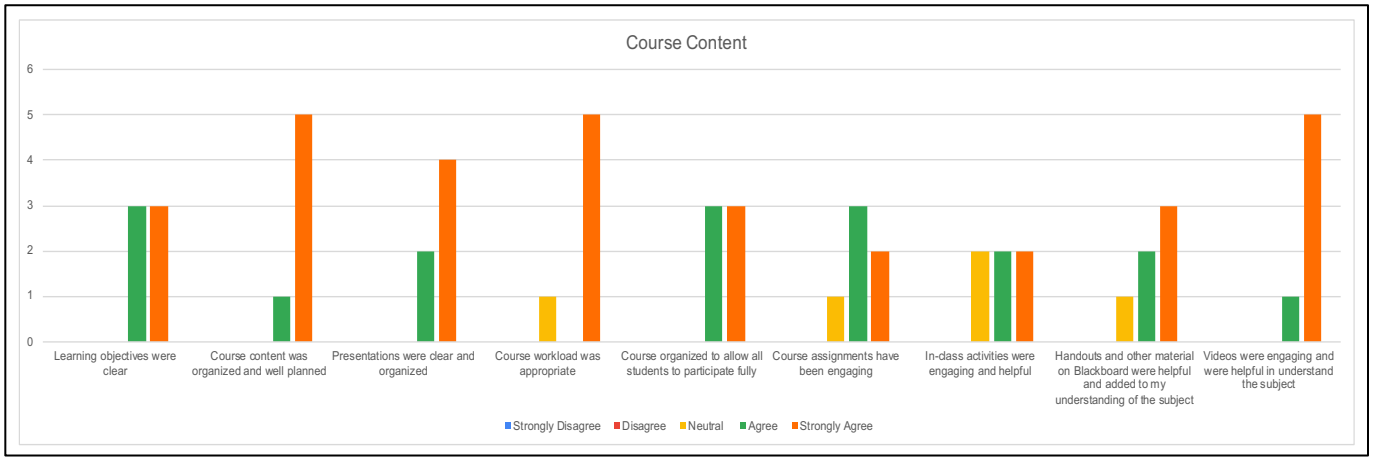
Theoretically, do you think it would be helpful for this course information to be spread out and taught in other courses in the School of Theatre? Which classes would this information be useful in?
This would be. Great class for all the design and production students at both the undergrad and grad level.
I think a basic safety talk in each of the intro classes that relates specifically to that department (like SM 1, Scenic construction, lighting crafts etc.) would be nice!
There should be a required safety course such as this.
YES. Safety is important for everyone to be aware of.
I think it would be a good to talk about safety things at the beginning of everyone's time here at BU.
The problem is that this material covers such a wide area that needs to be covered in totality, so breaking it up I think heavily dilutes the impact of the information. What would be most helpful would be if it came with that OSHA 10 certification.

Any other comments about this course?
I am actually pleasantly surprised at how interesting a lot of this is. A lot of information that I had never really thought about
The course is very in-depth and comprehensive so far.

Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

The data in figure 5-b evaluates the course content that was given leading up to the mid-semester course evaluation sent to students. The evaluation showed that three students 'agreed' and three students 'strongly agreed' that the learning objectives were clear, and that the course was well organized to allow all students to participate fully. Five students 'strongly agreed' and one 'agreed' that the course content was well planned, along with the videos being engaging and were helpful in understanding the subject. The course workload appropriateness showed that five students 'strongly agreed' and one student was 'neutral' to the question. One student reported as 'neutral,' three as 'agreed,' and two as 'strongly agreed' that the course assignments were engaging. The students evaluated the in-class activities as engaging and helpful with two students reporting at 'neutral,' two at 'agreed', and two at 'strongly agreed'. The final data point shows that one student rated 'neutral,' two at 'agreed,' and three at 'strongly agreed' that the handouts and other material posted on Blackboard were helpful and added to the students understanding of the subjects.

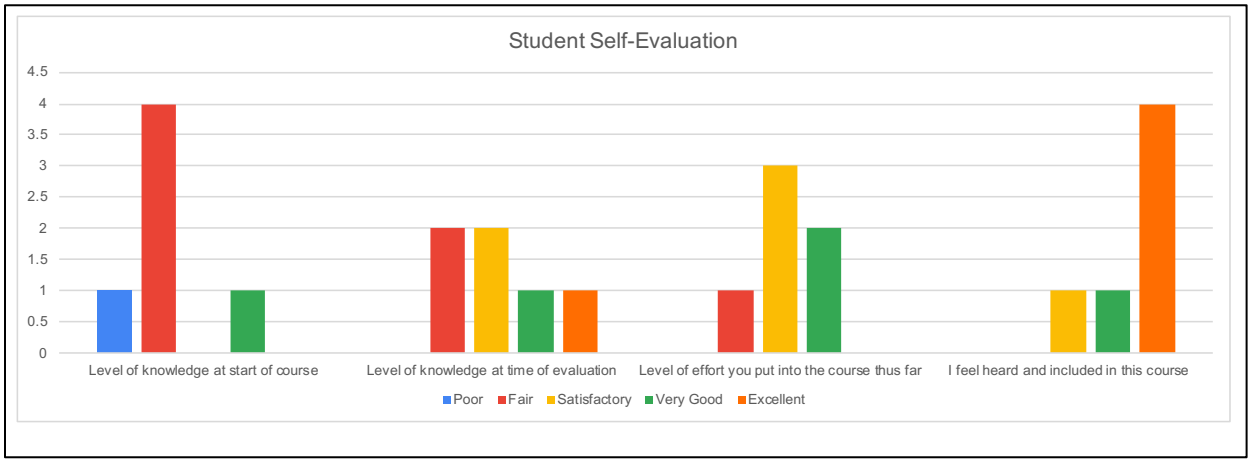
Figure 5-b: Mid-Semester Course Evaluation Feedback



Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

The data in figure 5-c evaluates the student's self-education in the moment of the mid-semester course evaluation given to students. One student rated at 'poor,' four at 'fair,' and one at 'very good' in terms of the student's level of knowledge at the start of the course. The following point of data reflected the level of knowledge at the time of the evaluation where two students rated at 'fair,' two at 'satisfactory,' one at 'very good,' and one at 'excellent'. The level of effort that each student put into the course at the mid-semester was evaluated with one student rating 'fair,' three at 'satisfactory,' and two at 'very good'. The remaining point being evaluated was the students being heard and included within the course where one student rated at 'satisfactory,' one at 'very good,' and four at 'excellent'.

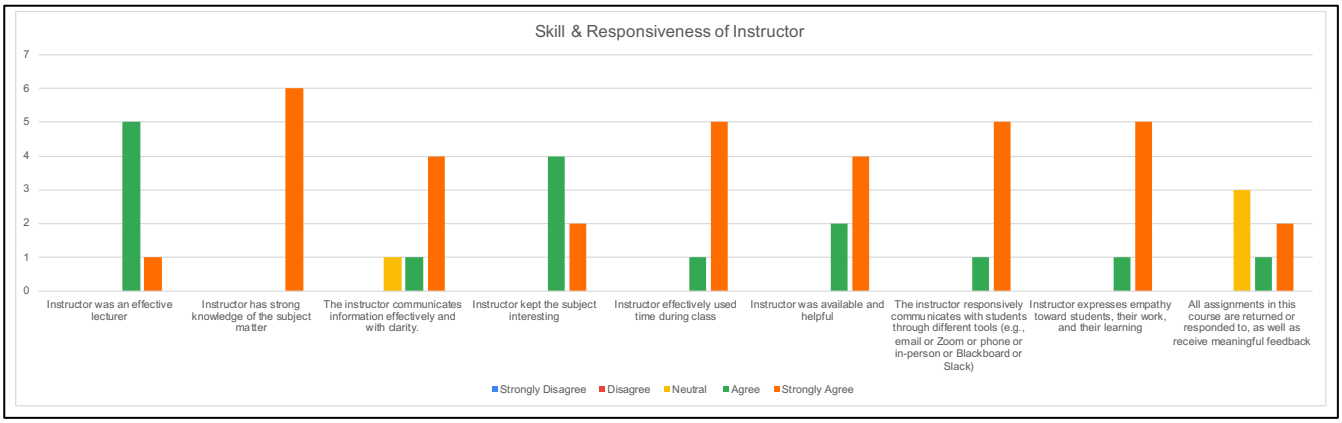
Figure 5-c: Mid-Semester Course Evaluation Feedback



Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

The data in figure 5-d evaluates the skills and responsiveness of the instructor at the time of the mid-semester course evaluation given to students. Five students rated 'agreed,' and one at 'strongly agreed,' that the instructor was an effective lecturer. All six of the students rated 'strongly agreed' that the instructor has a strong knowledge of the subject matter. One student rated 'neutral,' one at 'agreed,' and four at 'strongly agreed' that the instructor communicated information effectively and with clarity. Three students rated 'agreed,' and two at 'strongly agreed' that the instructor kept the subject interesting. Some of the remaining points that were received had matching data, which included one student rating 'agreed,' and five rating 'strongly agreed' that the instructor effectively used time during class, the instructor responsively communicated with the students through different tools, and the instructor expresses empathy towards students, their work, and their learning.

Figure 5-d: Mid-Semester Course Evaluation Feedback



Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

Class Seven

- **Topic:** Electrical Safety and Lockout/Tagout
- **Article to Read for Beginning of Class Discussion:** None.
- **Optional Readings:** None.
- **OSHA 29 CFR:** 1910.301-335 and 1910.147
- **Blackboard Material:**
  - Electrical Safety Information Sheet
  - Electrical Problems – 10 Most Common Issues
  - Lockout / Tagout Information Sheet
- **Assignments:** Job Hazard Analysis for the Booth Theatre with Grading Rubric.
- **Assignment Due:** HazCom Project

Opening on lecture seven, we first took time to analyze how everyone tackled the HazCom project assigned from the previous class. Upon checking in, many students seemed to have thought it was easy and gave them an opportunity to observe what chemicals may be found within the theatre. The assignment instructed students to select a chemical that is commonly used in the School of Theatre or the industry, and to practice using the proper safety data sheet and supplemental research on the material to: formulate and prepare a bullet-point list of elements of a label (identifier, signal word, pictogram used, etc.), create and design their own company label with correct information, create an appropriate NFPA 704 and HMIS, and create a list of needed PPE for the chemical (if any). Looking over the submissions, I noticed some students did the assignment minimally (*Appendix P*), whereas others put in more effort and deepened the understanding of the chemical of their choosing (*Appendix Q*). This project was a turning point in determining where each student was in terms of academic retention for the course, and the approach each student took when completing assignments. I took these notes to better help smooth out assignment details as we continued with the remainder of the semester.

We carried into the lecture about electrical safety and lockout tagout, starting with the basics that many learned in grade school being: “what is electricity, and how is it created?” I wanted to start the lecture off with a simple question to get everyone aligned to the subject and reaching back in their memories about the movement of electrons between atoms. After a few minutes of everyone slowly contributing to a small group discussion about what electricity was, the students were all on the same page. I proceeded and threw in some hard questions about terminology such as the movement of electrical charge (current), opposition of current flow (resistance), and a measurement of electrical force (voltage). After this small group discussion, I felt that everyone had a good understanding about electricity, and I had many engaged individuals on the matter. This gave me the ability to confidently transition to the hazards that can often come from electricity.

I had brought up the acronym “BE SAFE”, which stands for Burns, Electrocution, Shock, Arc Flash / Blast, Fire, and Explosion where I explained that it was a great tool to help others understand the importance of electrical safety, and the possible risks that are involved while working around electricity. We had another group discussion, this time about damaged wires, improper repairs, usage, and other dreadful examples that students have seen throughout different theatres that they have worked in. This discussion opened many individuals' eyes about some of the horrible things that can be found, and the dangers that can follow. Moving on to the next topic of repairing or working around larger electrical material/equipment and how we should properly lockout/tagout equipment when performing any maintenance. Many of the students were unaware of the majority of the devices present to help protect workers when performing maintenance. This was a huge highlight from the lecture that I thought the students took with them. I made sure to

have them read a useful article that outlines a six-step lockout/tagout procedure that I had posted on Blackboard.

Following the lecture, I presented them another project that would be due in two weeks' time. This project was a Job Hazard Analysis, where the students were able to observe and analyze potential hazards within the Joan & Edgar Booth Theatre on-campus. I also handed out a new rubric for the class, so they would have a better understanding of what I was looking for within their project. (*Figure 6-a*)

Figure 6-a: Job Hazard Analysis Grading Rubric

CFA TH535 – Special Topic
Theatre Health and Safety
Fall 2021

Job Hazard Analysis Grading Rubric

Points / Section of Project	4	3	2	1
Job Hazard Analysis Form Style			All Sections / Areas of Potential Hazard are Identified.	Missing Sections / Areas of Potential Hazard.
Content / Information on Form	Thorough walk-through and hazard identification of at least 4-6 potential hazards	Good Walk-through. Lacks hazard identification. Only 2-3 potential hazards.	Walk-through lacks hazard identification. Only 1 potential hazards.	Form lacks information from walk-through
Finding and Recommendation Letter	Letter relays the findings and recommendations thoroughly with reasoning backing up the recommendations	Letter relays some of the findings and recommendations with little reasoning backing up the recommendations	Letter only discusses little findings and recommendations with no reasoning backing the recommendations	Letter only discusses 1 finding and recommendations with no reasoning backing the recommendations

Project Maximum Total is 10 Points

Note: Moats, Ricky. *Job Hazard Analysis Grading Rubric.* Theatre Health and Safety. Boston University. 2021.

My personal learning outcome from this lecture was that the material left us with a lot of time at the end of the class period that could have been used more effectively. In the future, I would like to add just a little more material and examples about electrical hazards, continuing my search for a good theatre example to better connect the lecture to theatre.

Class Eight

- **Topic:** Understanding Fire; Fire Prevention – Equipment & Planning; NFPA, ADA, Boston Fire Code
- **Article to Read for Beginning of Class Discussion:** None.
- **Optional Readings:** NFPA 101 – Chapters 7, 12, & 13
- **OSHA 29 CFR:** 1910.33-.39 and 1910.155-.165
- **Blackboard Material:**
  - Chicago Theater (1903) Article
  - The Massachusetts State Building Code
  - Example of a Fire Protection Plan
  - Station Nightclub Fire Information Sheet
  - Egypt Theatre Fire Article
  - Triangle Shirtwaist Fire Article
- **Assignments:** Job Hazard Analysis for the Booth Theatre with Grading Rubric.
- **Assignment Due:** HazCom Project

Fire! Unlike the previous class, this lecture was packed full of material that spanned from start to finish. Earlier in the week I shifted the schedule to help conserve some room for the following lecture nine, as we would be joined by the university environmental health and safety office for an in-class activity. I started the course off by discussing an article that I recently came across from a National Fire Protection Association Journal entry that I sent students to read a few days prior to class. The article (*Appendix R*) elaborates on The Great Boston Fire that nearly incinerated the city in 1872. I thought this article brought attention to the lecture by having the students talk about the takeaways and what it might have felt like back then to witness such a horrific tragedy. This article gave us a steppingstone to jump into the lecture as a supplement because I would continually reference many of the Boston and Massachusetts fire and safety

regulations throughout the days presentation. The article gave the students a great reference as to why some of the codes today may exist.

Before explaining regulations, I wanted to start off by explaining how fire becomes…fire. Understanding the four elements that play a key role with how fire is formed, which are Oxygen, Heat, a Fuel Source, and the Chemical Reaction, is essential. I explained it as a pyramid theory; without one of the first three elements, the pyramid would fall, depriving the chemical reaction that would become a fire. However, when these three elements are provided without neglect, it creates the chemical reaction causing a fire. When fire is created, individuals should have an education on the phases of fire. The phases of a fire include the incipient phase, growth phase, fully-developed phase, and decay phase, which all play a vital role in the duration of a fire. The students had a grasp on the concept, so we continued and watched a video from a fire training exercise that goes through each phase as they catch a small "room" on fire. As this video played, I asked questions that aided the video, like "which phase are we at?", "what would be the best thing to do if you were in the room?", and "when should you make the decision to leave and save yourself and not the room?". These questions created a group discussion as the students could actively visualize and make the connections with the video.

How fire is classified was the next topic, being either a class A, B, C, D, or K. As we analyzed each classification, I made it a point to ask where we would see each example in the theatre, even K, which usually is only found in arenas and stadiums where there are industrial kitchens. By understanding each classification, we were able to understand the need for the proper fire extinguisher, and how each extinguisher should be placed either fifty to seventy feet away from one another. The fact of extinguisher distance surprised many students. They had never noticed the amount of extinguishers around them in many situations. We discussed what each fire

extinguisher looked like, how they should be maintained, and the technique of how to use them. This topic tied right into Fire Protection Plans and how having such a plan would help give those within the theatre a helpful guide in knowing how to engage in the event of an emergency. We discussed what a possible fire protection plan would have in it, and what procedures might be beneficial to have in a theatre or shops, even including information about hotwork fire watch.

With this information, I stopped to change course ever-so-slightly to discuss the Station Nightclub Fire which is a very prevalent fire safety topic, taking a break from lecture. I showed a less-graphic video, compared to some, which talked through some of the issues that occurred on that gruesome night. Following the video, we had a class debate on some of the issues that happened, including: pool tables pushed up against the windows, security not letting people through the exits until it was too late, how quickly the fire and smoke had spread, and the doors opening inward. I explained that this was one of the many fires that truly altered the face of fire code safety across the country. This gave a good opportunity to flow into the National Fire Protection Association along with the 101 Life Safety Code book, mainly analyzing the 2012 version, which the state of Massachusetts follows. In addition to the 527 CMR 1.00, which are the amendments to the 101-life safety guide that elaborate and narrow down certain regulations created by the state's Fire Marshall, we continued to talk about more state specific regulations, including the Massachusetts 780 CMR for Means of Egress, 521 CMR Architectural Access Board regulations #20.0 for Accessible Routes, and #24.0 for ramps and stairways. The broad subject of fire regulations had some students in a daze, so I often had to try to engage the students by asking questions about where we would see some regulations within the theatre while also making connections to the building we were in for class.

I went on to touch upon how these regulations affect those with disabilities. I asked the class to name areas that would potentially be an issue for someone who may be in a wheelchair. Many students made some obvious observations including stairways, but some individuals pointed out other lesser known areas of potential issue, like doorway widths, and patron lack of knowledge as to where they would go in case the fire system were activated. This led to Americans with Disabilities Act requirements, along with the Massachusetts 521 CMR Architectural Access Board regulations #14.0 for places of assembly. We also elaborated on the seating requirements for those with and without mobility issues; the lengths of rows within a theatre setting and how it differs depending on the set-up of the room, especially if it is a unique theatre where the ground plan changes for each production, just like the Joan and Edgar Booth Theatre! Wrapping up the lecture for the day, we briefly touched upon emergency signage and aisle illumination, proscenium walls, fire curtains, flame-retardant, and pyrotechnic safety. These topics squeezed together at the end of the lecture felt a little rushed, but we were able to finish just in time.

If I were to revisit this to teach again, I would like to expand on the fire portion of the lecture into an additional day or maybe even in the lecture prior, since we ended early previously. The class engagement was great throughout this lecture but making the regulation portions less dense would be a good idea.

Class Nine

The materials in this lecture was majority a carryover from the topics listed above with some additions as followed:

- **Topic:** Finish NFPA, ADA, Boston Fire Code and Emergency Action Plans; In-Class Activity
- **Article to Read for Beginning of Class Discussion:** Station Nightclub Article
- **Optional Readings:** None.
- **OSHA 29 CFR:** None.
- **Blackboard Material:**
  - MA 521 CMR 20 – Accessible Routes
  - MA 521 CMR 24 – Ramps
  - MA 521 CMR 14 – Places of Assembly
  - Rosebrand NFPA 701 VS. NFPA 255
  - Sample of an Emergency Action Plan
- **Assignments:** Fire Code Analysis Research
- **Assignment Due:** Job Hazard Analysis

At the top of the class, I quickly discussed the Job Hazard Analysis project that all the students should have completed before class. It was nice to hear their feedback about the project, while hearing about the potential safety issues that they found during a show load-in, and in technical rehearsals throughout the Booth Theatre. I felt that many of the students grasped the objectives of the project, which was to create a job hazard analysis form with the appropriate identifications filled out, along with a short one-page paper explaining what their recommendations would be for the space, resolving the issues that they found. My goal for the project was to enable the students to make a piece of documentation that they could keep as a reference for their future careers if they ever had to identify potential hazards within a theatre. Many of the projects that I received were spot on. (*Figure 7-a*)

Figure 7-a: Student Submitted Job Hazard Analysis

Job Hazard Analysis

Job: *Colossal Tech*

Department or location: Booth Theatre

Task or Step	Hazards	Controls	Personal Protective Equipment (PPE)
Refocusing lights from a genie.	Fall hazard from height. Falling items hazard. Strain from overhead work. Heat from light fixtures	Yearly training on proper genie use. Having at least two people on one genie. Making sure outriggers are being used properly.	Hard hats, PFAS, sturdy shoes. Connected tools e.g., crescent wrench on a lanyard. Heat protective gloves.
Running cables to risers for power	Using one power point to plug in too many devices. Trip hazard. Electrocution.	Neat wiring. Using cable covers or elevating the cable runs so that they run along a ceiling instead of the floor. No liquids around sensitive electronic equipment. Yearly fire training. Close access to fire extinguishers.	
Use of ladders to hang scenery	Fall hazard. Item fall hazard.	proper ladder safety training. Having at least two people per ladder. Ladder inspection before each job.	Hard hats. Sturdy shoes.
Painting touch ups in space	Exposure to paint fumes. Absorption of paint on skin	Controlling time spent with paint fumes. Proper ventilation in the space. Providing correct PPE when working with paint.	Personal air respirators. Gloves. Protective clothing.
Working around lowered pits	Falling into the pit	Having sturdy barriers. Kick rails. Proper lighting. Glow tape around the pits	Sturdy shoes

Figure 7-a continued

During a load-in call for *Colossal* in the Booth Theatre on 10/26/2021, I walked through and observed the work performed in the space. During my observations, I noticed multiple hazards connected to working in a theater. I would like to share them with you and offer some recommendations for improving our safety in our workplace.

Overhead Work Hazards

During my time in the space, there was work on the tech gallery level and focusing being done from genie lifts. The main hazards are:

- People fall hazard
- Item fall hazard
- Overhead strain
- The heat from lighting Fixtures

My recommendations are to have training sessions each semester to refresh students on the proper usage of genie lifts and ladders. In addition, part of the training needs to include appropriate use of PPE such as hardhats, PFAS, and sturdy shoes.

Working on lighting fixtures also has ergonomic issues of constant overheard work and hot lights. My recommendation here is to include yearly ergonomic training and the use of heat-resistant gloves. The workers can also switch off who is working in the genie and who is below watching the work to rest in between overhead work.

Electrical Hazards

Multiple cables were running on the ground from the wall to the risers to send power and data to tech tables set up for lighting and sound. Although the lines were taped down properly, using cable covers or running the line along with the ceiling and dropping it in would reduce the trip hazard completely. Electrical fire safety is also essential. Workers should be reminded not to daisy chain power strips and be conscious of how much power is drawn by a single circuit. I would also do semesterly fire safety training, including the proper use of fire extinguishers.

Paint Hazards

Proper ventilation is required during paint calls. Opening up the sizeable south side doors helps open up the space for ventilation. Providing appropriate PPE such as gloves and protective overalls can also reduce the exposure to paint chemicals via skin absorption.

Lowered Pit Hazards

Four small lowered pit areas around the stage are used as a playing space. Although the TD installed toe rails and glow tape, there is still a risk of falling in. Therefore, I recommend building more robust railings constructed into the deck to withstand someone catching

themselves on the railing. It is also vital to ensure that workers wear sturdy, work-appropriate shoes that can reduce the likelihood of slips, trips, and falls.

Note: Student. *Health and Safety Program Research "Pitch"*. Theatre Health and Safety. Boston University. 2021.

With the previous lecture being abundant with content, I wanted to take some time following the project discussion to have a good recap about anything that the students may have questions about in connection to the previous lecture. To my surprise, only a few comments were made, but each comment that I was given was for me to elaborate a little more on certain points that I made throughout the previous lecture. I expected to more questions that pertained to the previous lecture, but I decided to carry on into the remainder of the lecture, as our time was limited with guests visiting halfway into class. I did think this was a major learning moment for myself, believing that the fire section could be expanded over the course of three days rather than two, to help spread out the content.

The lecture material for the day was detailed Emergency Action Plans (EAP). I started by asking everyone what EAP's are, what they include, and how might they be beneficial to a theatre. The engagement from the students that I analyzed showed they knew some portions of an EAP. This furthered the discussion detailing the students' past experience in other theatre's where there were "plans," but were often told to individuals working within the theatre by word of mouth, not being a fully thought-out, well documented plan. We explored required elements of a plan, and any additional elements that would be helpful for both front of house and back of house in the theatre. I heavily reiterated that for emergency plans to be a success, all staff should be trained and retrained periodically. We touched upon sheltering in place, and how weather can often play a big role in creating safety issues. It was interesting to hear some of the students stories of working at a theatre, or had a show, during a storm or tornado watch, and what the plans were in each scenario. It made me feel that the students gathered enough knowledge that emergency action plans are something they should carry with them as they continue in the world.

At this point of the class, two individuals came into the class from the university's environmental health and safety office and were able to bring a digital fire extinguisher simulator training device with them. Prior to the training activity on the device, the two experts gave a quick university-specific presentation on fire safety and reiterated what I already explained to the students about the classifications of fires and fire extinguishers, the regulations and inspections behind them, and the P.A.S.S. (Pull, Aim, Squeeze, Sweep) technique. Following the presentation, each student practiced and demonstrated with the digital simulator to put a "fire" out with an "extinguisher." The students had a lot of fun with the simulator, and I thought that this was a successful hands-on learning activity for the students, taking a break from the normal lecture routine.

After the activity had finished, I handed out another assignment called "Code Analysis," which gave the students the opportunity to research, discover, and analyze a fire that has taken place within the entertainment industry that was not recently discussed in class, and to also talk about what occurred to cause a fire, along with the fire codes and safety procedures that were most likely neglected during the event. We would discuss the project two weeks later. The overall census for the fire lecture was very informative. The activity was a great touch for learning and brought in some extra student engagement. Like I said earlier, this layout of this lecture would need to be revisited to help spread out some of the material more, to make it less dense.

Class Ten

- **Topic:** Crowd Management
- **Article to Read for Beginning of Class Discussion:** None.
- **Optional Readings:** Peter Wynn-Moylan: *Risk and Hazard Management for Festivals and Events*
- **OSHA 29 CFR:** 1910.38
- **Blackboard Material:**
  - Chicago's E2 Nightclub Disaster Article
  - DIM-ICE Example
  - Article - *Big Crowds Flow Like Water in Amazing (and Terrifying) Ways*
  - *Managing Travel for Planned Special Events Handbook*
  - ANSI ES1.7-2021 Event Safety Requirements - Weather Preparedness
  - ANSI ES1.9-2020 Crowd Management
- **Assignments:** No assignments were given out during this lecture.
- **Assignment Due:** None.

While creating this lecture over the Summer of 2021, I heavily delved into a vast amount of research that took more time than the other lectures. Crowd Management was a newer, less common safety topic, where I was not as experienced in other than the knowledge of a few seminars and an Occupational Health and Safety Administration course for evacuation and emergency planning. I took extra time to research; read texts, articles, and historic events to piece together a well-rounded lecture that took on different practices of how to analyze and control crowd movements and behaviors.

I started the course off by asking the simple question: "What is a crowd?". Many of the students answered in different ways all leading to the same response being a mass of individuals. I continued, explaining what Google's definition of a crowd was, being "a large number of people gathered together in a disorganized or unruly way." To the students' surprise, I said that this was

wrong, and I asked the students to help build the case. The students seemed quiet and weary, so I explained that crowds always have an organized pattern whether we see it or not. This is due to human behavior, the activities that are happening within a group/crowd, and the immediate environment surrounding the group of individuals. One of the first, and most important elements of understanding crowd management is analyzing crowds themselves and evaluating which category they can fall into. A casual, conventional, expressive, active, or a riot type of crowd will determine what the approach should be for a crowd manager, and how and what type of crowd control will be needed in such situations. The beginning of the lecture took more time than I originally allotted. I wanted to make sure the students had a good grasp of crowd categories. After this portion of the lecture, I showed some videos of different crowd tragedies that have happened in the past causing some unfortunate deaths, a few of which occurred in an entertainment venue or festival.

After the video examples, we started on the different types of crowd behavior theories there are, which include Group Mind Theory, Deindividuation, Social Facilitation Theory, and Mass Panic. I heavily focused on the group mind theory particularly, which we actively see often in crowds. When individuals are submerged in a crowd, they lose all sense of self and responsibility, thus becoming anonymous members of a large group or crowd. I used examples that I saw at several concert venues, elaborating that the movement of the crowd itself is one, therefore it is harder to move as an individual, especially in types of events like a mosh pit. This was a good transition into discussing high density crowds, where I showed a video explaining the topic in detail. This provided some great visualized examples to the students.

We continued, in contrast, onto multiple types of crowd management, simultaneously making connections to crowd control, discussing what the differences are between the two. Crowd

management is the facilitation of both the activities and crowd members at the event. Crowd control, on the other hand, are the actions taken to organize a crowd once they begin to exhibit undesirable behaviors, such as crowd crushing or surging. We analyzed different aspects of planning and preparation techniques, including venue and site designs, entrance separations & dedications, emergency response plans, signage, crowd flows, and DIM-ICE. (*Figure 8-a*)

Figure 8-a: DIM-ICE Example

NORMAL	INGRESS	CIRCULATION	EGRESS
Design	Visible and clear entry points. Space to queue at entry gates. Capacity for 3000. Pram parking areas. Narrow stairs.	Narrow stairways. Pram and wheelchairs blocking concourse flow. Competitors' area fenced off and patron access restricted (and axes secured).	Narrow stairways. 6 exit gates. Egress into crowded areas.
Information	Show maps. Schedule in daily papers. Social media alerts. Directional signage. PA announcements.	PA announcements. Ushers visible. Large internal screen. Internal signage.	PA announcements. Ushers visible. Internal large screen. Internal signage.
Management	Morning briefings with emergency services and internal staff. Maintain queuing space. Security teams roaming. Competition program and wet weather schedule. First Aid Response onsite.	Communication with team members. Queue management. First Aid Response onsite. Control Room (monitoring external crowd flow via cctv). Security teams roaming.	Collection of prams. Egress into crowded areas. Ushers assisting at stairs. First Aid Response onsite. Control Room (monitoring external crowd flow via cctv). Security teams roaming.
EMERGENCY	**INGRESS**	**CIRCULATION**	**EGRESS**
Design	Crowding on Grand Parade and Monaro Street. Capacity for 3000. Visible and clear entry gates.	Narrow stairways. Pram and wheelchairs blocking concourse flow. Competitors' area fenced off and patron access restricted (and axes secured).	Narrow stairways. 6 exit gates. Egress into external crowded areas.
Information	PA announcements. Emergency management Plan. Communication with control room. Internal large screen. Internal signage.	PA announcements. Emergency management Plan. Communication with Control Room. Large internal screen. Internal signs in position.	PA announcements. Emergency management Plan. Communication with Control Room. Large internal screen. Internal signs in position.
Management	Ushers visible. Communication with Control Room. Emergency Services on site. First Aid Response onsite. Additional Security Response teams available.	Ushers visible. Communication with team members and Control Room. Enforcement of competitors' safety procedures. First Aid Response onsite. Emergency Services on site. Additional Security Response teams available.	Egress into a crowded area. Emergency Services on site. First Aid Response onsite. Additional Security Response teams available. Communications with Control Room.

Note: Wynn-Moylan, P. (2017). *Risk and Hazard Management for Festivals and Events* (1st ed.). Routledge.

I encouraged the students to view the DIM-ICE located on Blackboard; it is a great model that includes a systematic checklist for risk assessment and crowd management, breaking it down

into three primary influences in the vertical direction, being: design, information, and management, and three primary phases in the horizontal direction, being: ingress, circulation, and egress.

I ended the lecture for the day with a topic on post-event dispersal because I thought that this piece of crowd management was extremely important. Post-event dispersal is one of the most dangerous periods for both crowd and traffic control. I explained that this was often overlooked, especially in site designs, as many neglect the multiple routes through which crowds can disperse easily while causing no issues with the surrounding areas or neighborhoods. I used a recent example that I saw at Fenway Park following a Red Sox game; a huge group of individuals walked right into the streets that were active with oncoming traffic, thus creating another problem, considered a short-term grid lock. I explained that if they had proper detail and officials surrounding the area, they could have kept people off the roads and on the sidewalks. However, the only detail that were present was either in the stadium or farther down the street, taking care of other traffic related issues.

Coincidentally, following the class, I was notified of a crowd surge and crush incident that had happened the evening before. This was the Travis Scott concert that took place at the Astroworld Festival in Houston, Texas, where eight individuals died and a ten-year-old was declared in critical condition. I sent this article over to the students to read for the next class.

This lecture was well received in my personal perspective. While I thought that it went well, there can always be improvements in the amount of research, adding and detailing more content towards the lecture. I felt that some of the material was missing, and the class was not able to fully understand certain aspects. I would explore breaking this into two separate lectures, and possibly trying to invite a guest that specializes in human behavior to help highlight and discuss

the psychological approach of human behaviors in crowds. Having some kind of in-class activity would be a great addition to the lecture for the students, too. One in-class activity that I have been considering if I were to teach this again would be having the entire class physically merge together to feel how crowding works. The students would start separated at opposite ends of the classroom, and then would move towards each other, directionless, forming the outcome of a high-density group setting.

Class Eleven & Course Exam

- **Topic:** Unusual Circumstances and Exam Review Game
- **Article to Read for Beginning of Class Discussion:** Astroworld Festival and Linkin Park Concert Pause
- **Optional Readings:** None.
- **OSHA 29 CFR:** None.
- **Blackboard Material:** None
- **Assignments:** Final project was assigned during this lecture, along with the instructions for the online exam.
- **Assignment Due:** Fire Code Analysis Research was due during this lecture.

We started off the class with the article that I sent out to the students following the previous lecture, in addition to an article about how at a both the Travis Scott and Linkin Park concerts, which explain that the concert had crowd related safety issues. The Linkin Park concert, in particular, had to stop mid-way through a song when they noticed that crowd crushing was beginning and that the crowd was tightly moving forward. I felt that the students were heavily engaged in the conversation and were able to add their personal experiences on the times that they, too, were in a crowd that started to become one mind and move forward creating tension. Following the articles, we quickly discussed the code analysis project that was due at the beginning of class. Many students explained how interesting it was having the opportunity research some events that have happened in entertainment in connection to fire. I thought it helped make reasonable connections as to what type of fire codes might have been neglected or needed back when the fire(s) happened. The entries submitted were great, and I thought the students did enough research to convey the appropriate material (*Appendix S*). For next time, I would like to ask

everyone to choose a venue or event, then notify me of their choice, so I don't receive two of the same fire events again.

We began a short lecture for the day discussing unusual safety circumstances in entertainment. Much of this material stemmed from previous work that I did, which often involved rare artistic and performer abilities. This lecture involved topics such as gymnast and acrobatic safety, aqua dive theatrical production safety, and ice-skating production safety. The approach was to explore some abnormal productions that often need specific safety protocols. One of the main points that I carried throughout all of these types of productions, is injury preparedness and the similarities it has pertaining to emergency action plans. I explained that when creating a plan like these, you often need to use "what-if" scenarios originally introduced in the previous lecture, to better prepare those working in the show, for their protection. The students enjoyed being able to see some unique safety aspects, however, next time if I were to teach this or even a portion of it, I would like to add additional explanations and lesser-known protocols to make this a full-length lecture. I felt that there was more that we could have talked about, but I wanted to keep it short to ensure that we had the time to do an exam review for the remainder of the class period.

The exam review that we did was a type of Jeopardy safety game. I was able to create a master slideshow with clickable links to and from the selection screen, which asked safety questions regarding all the material previously discussed in all the lectures, combined. The students were seriously engaged and seemed to have had a great time. This also decreased some students' stress about the exam, reassuring them that these questions were very similar to the questions on the exam; little did they know, they were the exact same exam questions. The review also gave the ability to highlight areas where the students should go back and review more intensely. We wrapped up class after the exam review, and I told the students that the exam would be digital on

Blackboard rather than during the class period. This allowed them the ability to use their notes, as they would always have them (and the internet), as an unlimited resource to back up their knowledge. This is when I also assigned their final project that would be presented during the official final exam period.

Final Project

For the final project, I wanted to create an assignment that would encompass different aspects of the entire course, while also heavily embodying the last two subjects of Crowd Management and Fire Safety, more specifically Emergency Action Plans. I decided to have the students develop and propose a health and safety project based on a specific venue and concert which would consist of the following well thought-out written and printed documents:

- Emergency Action Plans and Fire Protection Plans
    - Ground Plans / Egress Pathways
    - Emergency Scenarios and Procedures
    - Types of potential Hazards
    - Checklists
- Crowd Management Plans
    - Communication Messages and Layouts
    - DIM-ICE
    - “What-If” Scenarios
- Other related planning and safety needs in relation to the venue and concert

The students would also create a presentation to show and explain your process, plans, and understanding of the topics listed above. This presentation would later be given during the final exam period.

The concert and specific criteria given to the students included the following:

- **Artists:** Bazzi, Tai Verdes, and Tate McRae
- **Guest artist not released to public:** Camila Cabello
- **Band:** Keys 1, Keys 2, Drums, Guitar 1, Guitar 2, Bass 1
- **Style:** Top Hits, Chill Hits,
- **Concert Length:** Approx. 2.5 Hours
- **Effects:** Pyrotechnics, confetti, haze, bringing their own drapes/drops
- **Gear:** Lighting gear are rentals
- **Venue:** Metropolitan Theatre, Morgantown, WV
- **Theatre Capacity:** 1300
- **Main Seating Bank:** 834 + 16 Box Seats
- **Balcony:** 426 + 24 Box Seats
- **Tickets Sold:** 1290
- **Comp. Tickets:** 20
- **Concessions:** Average snacks, candy, and drinks (including domestic local beer and wine).
- **Truck Parking:** Next to a parking lot near theatre, Address of lot is: 154-160 Fayette St. Morgantown, WV
- **Bus Parking:** On Fayette St.
- **Load In Area / Alley / Stage Door:** Between two buildings 160 Fayette St and 174 Fayette St.
- **Front of Venue / Main Entrance:** 371 High St. Morgantown, WV
- **Parking Spaces in Front of Building:** Covered / No Parking will be permitted

- **Theatre Staff Provided:** Sound Operator (1), Light Operator (1), Box Office (2), Front of House Manager (1), Stage Managers (1)
- **Volunteers Provided:** Ushers (4), Ticket Scanners (2), Concessions (2)
- **Age Demographic:** Morgantown's age distribution, is heavily influenced by the presence of West Virginia University as many individuals are students, is: 11.1% under the age of 18, 44.7% from 18 to 24, 20.4% from 25 to 44, 13.5% from 45 to 64, and 10.4% who were 65 years of age.

In addition to the criteria listed above that was given to the students, they were also provided with both AutoCAD / Vectorworks and PDF ground plans for each floor of the theatre, photos of the venue with and without productions and audience members in the space, and aerial photos of the streets depicting truck and bus parking locations, alley, stage door locations, and front entrance locations. This information gave the students a better idea of the venue, since they were never in the space before. This gave them additional support. I did not want to have the students do the venue research on their own, as it could have taken time away from the critical parts of the project that I wanted the student to focus on. The reasoning behind why I chose the concert with these artists was due to them being a good pick for the demographic which is a younger fan-base. This, along with other details, I knew would create a higher increase of potential crowd management issues, thus making it clearer for where areas would be a major risk within the theatre. I picked the venue specifically due it being smaller than recommended for this type of show and artists, which potentially creates more issues and high-risk areas.

I made it quite clear that the students could reach out, at any time, to ask any additional questions regarding the project, the venue, or the concert. I also recommended the students take

advantage of the Blackboard material, as there were pieces of different handouts that would be helpful to include, which provided a template of a fire plan from another theatre. Throughout the four weeks they had to complete the project, I only received one additional question about the venue, which I felt was less than what I expected. The submitted assignments were quite full of material, but as with some of the other projects throughout the semester, some individuals showed great achievement while others did not, completing small or barely any pieces of each required section discussed in the project overview. It was very clear that some individuals waited until the last minute to start the assignment, which was slightly disappointing, especially after giving the students so many resources to help support them.

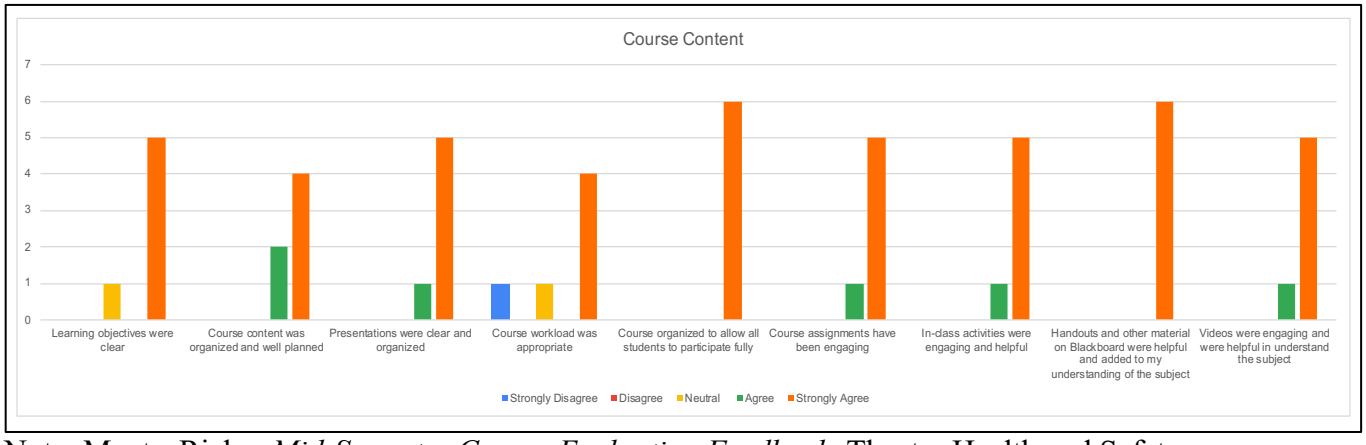
Following the results of the project and taking time to think about potential changes, I feel that I could make some edits that would better help and define the project. Next time, instead, I would choose a local theatre, and try to obtain time in the space for the students to go around and make their own observations while still providing some aspects to support the students, like ground plans. I also would make the crowd management section an overview for any event and cut the concert information. I felt as though this section was probably not as well received because the students were only thinking about the concert given.

Final Evaluations

Follow the final meeting of the class, I sent out a link to a final semester survey that I had created, along with Boston University's instructor survey to gauge the course effectiveness and myself as an instructor. Once again, I thought that the feedback was superior, and highlighted the expressions towards the course from the students. From my survey, six out of seven students had submitted feedback. The course scored higher than mid-semester at a 9.33 out of 10, previously being 8.33 out of 10. Some of the additional comments that were not originally on the mid-semester survey include things along the lines of "The content overall is useful. Even if I don't create Health and Safety plans in the future, knowing what is involved is helpful. No one has ever gone over this content with me professionally prior to this course. The additional handouts and material on Blackboard that supported lectures," and "Due to not getting an OSHA certification, the work is excessive for a 1 credit class. It would feel more appropriate if the class was 2 credits," and "This should remain an individual course and that the technical production and production management classes would benefit from this information. Perhaps shared with the other production departments especially the undergraduates." Again, class population gathered a successful education in Theater Health and Safety. Although there are opportunities to inform and engage the students more throughout each lecture, many of them were at least enlightened by the information taught throughout the entire course. This gave them the ability and the confidence to think more critically about safety in the theatre.

The data in figure 9-a evaluates the course content following the end of the semester. The first round of evaluations during mid-semester versus the final evaluations showed that the content had a more of a successful and favorable rating among the students in the end. The evaluation showed that five students 'strongly agreed' and one student was 'neutral' detailing that the learning objectives were clear. One student rated 'agreed,' and five as 'strongly agreed' that the course assignments, in-class activities, and the lecture videos were all engaging and helpful in understanding the subjects. All six of the students rated that they 'strongly agreed' that the course was well organized allowing all students to participate fully, along with the handouts and other material posted on Blackboard being helpful, adding to their education. The course workload appropriateness had some unexpected changes from the first evaluation showing three students rating at 'strongly agreed,' one student was 'neutral,' and one at 'strongly disagreed'. It seems that two of the students within the course believed that the amount of assignments were unbalanced in connection to the amount of credit hours awarded to the student for taking the course.

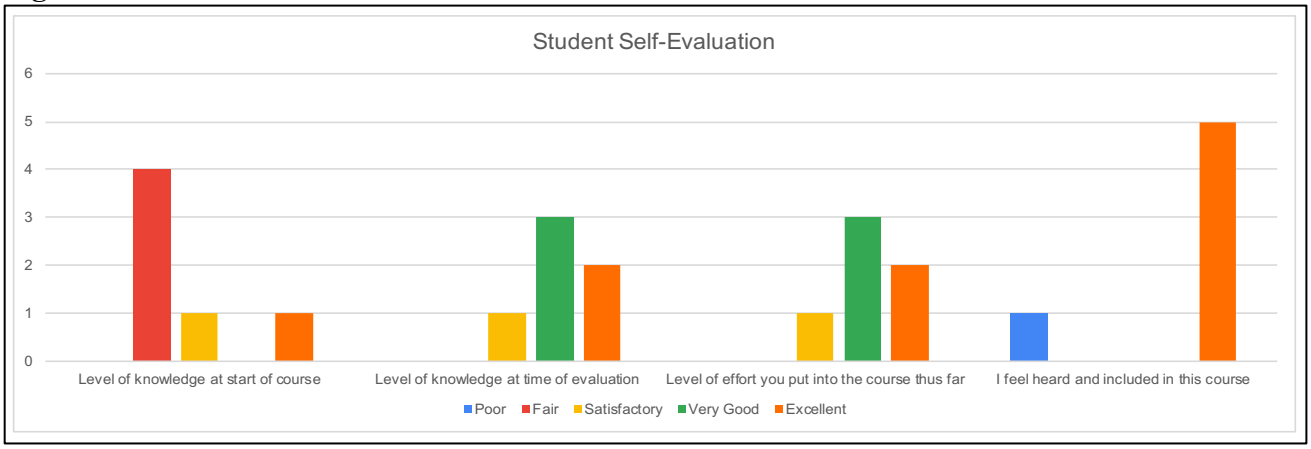
Figure 9-a: Final Course Evaluation Feedback



Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

The data in figure 9-b evaluates the students self-education at the end of the semester. Like the data above, the final evaluation showed a few differences between the first and the last evaluation. Four students rated at 'fair,' one at 'satisfactory,' and one at 'excellent' in terms of the students level of knowledge at the start of the course. The following point of data reflected the level of knowledge at the time of the evaluation where one student rated at 'satisfactory,' three at 'very good,' and two at 'excellent'. The level of effort that each student put into the course at the point of the evaluation where one student rated at 'satisfactory,' three at 'very good,' and two at 'excellent'. The remaining point being evaluated was the students being heard and included in the course, where one student rated at 'poor,' and five rated at 'excellent'. Analyzing the one 'poor' rating, the comments given from the students did not specify why this rating was submitted, so this rating will be difficult to incorporate in any future class.

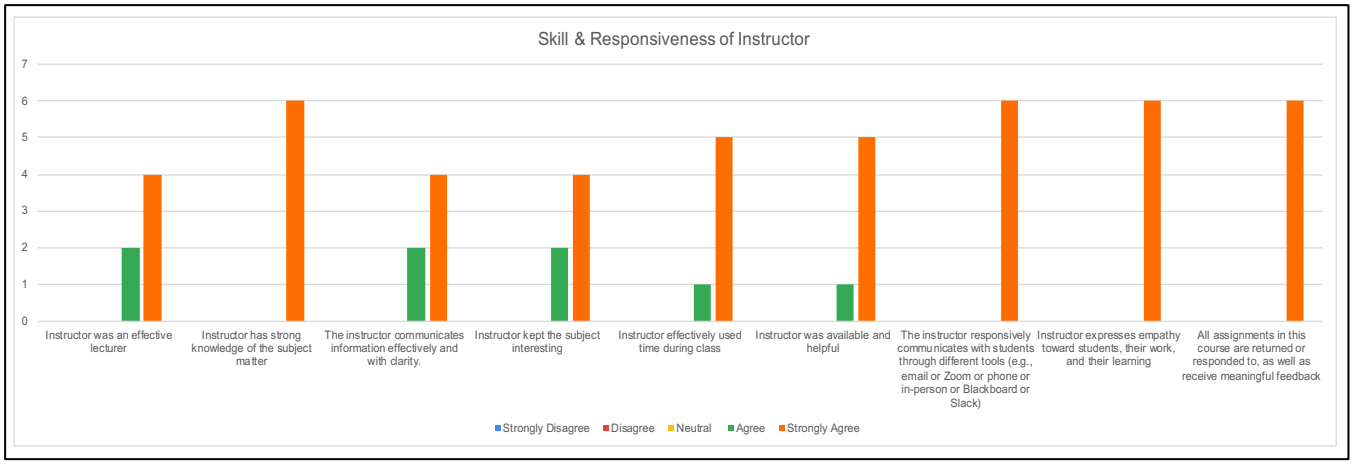
Figure 9-b: Final Course Evaluation Feedback



Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

The data in figure 9-c evaluates the skills and responsiveness of the instructor at the end of the semester. Two students rated 'agreed,' and three rated 'strongly agreed,' that the instructor was an effective lecturer that also communicated information effectively and with clarity while keeping the subjects interesting. All six of the students rated 'strongly agreed' that the instructor has a strong knowledge of the subject matter and responsively communicated with the students through different academic tools, while also expressing empathy towards students, their work, and their learning. One student rated 'agreed,' and five rated at 'strongly agreed' that the instructor effectively used time during the class, and was available and helpful in and outside the classroom.

Figure 9-c: Final Course Evaluation Feedback



Note: Moats, Ricky. *Mid-Semester Course Evaluation Feedback.* Theatre Health and Safety. Boston University. 2021.

The university results lacked greater results with only two of seven individuals completing the survey with the following results. (*Figure 10-a*)

Figure 10-a: University Create Course Evaluation Survey

TH 535 (ZG): Topics in Theatre: Theatre Health & Safety

Fall 2021 | Ricky Moats

7 | Students Enrolled
2 | Students Responded
28.57% | Response Rate

Quantitative

Please answer the following questions:	Poor	Fair	Average	Good	Outstanding	Not applicable	N	DNA	SD	M
The instructor has a strong knowledge of the subject matter.	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2	0	0	5
The instructor communicates information effectively and with clarity.	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	2	0	0.5	4.5
The instructor presents intellectually and creatively engaging material, projects, discussions, and ideas.	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	2	0	0.5	4.5
The instructor expresses empathy toward students, their work, and their learning.	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	2	0	0.5	4.5
I feel heard and included in this course.	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2	0	0	5
The instructor provides feedback on students' progress throughout the semester and gives extra help and advice when needed and requested.	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	2	0	0.5	4.5
The instructor responsively communicates with students through different tools (e.g., email or Zoom or phone or in-person or Blackboard or Slack).	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2	0	0	5
The course is well organized while also adapting to the needs and pace of the individual class.	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2	0	0	5
All assignments (e.g., written, presented, rendered) in this course are returned or responded to, as well as receive meaningful feedback.	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)	0% (0)	2	0	0	5

	F	D	C	B	A	N	DNA	SD	M
What do you anticipate your grade range is for the course?	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)	2	0	0.5	4.5

	Not at all	Somewhat	Average	Good	Excellent	N	DNA	SD	M
I put a great deal of effort into advancing my learning in this course.	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)	2	0	1	4

	Insufficient	Light	Average	High	Excessive	N	DNA	SD	M
How is the workload in this course?	0% (0)	50% (1)	50% (1)	0% (0)	0% (0)	2	0	0.5	2.5

Qualitative

No comments were made for this course section.

Note: Boston University. *Student Survey System Responses*. 2022.

New Horizons

I have learned a great deal over the past few years as I researched materials, took classes, and gathered information forming the class I have been discussing throughout this thesis. Now that I have had the ability to test the course out, there are some changes that I have realized I need to make for the next group of students to enjoy and gain more knowledge from the material presented. Below this section is an updated syllabus with these changes in green font, along with an entirely new and recommended course schedule.

I wanted to highlight the credit amounts for the course, which I have increased to two credits, instead of one. The reasoning behind this is that, from the feedback given to me by the students, the amount of work, presentations, and activities seemed unproportionate for the number of credits being given. Although the university recommends one credit per four hours per week, some of the students this past class took longer to work on assignments, thus pushing them over the threshold. I feel that this change is great and will allow the students to feel like they are getting more in return for the course. In addition to the credit threshold, this course would have the ability to offer the students with the OSHA 10-Hour Card. This would be dependent on whether I am able to successfully pass the OSHA 501 General Industry Trainer Course to become an OSHA Authorized Outreach Trainer.

Another major thing that I would change to best suit the course would be altering the class meeting period to twice per week for one hour and thirty minutes, instead of once a week for only one hour and forty-five minutes. This would give me better capability for adding more material to help support the areas of different lectures that need it, so I can spend more time on certain subjects.

After taking some time to analyze the new schedule, I was able to add some padding for any overflow, along with extra lectures for certain subjects, like crowd management and fire. I also added an entirely new subject entailing machine guarding, industrial tools, and more extensive

shop safety guidelines. From this new addition, I could add another class project where the students would create a safety protocol plan for one of the shops within the theatre. I believe the additional project would be useful at evaluating their approaches to shop safety, along with giving them the experience necessary for later in their professional careers. The new schedule would also allow some extra time for a guest speaker that I originally discussed for crowd management. I would have also enjoyed the benefit of having another guest speaker to discuss front of house safety and patron de-escalation training. This subject matter would be helpful for the students to get a solid understanding of how to approach patrons who are expressing unruly behavior. We can often see that having this type of training is a necessity in venues that serve alcoholic beverages, as that is often the main factor of patrons becoming disorderly. This would treat the students to a slight break from the normal lecture-based course material.

Finally, with the changes to the final project that I would make in terms of having the students use a local theatre to create an Emergency Action Plan (EAP) from, we would have an entire day where the entire class would meet at a theatre downtown to make observations and gather any data that may be needed to aide their final projects. The changes that I have made throughout the syllabus may be small, but I feel that they would make a better learning experience for the next class, if I were to reteach the course.

Figure 11-a: Revised Version of the Theatre Health and Safety Syllabus

CFA TH535 – Special Topic
Theatre Health and Safety
Fall 2021

Instructor: Ricky A. Moats (He/Him/His)
Email: ramoats@bu.edu
Phone Number: (304) 279-7382
Office Hours: By Appointment

Course Dates: Sept. 2 - Dec. 17
Course Time: T & R from 8:00a-9:30a
Course Location: Booth - Room 412
Course Credits: 2

Course Objective
This course is to familiarize students with health and safety practices within the field of entertainment. Students will be able to analyze personal health and safety practices, understand the connection between the entertainment industry and OSHA General Industry Code, and understand the approach of being a risk and safety manager. Students will achieve knowledge and be able to confidently research the organizations that set specific codes which are commonly related and used within the industry. This class will also offer the ability to gain an OSHA 10 certification for an additional fee.

Course Learning Outcomes
- Analysis and practice safety within the theatrical and entertainment industry
- Be able to explain specific regulations and code
- Communicate the need and the reasons why we follow specific codes and safety regulations
- Apply knowledge to all future entertainment and non-entertainment applications

Course Pedagogy
This course will be a combination lectures, discussions, activities, guest speakers, and projects either by the instructor and/or students.

Recommended Text
- William J Reynolds: *Safety and Health For The Stage: Collaboration with the Production Process*. 1st Edition. Published by: Routledge
- Monona Rossol: *The Health and Safety Guide for Film, TV, and Theater*. 2nd Edition. Published by: Allworth Press
- Peter Wynn-Moylan: Risk and Hazard Management for Festivals and Events
- NFPA: *NFPA 101 Life Safety Code 2012 ed.* (Current MA Standards)
- OSHA: *OSHA 29 CFR 1910 General Industry Regulations and Standards 2020 ed.*

Courseware
Our class has a Blackboard site that contains the syllabus, assignments, readings, links to videos/podcasts, and other course-related materials. You can log in to our Blackboard page at: http://learn.bu.edu/.

All Boston University students have free access to Microsoft Office (a suite of basic personal and professional computing software). Download your free Microsoft Office suite here:https://www.bu.edu/tech/services/cccs/desktop/distribution/microsoft/studentoffice/.

Figure 11-a continued

CFA TH535 – Special Topic
Theatre Health and Safety
Fall 2021

Grading Distribution

- 10% Participation
  - Students are expected to engage in the in-class discussions and experiential learning exercises in order to learn and apply best practices in theatre health and safety.

- 10% Health and Safety Program Research
  - Students will be able to understand, analyze, and research health and safety programs either in the entertainment industry or close to the industry.

- 5% In-Class Activities
  - Students will have the ability to have a hands-on approach to safety aspects.

- 10% HazCom Assignment
  - Students will be able to understand, analyze, and research materials common to our industry while compiling information commonly found in relation to HazCom.

- 10% Job Hazard Analysis
  - Students will analyze potential hazards and needed PPE within an area we commonly use every day.

- 10% Code Analysis
  - Students should be able to understand, analyze, and research fire codes that are connected to a previous fire within the entertainment industry.

- 15% Exam
  - Students will take all the information from throughout the semester and answer in-depth questions from each section discussed in class.

- 30% Final Project
  - Using previous discussions, lectures, and project research – Students will develop and propose an EAP and Crowd Management Plan for a local theatre.

Details for all course assignments will be on Blackboard the day that they are assigned.

Grading Scale

Students will receive a letter grade for based on the breakdown that will be combined and calculated into their final grade using the percentage weighting noted above. The Blackboard for this course uses a numerical value to assign letter grades as follows:

A 95%	B 85%	C 75%	D 65%
A- 92%	B- 82%	C- 72%	D- 62%
B+ 88%	C+ 78%	D+ 68%	F <60%

Figure 11-a continued

CFA TH535 – Special Topic
Theatre Health and Safety
Fall 2021

Attendance Policy
Your regular attendance and active participation are essential both to your own learning and to your classmates' learning. This course covers a wide range of topics, and a significant amount of information will be presented or brought up in discussions in each class. Therefore, students are expected to attend all of the classes. More than one absence can greatly impact your learning the subject matter and class participation and adversely affect your overall performance. If you must miss a class, you are required to contact the instructor.

Per the School of Theatre Student Manual 2021-2022: In a class that meets one day per week, a maximum of one unexcused class absence is allowed; two unexcused absences will result in a failing grade (i.e. an "F"). Three tardies in any course equals one unexcused absence.

Projects and Presentations
All projects and presentations come with a specified completion date and are due at the beginning of the specific class period. It is the student's responsibility to be aware of this date, and to complete the project and/or presentation on time. If a project cannot be completed by the deadline the student must contact the instructor for an approved extension *before* (minimum of 48 hours prior) the deadline. All late work, without prior approval, will result in zero (0%) credit. There will be no extra credit or make-up assignments for missed projects.

Electronic Policy
Students may use their laptops, tablets, or other electronic note taking devices to take notes as needed. Checking of texts, emails, messages, and other social media during class is prohibited and will result in the lowering of the student's participation grade for the day.

Academic Integrity:
The integrity of the classes by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. Students are expected to be familiar with and to adhere to the university's policies on academic conduct. http://www.bu.edu/academics/policies/academic-conduct-code/

Chosen Name and Gender Pronouns
All people have the right to be addressed and referred to in accordance with their personal identity. This course aims to be an inclusive learning community that supports students of all gender expressions and identities.

Figure 11-a continued

CFA TH535 – Special Topic
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Fall 2021

While class rosters are provided to instructors with students' legal names, please let me know if you would like to be addressed by a different name than that listed in the StudentLink. You are also invited to tell me early in the semester which set of pronouns you feel best fits your identity. If you have any questions or concerns, please do not hesitate to contact me. I will do my best to address and refer to all students accordingly and support classmates in doing so as well.

Office of Disability Services
I assume that all of us learn in different ways. If there are circumstances that may affect your performance in this class, please talk to me as soon as possible so that we can work together to develop strategies for accommodations that will satisfy both your learning needs and the requirements of the course. Whether or not you have a documented disability, BU provides many support services that are available to all students. For more information, visit: https://www.bu.edu/disability/

English Language Statement:
In this class, I welcome students from around the country and the world, and the unique perspectives that students bring to enrich our learning community. To support students whose primary language is not English, services are available on campus including language workshops and individual appointments. For more information, contact the Global Programs: Center for English Language & Orientation Programs at celop@bu.edu or (617) 353-6195. Reference: https://www.bu.edu/celop/

Diversity, Equity, Inclusion, and Access Statement:
At Boston University, "We strive to create environments for learning, working, and living that are enriched by racial, ethnic, and cultural diversity. We seek to cultivate an atmosphere of respect for individual differences in life experience, sexual orientation, and religious belief, and we aspire to be free of intellectual parochialism, barriers to access, and ethnocentrism." bu.edu/about/diversity

The CFA School of Theatre commits to inclusivity, dialogue, and collaboration. We vow to continue to translate these beliefs into action. We recognize our Student Body as future colleagues and artists working with us to make a better world and an art form that will predict the future rather than reflect the past. We embrace a notion of an artistic and intellectual community enriched and enhanced by diversity along a number of dimensions, including race, ethnicity and national origins, gender and gender identity, sexuality, socio-economic class, age, religion, and disability.

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit.

Figure 11-a continued

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It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups.

This course will adhere to the Boston University Policy on Religious Observance (Chapter 151C of the General Law in the Commonwealth of Massachusetts).
BU Reference: http://www.bu.edu/ctl/university-policies/policy-on-religious-observance/
State: https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXI/Chapter151C

Land Acknowledgements:
I acknowledge that we are on the traditional homelands of the Massachusett peoples. Learn more about this: A land acknowledgement is a "formal statement that recognizes the unique and enduring relationship that exists between Indigenous Peoples and their traditional territories." Reference: http://www.lspirg.org/knowtheland/

Mental Health and Wellness
As a student, you may experience a range of challenges that result in diminished mental health and wellness that can interfere with academic experiences and negatively impact your daily life, such as strained relationships, increased anxiety, problems with eating and/or sleeping, substance use, feeling down, difficulty concentrating and/or lack of motivation. We all experience stressful and difficult events as a normal part of life.

As your instructor, I am not qualified to serve as a counselor, but there are many helpful resources available on campus. If you experience mental health challenges while at Boston University, please contact **BU Student Health Services – Behavioral Medicine.** Clinicians are available 24 hours a day, 7 days a week by calling **617-353-3569** (this number is also on the back of your BUID). For more information visit: http://www.bu.edu/shs/behavioral-medicine. A list of additional resources is available under "Quick Links" on butheatrebridge.com.

If you need a safe, quiet place to make a phone call or to do research visit Brendan Hoey's or Ruthie Jean's office in the CFA Dean's Office (CFA 201). Remember that getting help is a smart and courageous thing to do – for yourself, for those you care about, and for those who care about you.

Title IX Statement
Title IX requires universities to respond promptly and effectively to complaints of all kinds of sexual misconduct, including sexual harassment and sexual violence. For information, resources, and contact info, visit: http://www.bu.edu/safety/sexual-misconduct/title-ix-bu-policies/

Figure 11-a continued

CFA TH535 – Special Topic
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Fall 2021

Course Schedule
This schedule is intended as a blueprint and is subject to change based on the needs of the class. Any changes will be announced in class and will be emailed the week prior.

	Date	Agenda	Due	Optional Reading
Week 1	Class 1	• Class Overview • Introduction to OSHA		Chpt. 2 - The Health & Safety Guide Chpt. 4 - Safety & Health for the Stage
	Class 2	• Ergonomics • Health within the industry		
Week 2	Class 3	• OSHA Safety and Health Programs • Risk Management (JHA) *Assign: Health and Safety Program Research*		Chpt. 3 & 7 - Safety & Health for the Stage
	Class 4	• Walking Working Surfaces		
Week 3	Class 5	No Class – Holiday/Extra for Schedule Padding		
	Class 6	• Fall Protection	*H & S Program*	
Week 4	Class 7	• Understanding Bloodborne Pathogens • Personal Protective Equipment (PPE)		Chpt. 3 & 7-10, The Health & Safety Guide
	Class 8	• Personal Protective Equipment (PPE) • HVAC and Dust Collection Systems		
Week 5	Class 9	• Hazardous Materials & Communications • Safety Data Sheets (SDS)		Chpt. 5, The Health & Safety Guide
	Class 10	• Safety Data Sheets (SDS) • In-Class Activity – SDS Game *Assign: HazCom Project*		
Week 6	Class 11	• Electrical Safety • Lock-Out/Tag-Out *Assign: Job Hazard Analysis*	*HazCom Project*	
	Class 12	• Machine Guarding / Industrial Tools • Shop Safety		
Week 7	Class 13	• Understanding Fire • Fire Prevention – Equipment and Plans • Begin NFPA. ADA, & Boston Fire Code		NFPA 101 – Chapter 7, 12, & 13
	Class 14	• Finish NFPA. ADA, & Boston Fire Code • Emergency Action Plans (EAP)	*Job Hazard Analysis*	
Week 8	Class 15	• In-Class Activity – Fire Extinguisher Training *Assign: Code Analysis*		
	Class 16	• Crowd Management *Assign: Final Project*		

Continued, Next Page →

Figure 11-a continued

CFA TH535 – Special Topic
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	Date	Agenda	Due	Optional Reading
Week 9	Class 17	• Crowd Management	*Code Analysis*	
	Class 18	• Theatre Tour for Final Project		
Week 10	Class 19	• Guest Speaker: FOH Crisis Intervention & De-Escalation		
	Class 20	• Unusual Safety Circumstances		
Week 11	Class 21	• Exam Review Day		
	Class 22	• Exam		
Week 12	Class 23	• Final Project Work Day		
	Class 24	• Present Final Projects	*Final Projects*	

Note: Moats, Ricky. *Revised Syllabus.* Theatre Health and Safety. Boston University. 2022.

Self-Reflection

This endeavor of researching, creating, and teaching a theatre health and safety course advanced my understanding of how individuals receive information through different teaching techniques and learning styles. It was interesting to see what topics had some students engaged, but seemed to bore others. By analyzing their engagement in real-time, this helped me be able to adapt to quick shifts in teaching techniques to better accommodate the students. Learning from these quick shifts will help support my future teaching endeavors and understand where I need to better support my presentation skills within a lecture that could have the potential to be a boring topic.

Separately from the course, I continued to help individuals outside of the classroom whenever they came to me personally with questions regarding theatre-related topics, or anything else that was connected to a production. It felt nice guiding their questions while being able to connect them to a past experience or case-study, which tied to the learning techniques I often used in the course; I was more engaged and naturally fell into offering learning experiences to others.

As the course was being created, through heavy volumes of research, many of the OSHA and other safety related subjects opened new avenues of information that I had not previously discovered in past courses that I had taken in preparation for creating the class. It was great having the ability to dive deep into sections that I never had the time to focus on in the past. This was especially notable when I was researching the intricate aspects of crowd management and crowd control. My knowledge and understanding of the multiple facets of OSHA and other safety related topics found in theatre had increased significantly since creating this course.

Additionally, in my past, I was often fearful; lacking the motivation or confidence that it took to sit in front of a group of people to discuss and present topics. I have always been a quiet

individual, so being able to stand in front of some of my peers gave me the ability to become a stronger and more confident public speaker through my teaching.

Overall, this opportunity was such a unique experience; being able to share such a topic to my peers, while helping them to expand their knowledge was a profound moment in my academic career. I am hoping to continue refining my skills as a teacher throughout my future; hopefully being able to teach this course once again soon.

Appendices

Appendix A: *Course Schedule in the Syllabus – First Pass*

CFA TH [Class and Section Number]
Theatre Health and Safety
Fall 2021

Course Schedule
This schedule is intended as a blueprint and is subject to change based on the needs of the class. Any changes will be announced in class and will be emailed the week prior.

Date	Agenda	Due	Optional Reading	29 CFR
Day 1	• Class Overview • Intro. to OSHA Part 1		Chpt. 2, The Health & Safety Guide Chpt. 4, Safety and Health for the Stage	1903 and 1910.1-1910.9
Day 2	• Intro. to OSHA Part 2 • Long Term Health in The Arts			Continued
Day 3	• Safety and Health Programs		Chpt. 3, Safety and Health for the Stage	
Day 4	• Personal Protective Equipment (PPE) • HVAC, Ventilation, & Respirators • In-Class Respirator Training		Chpt. 3 & 7-10, The Health & Safety Guide	1910.94-.98, and .132-.140
Day 5	• Hazardous Communications • Safety Data Sheets (SDS) In-Class Activity *(Graded)* *Assign: SDS Project*		Chpt. 5, The Health & Safety Guide	1910.101-.126, and .176-.184
Day 6	• Walking Working Surfaces • Present SDS Projects	*SDS Project*		1910.21-.30
Day 7	• Fall Protection			1910.140
Day 8	• Electrical Safety • Lock-Out/Tag-Out • Risk Management *Assign: Risk Management Analysis*		Chpt. 7, Safety and Health for the Stage	1904 and 1910.301-.335, .147
Day 9	• Exit Routes, Fire Protection, Fire Prevention Plans, Emergency Action Plans (EAP) - Part I • Intro to NFPA Codes • Intro to Boston Fire Code *Assign: Code Analysis*			1910.33-.39, and .155-.165
Day 10	• Exit Routes, Fire Protection, Fire Prevention Plans, Emergency Action Plans (EAP) - Part II • In-Class Fire Ext. Training** *Assign: Final Project*	*Risk Management Analysis*	In-class Handouts on NFPA	Continued
Day 11	• Exam Review • Theatrical Firearms	*Code Analysis*		
Day 12	• OSHA Exam			
Exam	• Present Final Projects	*Final Projects*		

**Class field trip to outdoor area

Appendix B: *Course Schedule in the Syllabus – Final Pass*

CFA TH535 – Special Topic
Theatre Health and Safety
Fall 2021

Course Schedule
This schedule is intended as a blueprint and is subject to change based on the needs of the class. Any changes will be announced in class and will be emailed the week prior.

Date	Agenda	Due	Optional Reading	29 CFR
Class 1 9/3/21	• Class Overview • Introduction to OSHA		Chpt. 2 - The Health & Safety Guide Chpt. 4 - Safety & Health for the Stage	1903 and 1910.1-1910.9
Class 2 9/10/21	• Ergonomics • Health within the industry			
Class 3 9/17/21	• OSHA Safety and Health Programs • Risk Management (JHA) *Assign: Health and Safety Program Research*		Chpt. 3 & 7 - Safety & Health for the Stage	
Class 4 9/24/21	• Walking Working Surfaces • Fall Protection			1910.21-.30 1910.140
Class 5 10/1/21	• Personal Protective Equipment (PPE) • Understanding Bloodborne Pathogens	*H & S Program*	Chpt. 3 & 7-10, The Health & Safety Guide	1910.94-.98, and .132-.140
Class 6 10/8/21	• Hazardous Materials & Communications • Safety Data Sheets (SDS) *In-Class Activity* *Assign: HazCom Project*		Chpt. 5, The Health & Safety Guide	1910.101-.126
Class 7 10/15/21	• Electrical Safety • Lock-Out/Tag-Out *Assign: Job Hazard Analysis*	*HazCom Project*		1910.301-.335, .147
Class 8 10/22/21	• Understanding Fire • Fire Prevention – Equipment and Plans • Begin NFPA. ADA, & Boston Fire Code		NFPA 101 – Chapter 7, 12, & 13	1910.33-.39, and .155-.165
Class 9 10/29/21	• Finish NFPA. ADA, & Boston Fire Code • Emergency Action Plans (EAP) *TBD In-Class Activity* *Assign: Code Analysis*	*Job Hazard Analysis*		Continued
Class 10 11/5/21	• Crowd Management			1910.38
Class 11 11/12/21	• Exam Review • Unusual Safety Circumstances *Assign: Final Project*	*Code Analysis*		
Class 12 11/19/21	• Exam			
Exam Period TBD	• Present Final Projects	*Final Projects*		

Appendix C: *OSHA Log 300 – How to Fill Out the Log*

U.S. Department of Labor
Occupational Safety and Health Administration

How to Fill Out the Log

Note: Because the forms in this recordkeeping package are "fillable/writable" PDF documents, you can type into the input form fields and then save your inputs using the free Adobe PDF Reader. In addition, the forms are programmed to auto-calculate as appropriate.

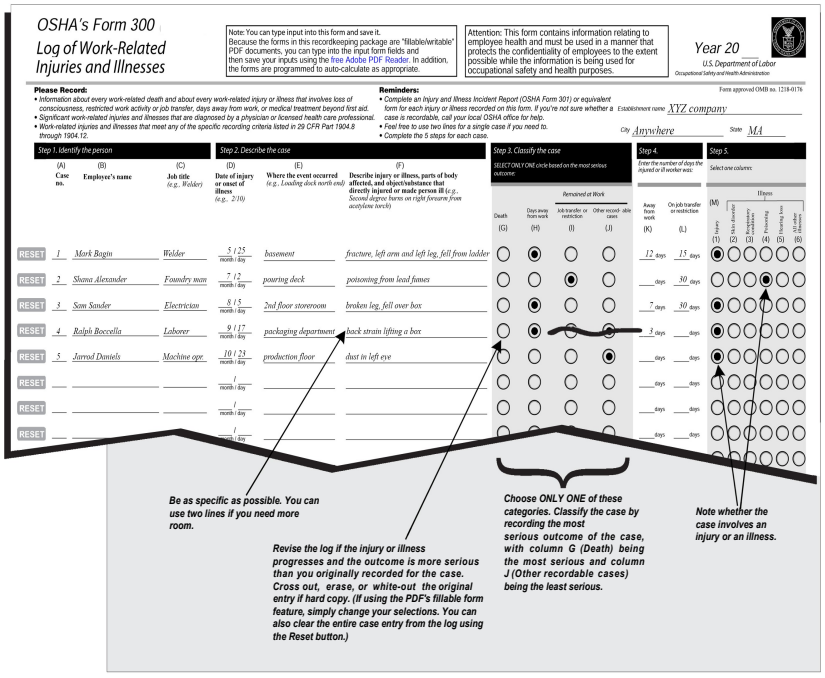
The *Log of Work-Related Injuries and Illnesses* is used to classify work-related injuries and illnesses and to note the extent and severity of each case. When an incident occurs, use the *Log* to record specific details about what happened and how it happened.

If your company has more than one establishment or site, you must keep separate records for each physical location that is expected to remain in operation for one year or longer.

If you need additional copies of the *Log*, you may photocopy the printout or insert additional form pages in the PDF, and then use as many as you need.

The *Summary* — a separate form — shows the work-related injury and illness totals for the year in each category. At the end of the year, count the number of incidents in each category and transfer the totals from the *Log* to the *Summary*. Then post the *Summary* in a visible location so that your employees are aware of injuries and illnesses occurring in their workplace.

You don't post the Log. You post only the Summary at the end of the year.



Appendix D: *OSHA Fact Sheet – Whistleblower*

Handout #2

OSHA FactSheet

Your Rights as a Whistleblower

You may file a complaint with OSHA if your employer retaliates against you by taking unfavorable personnel action because you engaged in protected activity relating to workplace safety and health, commercial motor carrier safety, pipeline safety, air carrier safety, nuclear safety, the environment, asbestos in schools, corporate fraud, SEC rules or regulations, railroad carrier safety or security, or public transportation agency safety or security.

Whistleblower Laws Enforced by OSHA

Each law requires that complaints be filed within a certain number of days after the alleged retaliation.

You may file complaints by telephone or in writing under the:

- Occupational Safety and Health Act (30 days)
- Surface Transportation Assistance Act (180 days)
- Asbestos Hazard Emergency Response Act (90 days)
- International Safe Container Act (60 days)
- Federal Rail Safety Act (180 days)
- National Transit Systems Security Act (180 days)

Under the following laws, complaints must be filed in writing:

- Clean Air Act (30 days)
- Comprehensive Environmental Response, Compensation and Liability Act (30 days)
- Energy Reorganization Act (180 days)
- Federal Water Pollution Control Act (30 days)
- Pipeline Safety Improvement Act (180 days)
- Safe Drinking Water Act (30 days)
- Sarbanes-Oxley Act (90 days)
- Solid Waste Disposal Act (30 days)
- Toxic Substances Control Act (30 days)
- Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (90 days)

Unfavorable Personnel Actions

Your employer may be found to have retaliated against you if your protected activity was a contributing or motivating factor in its decision to take unfavorable personnel action against you.
Such actions may include:

- Firing or laying off
- Blacklisting
- Demoting
- Denying overtime or promotion
- Disciplining
- Denying benefits
- Failing to hire or rehire
- Intimidation
- Reassignment affecting promotion prospects
- Reducing pay or hours

Filing a Complaint

If you believe that your employer retaliated against you because you exercised your legal rights as an employee, contact your local OSHA office as soon as possible, because you must file your complaint within the legal time limits. OSHA conducts an in-depth interview with each complainant to determine whether to conduct an investigation. For more information, call your closest OSHA Regional Office:

• Boston	(617) 565-9860
• New York	(212) 337-2378
• Philadelphia	(215) 861-4900
• Atlanta	(404) 562-2300
• Chicago	(312) 353-2220
• Dallas	(972) 850-4145
• Kansas City	(816) 283-8745
• Denver	(720) 264-6550
• San Francisco	(415) 625-2547
• Seattle	(206) 553-5930

Addresses, fax numbers and other contact information for these offices can be found on OSHA's website, www.osha.gov, and in local directories. Some complaints must be filed in writing and some may be filed verbally (call your local OSHA office for assistance). Written complaints may be filed by mail (we recommend certified mail), fax, or hand-delivered during business hours. The date postmarked, faxed or hand-delivered is considered the date filed.

If retaliation for protected activity relating to occupational safety and health issues takes place in a state that operates an OSHA-approved state plan, the complaint should be filed with the state agency, although persons in those states may file with Federal OSHA at the same time. Although the Occupational Safety and

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Health Act covers only private sector employees, state plans also cover state and local government employees. For details, see http://www.osha.gov/fso/osp/index.html.

How OSHA Determines Whether Retaliation Took Place

The investigation must reveal that:

- The employee engaged in protected activity;
- The employer knew about the protected activity;
- The employer took an adverse action; and
- The protected activity was the motivating factor (or under some laws, a contributing factor) in the decision to take the adverse action against the employee.

If the evidence supports the employee's allegation and a settlement cannot be reached, OSHA will issue an order requiring the employer to reinstate the employee, pay back wages, restore benefits, and other possible remedies to make the employee whole.

Limited Protections for Employees Who Refuse to Work

You have a limited right under the OSH Act to refuse to do a job because conditions are hazardous. You may do so under the OSH Act only when (1) you believe that you face death or serious injury (and the situation is so clearly hazardous that any reasonable person would believe the same thing); (2) you have tried to get your employer to correct the condition, and there is no other way to do the job safely; and (3) the situation is so urgent that you do not have time to eliminate the hazard through regulatory channels such as calling OSHA.

Regardless of the unsafe condition, you are not protected if you simply walk off the job. For details, see http://www.osha.gov/as/opa/worker/refuse.html. OSHA cannot enforce union contracts or state laws that give employees the right to refuse to work.

Whistleblower Protections in the Transportation Industry

Employees whose jobs directly affect commercial motor vehicle safety are protected from retaliation by their employers for refusing to violate or for reporting violations of Department of Transportation (DOT) motor carrier safety standards or regulations, or refusing to operate a vehicle because of such violations or because they have a reasonable apprehension of death or serious injury.

Similarly, employees of air carriers, their contractors or subcontractors who raise safety concerns or report violations of FAA rules and regulations are protected from retaliation, as are employees of owners and operators of pipelines, their contractors and subcontractors who report violations of pipeline safety rules and regulations. Employees involved in international shipping who report unsafe shipping containers are also protected. In addition, employees of railroad carriers or public transportation agencies, their contractors or subcontractors who report safety or security conditions or violations of federal rules and regulations relating to railroad or public transportation safety or security are protected from retaliation.

Whistleblower Protections for Voicing Environmental Concerns

A number of laws protect employees who report violations of environmental laws related to drinking water and water pollution, toxic substances, solid waste disposal, air quality and air pollution, asbestos in schools, and hazardous waste disposal sites. The Energy Reorganization Act protects employees who raise safety concerns in the nuclear power industry and in nuclear medicine.

Whistleblower Protections When Reporting Corporate Fraud

Employees who work for publicly traded companies or companies required to file certain reports with the Securities and Exchange Commission are protected from retaliation for reporting alleged mail, wire, or bank fraud; violations of rules or regulations of the SEC, or federal laws relating to fraud against shareholders.

More Information

To obtain more information on whistleblower laws, go to www.osha.gov, and click on the link for "Whistleblower Protection."

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For more complete information:

OSHA Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov (800) 321-OSHA

HANDOUT #3

Refusing to Work because Conditions are Dangerous

Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an imminent danger. "Good faith" means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did exist.

The United States Supreme Court, in the Whirlpool case, issued the landmark ruling which more clearly defined a worker's right to refuse work where an employee has reasonable apprehension that death or serious injury or illness might occur as a result of performing the work. **However, as a general rule, you do not have the right to walk off the job because of unsafe conditions.**

REFUSING WORK IS PROTECTED IF:

Your right to refuse to do a task is protected if **ALL** of the following conditions are met:

- ✓ Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; **and**
- ✓ You refused to work in "good faith." This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; **and**
- ✓ A reasonable person would agree that there is a real danger of death or serious injury; **and**
- ✓ There isn't enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.

CONDITIONS ARE MET, NEXT STEPS:

When all of these conditions are met, you take the following steps:

- ✓ Ask your employer to correct the hazard;
- ✓ Ask your employer for other work;
- ✓ Tell your employer that you won't perform the work unless and until the hazard is corrected; **and**
- ✓ Remain at the worksite until ordered to leave by your employer.

The table below offers a few "IF/THEN" scenarios to follow.

IF	THEN
You believe working conditions are unsafe or unhealthful.	Call your employer's attention to the problem.
Your employer does not correct the hazard or disagrees with you about the extent of the hazard.	You may file a complaint with OSHA.
Your employer discriminates against you for refusing to perform the dangerous work.	Contact OSHA immediately.

Source: http://www.osha.gov/as/opa/worker/refuse.html

Appendix E: *OSHA – Safety and Health Resources*

HANDOUT #5

Safety & Health Resources

Government Resources

OSHA: http://www.osha.gov/ Contact the OSHA Office nearest you or contact the toll free number: 1-800-321-OSHA (6742)

NIOSH: http://www.cdc.gov/niosh/ Phone NIOSH at 1-800-CDC-INFO (1-800-232-4636) or Email at: cdcinfo@cdc.gov

NIOSH is a part of the Centers for Disease Control and Prevention (http://www.cdc.gov/). CDC has extensive information on health and safety topics.

Universities

CORNELL UNIVERSITY School of Industrial and Labor Relations: http://www.ilr.cornell.edu/healthSafety/

LABOR OCCUPATIONAL HEALTH PROGRAM, University of California at Berkeley: http://www.lohp.org/

NATIONAL LABOR COLLEGE, George Meany Center: http://www.nlc.edu/

UCLA, Labor Occupational Safety and Health (UCLA-LOSH): http://www.losh.ucla.edu/

COSH GROUPS

COSH groups are private, non-profit coalitions of labor unions, health and technical professionals, and others interested in promoting and advocating for worker health and safety. *If you don't see a COSH group in your area, check the NATIONAL COSH website for local COSH groups.*

NATIONAL COUNCIL FOR OCCUPATIONAL SAFETY & HEALTH National COSH is a federation of local and statewide "COSH" groups: http://www.coshnetwork.org/

CACOSH – Chicago Area Committee on Occupational Safety and Health: http://www.cacosh.org/

MASSCOSH –Massachusetts Coalition on Occupational Safety and Health: http://www.masscosh.org/

NYCOSH – New York Committee for Occupational Safety and Health: http://www.nycosh.org/

PHILAPOSH – Philadelphia Area Project for Occupational Safety and Health: http://www.philaposh.org/ Prevention (http://www.cdc.gov/).

Unions

The following is a sample list of unions with links to useful health and safety information.
AFL-CIO: http://www.aflcio.org/Issues/Job-Safety

AFSCME: http://www.afscme.org/issues/73.cfm

eLCOSH – The Electronic Library of Construction Safety and Health is a collection of information on construction safety and health developed by CPWR – Center for Construction Research and Training, with funding by NIOSH: http://www.elcosh.org/

SEIU (Service Employees International Union) Health and Safety Department: http://www.seiu.org/a/members/safety-and-health.php

UAW Health and Safety Department**:** http://www.uaw.org/healthsafety

Appendix F: *OSHA – General Industry Complaint Scenarios*

HANDOUT #8a

General Industry Complaint Scenario

Use the following scenario to determine what information should be put on an OSHA complaint form. Is any additional information needed?

You have worked at Ben Brothers Woodworking for 8 years as a janitor. Ben Brothers is located at 88 Wren Street, Anytown, USA, 40001. The company makes and refinishes office furniture. You usually work the second shift, but come in early sometimes. You and at least 3 of your co-workers have been getting headaches when you are working in the warehouse and the propane-operated forklift is running. You have had headaches over the past two months, at least twice a week.

The forklift operator told you that there are a lot of problems with the forklift and it needs to be replaced. You reported your headaches to your supervisor. She told you to go outside until you felt better and that there was nothing more she could do. You did some research and found out that exposure to propane in a confined, unventilated area can cause headaches, dizziness, difficulty breathing and unconsciousness. There is no monitoring of the air in the warehouse. There is no union at the facility. You decide to file a complaint with OSHA.

NOTES:

Appendix G: *The New York Times – "Broadway Theatre Owner Cited by OSHA in Stagehand's Fatal Fall"*

The New York Times https://www.nytimes.com/2021/06/02/theater/death-winter-garden-theater-shubert-organization.html

Broadway Theater Owner Cited by OSHA in Stagehand's Fatal Fall

Federal regulators cited the Shubert Organization for four workplace safety violations in the death of an employee in the Winter Garden Theater.

By Sarah Bahr

June 2, 2021

Federal regulators have cited the Shubert Organization for four serious workplace safety violations and proposed a fine of $45,642 in connection with the death of an employee who fell from a ladder while working at the Winter Garden Theater last fall.

The citations, from the Occupational Safety and Health Administration, were issued on May 11, six months after Peter Wright, a 54-year-old stagehand, fell nearly 50 feet from a narrow, raised platform while performing routine maintenance in the theater.

OSHA issues these serious citations when, according to its review, lapses have led to hazards carrying a "substantial probability that death or serious physical harm could result." In the Shubert Organization's case, OSHA did not find that the violations were willful ones, in which an employer "intentionally and knowingly" violates the law.

The Shubert Organization has set up a meeting to discuss the citations and penalties, James C. Lally, a spokesman for the U.S. Department of Labor, said. If the two parties do not reach a settlement, the company can still contest the citations, Mr. Lally said. Otherwise, they will be obligated to pay the full amount.

A spokesman for the Shubert Organization declined a request for comment, citing the ongoing investigation.

The violations issued to the group, which is the largest landlord on Broadway, included having a wooden ladder coated with a material that could obscure structural defects and two instances of a ladder used for a purpose for which it was not designed.

Mr. Wright, who was from Milford, Conn., was a stagehand for Local 1 of the International Alliance of Theatrical Stage Employees, the labor union that represents professional stage employees in New York, for 34 years. He and his wife of 23 years, Marcie Lowy Wright, met when they were both working as stagehands for a 1990s "Grease" revival at the Eugene O'Neill Theater.

James J. Claffey Jr., the president of Local 1, wrote in a tribute in November that Mr. Wright "had a work ethic that was nothing short of exemplary, was extremely talented and skilled in his craft, and he was one of the finest riggers/flyman in our industry."

The last show to play at the Winter Garden Theater had been "Beetlejuice," which had been set to end its run on June 6, 2020, before the theater, like all on Broadway, shut on March 12 because of the pandemic; "Beetlejuice" was not slated to return.

A revival of "The Music Man" that will star Hugh Jackman and Sutton Foster is set to begin performances in December and open next February.

Bill Evans, a spokesman for the Shubert Organization, said at the time of Mr. Wright's death that most stagehands had not been working at the organization's other theaters during the pandemic shutdown.

"We mourn the loss of our valued colleague," he said in a statement. "Our heartfelt condolences go out to the family during this difficult time."

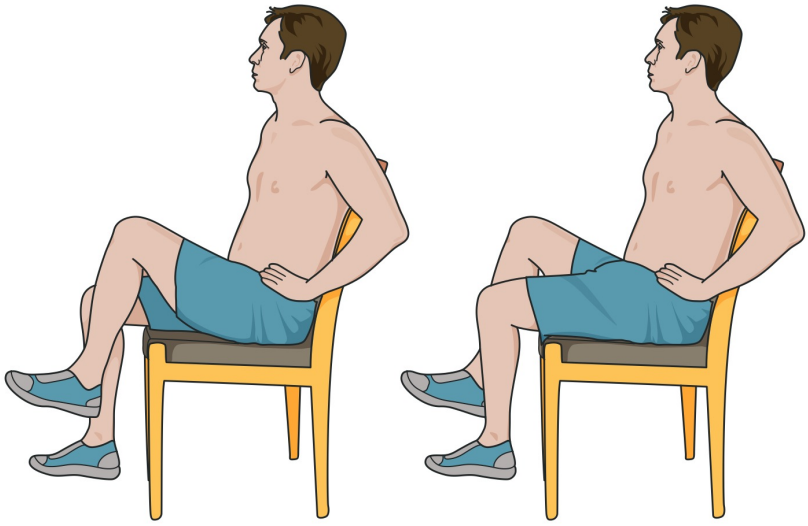
Dylan Foley, who was a friend and co-worker of Mr. Wright's, wrote in a Facebook tribute in November that Mr. Wright was "completely fearless in how he lived his life as a stagehand" and often did the work of three men.

"He had a dry wit, an unstoppable work ethic, and a trademarked grin," Mr. Foley wrote. "If you asked for something from Pete, his line was, 'For you, the grid's the limit.'"

Appendix H: *Back Talk, An Owner's Manual for Backs – Knee Raises*

3. Knee raises

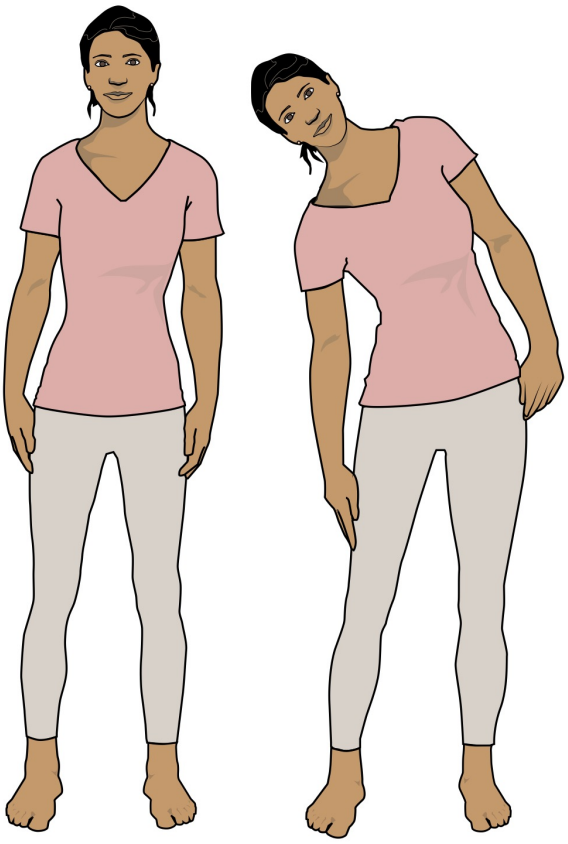
Sit upright on the edge of a chair with your back in a neutral posture, maintaining the curves of the spine. Tighten your abdominal muscles to brace your spine. Slowly raise one knee up and move your foot off the floor without moving the rest of your body or pushing down on your other foot. Hold for about five seconds before slowly returning your foot to the floor. Repeat the exercise using the opposite leg.



Appendix I: *Back Talk, An Owner's Manual for Backs – Side Bending*

5. Side bending

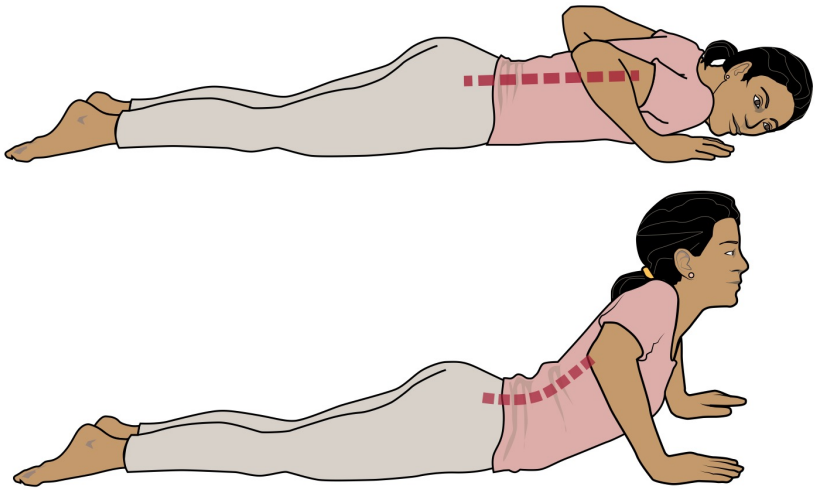
With your feet shoulder width apart, drop your head and shoulder while sliding your hand down your leg. Tighten your abdominal muscles and bend sideways slowly, as far as you can. Hold for five seconds and repeat on the other side. This is one repetition.



Appendix J: *Back Talk, An Owner's Manual for Backs – Trunk Extensions*

6. Trunk extension

Lie on your stomach. Push up with your arms. Keep your hands on the floor. Let your stomach relax and your back sag. Be careful not to bend back too far and don't over extend your neck. Hold for five seconds before returning to the starting position.



Appendix K: *Mental Health in the Workplace*

JULY 2018

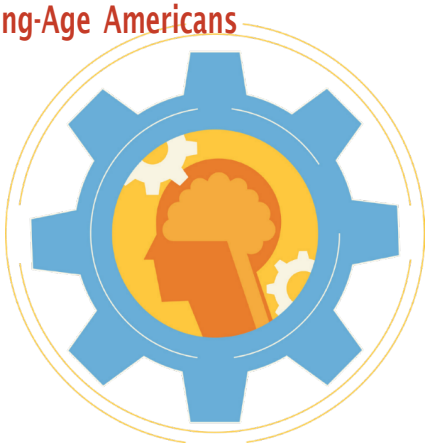
MENTAL HEALTH IN THE WORKPLACE

Mental Health Disorders and Stress Affect Working-Age Americans

Mental health disorders are among the most burdensome health concerns in the United States. Nearly 1 in 5 US adults aged 18 or older (18.3% or 44.7 million people) reported any mental illness in 2016.[2] In addition, 71% of adults reported at least one symptom of stress, such as a headache or feeling overwhelmed or anxious.[4]

Many people with mental health disorders also need care for other physical health conditions, including heart disease, diabetes, respiratory illness, and disorders that affect muscles, bones, and joints.[5–8] The costs for treating people with both mental health disorders and other physical conditions are 2 to 3 times higher than for those without co-occurring illnesses.[9] By combining medical and behavioral health care services, the United States could save $37.6 billion to $67.8 billion a year.[9]

About 63% of Americans are part of the US labor force.[10] The workplace can be a key location for activities designed to improve well-being among adults. Workplace wellness programs can identify those at risk and connect them to treatment and put in place supports to help people reduce and manage stress. By addressing mental health issues in the workplace, employers can reduce health care costs for their businesses and employees.



IN 2014, **$186 BILLION** Was Spent on Health Care Services to Treat Mental Health Disorders.[1]

44.7 MILLION Or 18.3% of US Adults 18 or Older Reported Any Mental Illness **IN 2016.**[2]

IN 2015, **8.8%** OF ADULTS Aged 18-64 Reported Visiting a Mental Health Provider in the Past 12 Months.[3]

National Center for Chronic Disease Prevention and Health Promotion
Division of Population Health

CDC

To learn more about workplace health, visit **www.cdc.gov/WHRC**.

1

PROBLEM

Mental Health Issues Affect Businesses and Their Employees

Poor mental health and stress can negatively affect employee:

- Job performance and productivity.
- Engagement with one's work.
- Communication with coworkers.
- Physical capability and daily functioning.

Mental illnesses such as depression are associated with higher rates of disability and unemployment.

- Depression interferes with a person's ability to complete physical job tasks about 20% of the time and reduces cognitive performance about 35% of the time.[11]
- Only 57% of employees who report moderate depression and 40% of those who report severe depression receive treatment to control depression symptoms.[12]

Even after taking other health risks—like smoking and obesity—into account, employees at high risk of depression had the highest health care costs during the 3 years after an initial health risk assessment.[13,14]

Get the resources you need to start your own workplace health promotion program at **www.cdc.gov/WHRC**. 2

SOLUTION

Employers Can PROMOTE Awareness About the Importance of Mental Health and Stress Management

Workplace health promotion programs have proven to be successful, especially when they combine mental and physical health interventions.

The workplace is an optimal setting to create a culture of health because:

- Communication structures are already in place.
- Programs and policies come from one central team.
- Social support networks are available.
- Employers can offer incentives to reinforce healthy behaviors.
- Employers can use data to track progress and measure the effects.

Action steps employers can take include:

- Make mental health self-assessment tools available to all employees.
- Offer free or subsidized clinical screenings for depression from a qualified mental health professional, followed by directed feedback and clinical referral when appropriate.
- Offer health insurance with no or low out-of-pocket costs for depression medications and mental health counseling.
- Provide free or subsidized lifestyle coaching, counseling, or self-management programs.
- Distribute materials, such as brochures, fliers, and videos, to all employees about the signs and symptoms of poor mental health and opportunities for treatment.
- Host seminars or workshops that address depression and stress management techniques, like mindfulness, breathing exercises, and meditation, to help employees reduce anxiety and stress and improve focus and motivation.
- Create and maintain dedicated, quiet spaces for relaxation activities.
- Provide managers with training to help them recognize the signs and symptoms of stress and depression in team members and encourage them to seek help from qualified mental health professionals.
- Give employees opportunities to participate in decisions about issues that affect job stress.

EMOTIONAL HEALTH

To get started today, visit the CDC Workplace Health Resource Center at **www.cdc.gov/WHRC**.

3

SUCCESS STORIES

Many Businesses PROVIDE Employees With Resources to Improve Mental Health and Stress Management

Prudential Financial[15]

- Monitors the effect of supervisors on worker well-being, especially when supervisors change.
- Conducts ongoing, anonymous surveys to learn about attitudes toward managers, senior executives, and the company as a whole.
- Normalizes discussion of mental health by having senior leadership share personal stories in video messages.

TiER1 Performance Solutions[16]

- Focuses on 6 key health issues: depression, anxiety, obsessive-compulsive disorder, schizophrenia, bipolar disorder, and addictions as part of its Start the Conversation about Mental Illness awareness campaign.
- Provides resources to assess risk, find information, and get help or support using multiple formats to increase visibility and engagement. For example, information is provided as infographics, e-mails, weekly table tents with reflections and challenges, and videos (educational and storytelling).

Beehive PR[17]

- Maintains the "InZone," a dedicated quiet room that is not connected to a wireless internet signal, which gives employees a place to recharge.
- Combines professional and personal growth opportunities through goal-setting, one-on-one coaching, development sessions, and biannual retreats.

Tripler Army Medical Center[18]

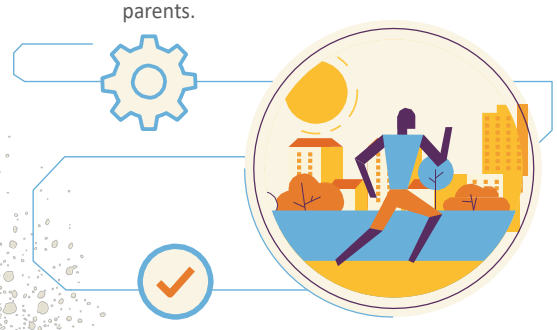
- Requires resiliency training to reduce burnout and increase skills in empathy and compassion for staff members who are in caregiver roles. Training sessions mix classroom-style lectures, role-playing, yoga, and improvisational comedy to touch on multiple learning styles.

Certified Angus Beef[19]

- Provides free wellness consultations by an on-site clinical psychologist. Employees do not have to take leave to access these services.
- Holds lunchtime learning sessions to reduce stigma about mental health and the services available to employees.
- Offers quarterly guided imagery relaxation sessions to teach stress management strategies.

Houston Texans[20]

- Provides comprehensive and integrated physical, mental, and behavioral health insurance coverage, including round-the-clock access to employee assistance program (EAP) services.
- Extends EAP access to anyone living in an employee's home, with dedicated programming for those who are caring for children or elderly parents.



Get the resources you need to start your own workplace health promotion program at **www.cdc.gov/WHRC**. 4

What Can Be Done

Strategies for Managing Mental Health and Stress in the Workplace

Health care providers can:

- Ask patients about any depression or anxiety and recommend screenings, treatment, and services as appropriate.
- Include clinical psychologists, social workers, physical and occupational therapists, and other allied health professionals as part of core treatment teams to provide comprehensive, holistic care.

Public health researchers can:

- Develop a "how-to" guide to help in the design, implementation, and evaluation of workplace health programs that address mental health and stress issues.
- Create a mental health scorecard that employers can use to assess their workplace environment and identify areas for intervention.
- Develop a recognition program that rewards employers who demonstrate evidence-based improvements in metrics of mental health and well-being and measurable business results.
- Establish training programs in partnership with business schools to teach leaders how to build and sustain a mentally healthy workforce.

Community leaders and businesses can:

- Promote mental health and stress management educational programs to working adults through public health departments, parks and recreational agencies, and community centers.
- Support community programs that indirectly reduce risks, for example, by increasing access to affordable housing, opportunities for physical activity (like sidewalks and trails), tools to promote financial well-being, and safe and tobacco-free neighborhoods.
- Create a system that employees, employers, and health care providers can use to find community-based programs (for example, at churches and community centers) that address mental health and stress management.

Get the resources you need to start your own workplace health promotion program at **www.cdc.gov/WHRC**. 5

What Can Be Done

Federal and state governments can:

- Provide tool kits and materials for organizations and employers delivering mental health and stress management education.
- Provide courses, guidance, and decision-making tools to help people manage their mental health and well-being.
- Collect data on workers' well-being and conduct prevention and biomedical research to guide ongoing public health innovations.
- Promote strategies designed to reach people in underserved communities, such as the use of community health workers to help patients access mental health and substance abuse prevention services from local community groups (for example, churches and community centers).

Employees can:

- Encourage employers to offer mental health and stress management education and programs that meet their needs and interests, if they are not already in place.
- Participate in employer-sponsored programs and activities to learn skills and get the support they need to improve their mental health.
- Serve as dedicated wellness champions and participate in trainings on topics such as financial planning and how to manage unacceptable behaviors and attitudes in the workplace as a way to help others, when appropriate.
- Share personal experiences with others to help reduce stigma, when appropriate.
- Be open-minded about the experiences and feelings of colleagues. Respond with empathy, offer peer support, and encourage others to seek help.
- Adopt behaviors that promote stress management and mental health.
- Eat healthy, well-balanced meals, exercise regularly, and get 7 to 8 hours of sleep a night.
- Take part in activities that promote stress management and relaxation, such as yoga, meditation, mindfulness, or tai chi.
- Build and nurture real-life, face-to-face social connections.
- Take the time to reflect on positive experiences and express happiness and gratitude.
- Set and work toward personal, wellness, and work-related goals and ask for help when it is needed.

CDC's **Workplace Health Resource Center (WHRC)** is a one-stop shop for organizations of all sizes to find credible tools, guides, case studies, and other resources to design, develop, use, evaluate, and sustain workplace health programs.

Get the resources you need to start your own workplace health promotion program at **www.cdc.gov/WHRC**. 6

Appendix L: *Sample Hazard Identification and Risk Assessment*

HAZARDS

The first step in assessing risk is to identify the hazards. The process to identify hazards must consider the reasonably foreseeable hazards or situations related to the process being assessed that may cause harm to a worker. Hazards may originate from any of the following hazard categories, or any combination of thereof:

- Chemical – Conditions that can lead to contamination by harmful or potentially harmful substances. Examples include toxic gases, noxious fumes, corrosive liquids or powders, etc.
- Biological – Conditions where living organisms can pose a threat to human health. Examples include syringes carrying potentially infected blood, specimen containers with potentially infected materials, viruses spread by HVAC systems, etc.
- Physical – Conditions in which objects, materials, or structures can cause material or bodily harm. Examples include objects or substances that are explosive, noisy, conduct electricity (shock), or hazardous environments involving extreme hot or cold, radiation, slippery surfaces, low ceilings, etc.
- Biomechanical – Conditions that cause biomechanical (body and movement) stress on workers. Examples include workbench height, chair design, workstation set-up, etc.
- Psychosocial – Conditions that can affect the thoughts, behaviour, and mental well-being of workers. Examples include stress from using equipment without proper training or instruction, or from being coerced into using defective tools or materials; burnout or depression from constant exposure to high-stress situations, etc.

Once hazards have been identified, the preferred means of control is to eliminate the hazard. Only once hazards have been identified can action be taken to eliminate them. For hazards identified as part of a risk assessment, it is assumed that the hazards (or a combination of hazards, interaction with other hazards, etc.) will cause harm if control measures are not implemented to eliminate or otherwise control the hazard. When a hazard cannot be immediately eliminated, interim controls shall be implemented until the risk assessment is complete and permanent controls implemented.

RISK ASSESSMENT

There are varying levels of risk assessment, from preliminary to detailed. People conduct risk assessments every day, even though they may not be consciously aware of doing so (e.g. pedestrians crossing the street).

Before beginning a risk assessment, the supervisor must establish the proper context, including:

- Scope – the extent or lifecycle of the thing, process, or operation, including the physical work area and the types of hazards assessed
- Parameters – the scales used to assess the process, such as:
    - Frequency of occurrence (e.g. rare/unlikely/possible/likely/certain)
    - Severity of occurrence (e.g. insignificant/minor/moderate/major/catastrophic)
- Stakeholders – those involved in the risk assessment, including those who are internal and external to the process.

- Risk criteria – a definition of the situations that require further risk reduction to improve worker protection. The criteria must be derived from applicable legislation and include input from the relevant stakeholders.

Whether as part of a structured program or conducted informally, a risk assessment will follow a process, namely:

- Identification of hazard(s);
- Elimination of hazard(s);
- Analysis of risks of the remaining hazard(s);
- Evaluation of risks of the remaining hazard(s).

Hazard Identification

The core element of the risk assessment process is the identification of things or processes that can cause harm. The identification of hazards must consider reasonably foreseeable hazards that have the potential to cause harm to a worker. This includes all aspects of operations, including the physical components of equipment, the surrounding environment, foreseeable human factors (including misuse), cognitive limitations on the use of equipment or execution of the process, and all relevant phases of the process and/or operation. Sources of hazards may originate from any of the hazard categories listed above.

When identifying hazards, the assessor (i.e., the supervisor) must account for how a particular hazard may potentially harm a worker. For example, some of the factors that affect the degree of hazard are:

- Amount (e.g. volume, concentration, intensity, etc.) of the hazard that can cause harm
- Route of entry (e.g. inhalation, absorption, ingestion, injection)
- Frequency and duration of exposure
- Manner of interaction

The supervisor may also identify hazards by combing through existing records (such as past incident reports), interviewing or observing employees, collecting workplace samples (e.g. direct, air, etc.), and other scientific data (e.g. safety data sheets).

The supervisor must also consider the potential combination of hazards and how they might interact and affect each other, which may create an entirely different hazard (e.g. A + B = C rather than A + B =AB).

The Office of Risk Management can provide supervisors with additional hazard criteria listed in Annex B of *CSA Z1002-12 – Occupational Health and Safety – Hazard Identification and Elimination and Risk Assessment and Control*.

Hazard Elimination

For the purposes of a risk assessment, a supervisor assumes that when the hazard, or combination of hazards, is present, harm to a worker will occur if measures are not taken to eliminate or further control the hazard(s). While the supervisor should strive to eliminate hazards to provide the greatest level of protection from harm, this is not always possible or reasonable; therefore, hazard controls should follow a hierarchy until risk is reduced to an acceptable level.

The level of acceptable risk is determined by analysing, then evaluating, risks. From this evaluation, the supervisor can identify and then apply the appropriate controls to mitigate the hazard. Figure 1 depicts the hierarchy of hazard controls. Note that although hazard elimination is ideal, it may not be feasible; a lower level of control may be acceptable given the nature of the work and risk involved.

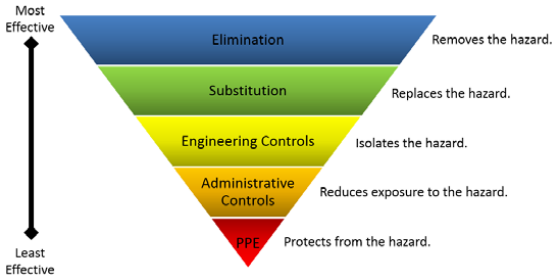


Figure 1 - Hierarchy of Hazard Control

Risk analysis

Risk analysis is the process of developing an understanding of the risk that helps to improve and focus the evaluation of the risk. The supervisor will probably identify multiple hazards; therefore, the risk of harm should be prioritized, namely by identifying the risks that have the greatest potential for harm, that are likely to occur most frequently, etc. The supervisor should always prioritize action on situations involving dangerous circumstances, with work suspended until interim (or permanent) controls can be implemented.

The risk analysis should include:

- a description of the hazard or the hazardous situation;
- the methods of interaction, including the circumstances under which interaction with the hazard can occur. The supervisor can determine this by reviewing anticipated worker tasks, procedures, incident history, conducting observation tours, consulting with operators and other workers, etc.;
- the frequency and conditions of exposure to the hazard;
- the duration of exposure to the hazard; and
- the severity of a potential exposure.

Use the following scales to quantify frequency and severity, and thus reduce the subjective nature of the estimate.

Frequency	Value	Descriptor
Almost certain	5	Anticipated to occur *often* during entire project.
Likely	4	Anticipated to occur *several times* during entire project.
Possible	3	Reasonably anticipated to occur *at some time* during entire project.
Unlikely	2	Not anticipated to occur during entire project but *possible.*
Rare	1	*Not anticipated* during entire project.

Severity	Value	Descriptor

Severity	Value	Descriptor
Catastrophic	5	Results in death, total loss or shutdown of system, significant release into the environment affecting the public or regulatory intervention.
Major	4	Results in permanent impairment, serious lost-time injury, loss or shutdown of part of system, large on-site release into environment.
Moderate	3	Short-term lost-time injury, short-term interruption in use of system, recoverable release into environment.
Minor	2	Minor injury, minor damage to system, minor confined release into the environment.
Insignificant	1	Very minor injury, with consequence less serious than **Minor.**

Risk level is assessed as frequency x severity; therefore, if a risk is ***likely (4)*** to occur and would result in ***major (4)*** consequences, that would yield a **risk level of 16**. The risk matrix below places this on the high end of the risk scale, meaning that further risk control is probably required. The greater the risk level, the greater the attention required to address the issue.

		Frequency				
		Rare (1)	**Unlikely (2)**	**Possible (3)**	**Likely (4)**	**Certain (5)**
Severity	**Insignificant (1)**	**1**	**2**	**3**	**4**	**5**
	Minor (2)	**2**	**4**	**6**	**8**	**10**
	Moderate (3)	**3**	**6**	**9**	**12**	**15**
	Major (4)	**4**	**8**	**12**	**16**	**20**
	Catastrophic (5)	**5**	**10**	**15**	**20**	**25**

Table 1 - Risk Matrix

Risk Evaluation

Once risks have been analyzed and estimated, the supervisor can conduct a risk evaluation. The risk evaluation aims to formalize decisions about whether a particular work activity should be conducted, which risks needs to be further controlled, and the priority for addressing risks. The treatment of risks may fit into one of four categories:

- Avoidance – taking action to exit (or avoid) the activity that gives rise to the risk(s).
- Reduction – reducing the risk probability, consequence, or both.
- Transfer – reducing risk probability or consequence by transferring or sharing a portion of the risk.
- Acceptance – taking no action to affect probability or consequence.

Risk Control

Risk control actions follow a hierarchy, with the **elimination** of the hazard to the reasonable extent possible being the most preferred. If the hazard does not exist, it cannot cause harm. Where the removal of the hazard is not possible, **substitution** of the hazard with a less-hazardous alternative is the next best option.

Although eliminating the hazard is desirable, it is understood that work may need to involve hazardous materials or hazardous conditions; therefore, hazard elimination and substitution are not always feasible or realistic. Nonetheless, hazard controls still follow a hierarchy (see Figure 1).

Engineering controls, or controls implemented at the source of the hazard, are the next most desirable and are typically the next most effective, as they usually do not require further intervention by the end user; the control exists indefinitely. Some examples of engineering controls include lockout devices, dual operation controls, fume hoods, etc.

If the implementation of engineering controls is not feasible or practical, the next-most-desirable control measures are **administrative controls**. In other words, the way the work is conducted is augmented or modified to reduce the extent of the hazard or exposure to it. Some examples of administrative controls include reducing the time that a worker is exposed to the hazard, changing the work practices, training programs, etc.

If none of the above hazard control options can be implemented, **personal protective equipment** (PPE) is a reasonable hazard control option. Remember that PPE does not actually remove or reduce the hazard – it only protects against the hazard for those individuals wearing properly selected and fitted PPE. As a result, PPE is the least-desired control method, although it can still be effective. Some examples of personal protective equipment are hearing protection, protective eyewear, fall arrest harnesses, respiratory protection, and protective footwear. Figure 1 illustrates the hierarchy of hazard control.

A combination of hazard control measures may be required to achieve a reasonable level of worker protection. For example, a worker conducting work inside a fume hood may also be required to wear respiratory protection due to the acute toxicity of a certain hazardous substance. Regardless of the hazard control measure proposed, it must be reasonable: that is, the recommendations are not excessive or do not address every single potential, tangential situation.

It should be noted that hazard controls have the potential to fail – even under properly designed and implemented processes – or may even introduce new hazards. If the hazard control fails, it will be less effective in reducing the frequency and/or severity of harm. When selecting risk controls, the failure or deterioration of hazard controls must be considered along with the possibility that the failure may introduce new hazards. Supervisors must regularly assess the effectiveness of hazard controls to ensure that they remain effective.

TOOLS

Supervisors have tools at their disposal to help them identify hazards and assess risks.

Job Safety Analysis (JSA)

A job safety analysis is a process that reviews job methods and uncovers hazards that may have been overlooked in the design and layout of a facility or building, and in the design of the machinery, equipment, tools, workstations, and processes. Additionally, hazards may have been created or developed after production, occupancy, or may have resulted and evolved from changes in work practices or personnel.[1] The major benefit of the JSA comes once it is complete: it clearly outlines the hazards and control measures of the activity.

The JSA provides supervisors with an opportunity to review work practices and the individual tasks conducted by those they supervise. Workers are encouraged to participate in the JSA process. For new personnel, there is no better guide for training than a well-prepared JSA.

1 Accident Prevention Manual for Business and Industry – Administration and Programs. National Safety Council; pp. 207

A JSA involves the following steps:

- **Selecting the job.** Activities selected for a JSA are typically broad and encompass a multitude of steps or sequences that come together as part of a larger goal. Narrowly defined tasks are generally not suitable for a JSA. The job(s) selected should be those with potential for injury – either documented or speculative. Examples of factors to guide job selection include those that feature injury frequency (including no-lost time occurrences), potential incident severity, new processes, etc.
- **Breaking the job down into steps.** Once the job is selected, the job is broken down into a sequence of steps required to accomplish the goal. Each step describes the work done and is most often reviewed by an experienced and competent worker. The focus at this stage should be on what is done, not how it is done.
- **Identifying hazards and potential incident causes**. After listing the activity sequence, the supervisor identifies hazards, including those directly related to the work and those related to the environment. The common question that should be asked at this stage is "can an injury occur"? If there is a hazard, the hazard category (e.g. contact with XYZ, exposure to ABC, etc.) should be documented. Once completed, the supervisor should revisit the hazards with the worker who was observed, as well as other personnel performing or familiar with the task, to ensure an accurate recording of the task.
- **Developing solutions and implementing corrective actions**. The last step of a JSA is to develop hazard control measures to eliminate or mitigate the hazards. Examples of controls may include physical barriers, a new way to perform the job, changing the conditions that created the hazard, reducing frequency or exposure to the hazard, providing protective equipment, etc. Each corrective action may introduce other, unintentional hazards that require their own controls, which is why the process must be reviewed regularly to ensure that control measures are suitable and reasonable.

Appendix 1 provides a sample JSA form.

Project Risk Assessment (PRA)

Much like operational work, a research project involves inherent risks. The project may be the first of its kind, may involve new components or steps, or may be upscaled or down-scaled. The intent of the project risk assessment is similar to that of a job safety analysis; however, instead of focussing on the job or task, the PRA focusses on the steps and expected outcomes of the specific project. Like a JSA, the supervisor identifies the hazards at each step of the project, assesses the risks, and implements controls.

Appendix 2 provides a sample PRA form.

Pre-Start Health and Safety Review (PSR)

A pre-start health and safety review is an in-depth examination of an apparatus, structure, protective element, or process identified in the table of Section 7 of *Regulation 851 – Industrial Establishments*. The PSR is undertaken to identify any existing or potential non-compliance with the applicable provisions of the regulation. PSRs apply to specific circumstances (i.e. those workplaces defined as *factories*) and ensure a timely, professional review that identifies specific hazards and ensures that such hazards are removed or controlled before the apparatus or process is started.

PSRs are generally conducted by professional engineers, who produce formal reports outlining all areas of non-compliance. The report will include the measures necessary to achieve compliance.

The University of Ottawa is not a factory; however, in certain circumstances, it may prove beneficial to have an apparatus, structure, protective element or process undergo a pre-start health and safety review as a matter of due diligence.

You can find additional information on pre-start health and safety reviews in the Ministry of Labour Guidelines for Pre-Start Health and Safety Reviews and from the Office of Risk Management.

RESOURCES

Additional information is available from the following resources:

- *CSA Z1002-12 – Occupational Health and Safety – Hazard Identification and Elimination and Risk Assessment and Control* (available from the Office of Risk Management).
- *CSA 31000-10 – Risk Management – Principles and Guidelines* (available from the Office of Risk Management).

Appendix M: *Boston Globe – Rusted Staircase Fatal Incident*

Rusted staircase removed near JFK/UMass Red Line station where BU professor died

By John R. Ellement Globe Staff, Updated September 20, 2021, 19 minutes ago

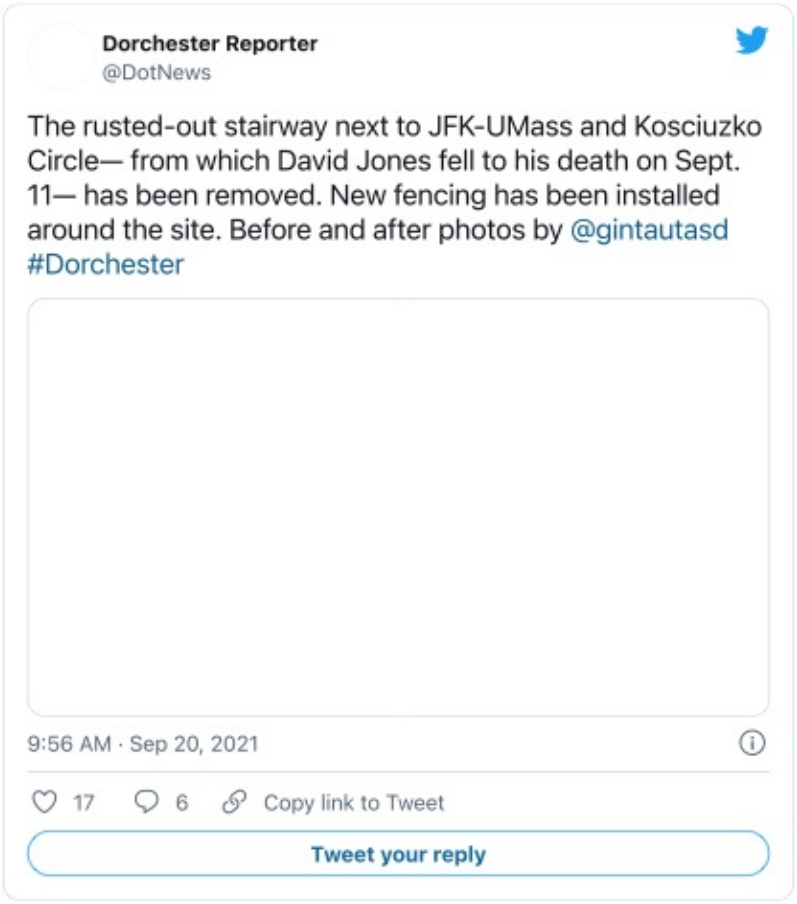
The rusted staircase with missing steps where Boston University Professor David K. Jones fell to his death on Sept. 11 has been removed. The former base is at left, and the former connection to Columbia Road is above, center. The staircase was located near the MBTA' s JFK/UMass Red Line station and connected to the Columbia Road rotary as it passes over Old Colony Avenue some 20 feet below. SUZANNE KREITER/GLOBE STAFF

The rusted staircase with missing steps where Boston University professor David Jones fell to his death on Sept. 11 has been removed.

Continued - Boston Globe – Rusted Staircase Fatal Incident

The staircase was located near the MBTA's JFK/UMass Red Line station and connected to the Columbia Road rotary as it passes over Old Colony Avenue some 20 feet below.

The removal, which apparently was conducted over the weekend, was first reported by the Dorchester Reporter.



While it was left in place after being closed to the public in January 2020, officials had a concrete barrier positioned on the Columbia Road rotary and metal fencing on Old Colony Avenue to block pedestrian access, according to Baker administration officials.

A section of six steps fell out of the closed staircase. Jones was found about 1:30 p.m.

Continued - Boston Globe – Rusted Staircase Fatal Incident

Sept. 11 under the staircase, and apparently died from injuries suffered during the fall, authorities said.

The circumstances of his death remain under investigation by Suffolk District Attorney Rachael Rollins's office and State Police.

Governor Charlie Baker and administration officials at MassDOT, the MBTA, and the Department of Conservation and Recreation have refused to identify which state agency was responsible for maintaining the staircase after its closure to protect the public.

Baker did address the removal of the stairs on Monday following a meeting with legislative leaders.

"The stairs were taken down by the Commonwealth," Baker told reporters Monday afternoon. The DOT did the work, but "under our jurisdiction," he added. "We felt it was important to take them down."

A wake for Jones was held Sunday in Milton.

Appendix N: *Theatre Safety Blog – Fall from Catwalk Kills Lighting Technician*

Theatre Safety Blog

A discussion of safety in the Performing Arts for professionals, students, teachers, and administrators. A sometimes terrifying look at some surprising conditions, what you might do about them; and how to plan for better safety in your facility, teaching program, and career.

Monday, December 7, 2009

Fall From Catwalk Kills Lighting Technician

WEST PALM BEACH, Florida — A lighting technician, Fenton "Andy" Hollingsworth, was killed Thursday, December 3rd after falling from a 30-foot-high catwalk. The incident occurred at the 300-seat Marshall E. Rinker, Sr. Playhouse, part of the Raymond F. Kravis Center for the Performing Arts.

Police and fire officials say that about 2 p.m., Hollingsworth, 27, slipped as he stood on the catwalk, installing lights on a truss.

Co-workers heard and saw him fall, Police Lt. Tom Hale said.

"He was not breathing when we arrived," police said spokesman Chase Scott.

Andy Hollingsworth was taken to St. Mary's Medical Center, where he died.

Both the Kravis Center and the Occupational Safety and Health Administration are investigating the incident.

The 16 catwalks in the Rinker's light truss are each eight feet long by 20 inches wide and there are several railings. A facility technical plan can be found at: http://cache.trustedpartner.com/docs/library/000285/RinkerTech%20Spec%20Oct%201%202009.pdf

Hollingsworth had worked for the center since April 10, 2007. Shannon McShane Hollingsworth said she did worry about her husband's safety.

"He always promised, and told me, he was always careful. We always made sure he had new shoes with new rubber soles" she told reporters. It was unknown if he was wearing any fall protection equipment when he lost his footing and fell.

"We're vigorously investigating the cause of the accident," Kravis Center Chief Executive Judy Mitchell said. "As always, we're very concerned about the safety of

Continued - Theatre Safety Blog – Fall from Catwalk Kills Lighting Technician

our employees. Andy was a wonderful young man and a valued employee who will be greatly missed by the entire family of the Kravis Center."

Posted by Erich Friend at 4:49 PM

Labels: Accident, Catwalk, Fall Protection, hazard recognition, OSHA, Shock Absorption Lanyard, Theatre Safety Program

2 comments:

Anonymous December 26, 2009 at 9:16 PM

This accident should never had happened. It is the responsibility of the employer to provide fall protection equipment anytime employees are working in a hazardous area. Stagehands in San Francisco are routinely trained on the use of fall protection equpiment and rescue. We're also told never to put our lives in danger if an employer fails to provide fall protection equipment. We have that ability because stagehands in San Francisco are members of a union that will back us up if we decide that the work we're told to do is too dangerous. In this case, Andy didn't have anyone looking after him. He had an employer who failed to provide commonly used fall protection equipment as is required by federal law, and he didn't have a union that insisted on keeping a safe work environment. No show is worth the price Andy and his family paid. If the Kravis CFA was really concerned with Andy's safety, they would've provided a safety harness attached to a lifeline- a standard theatrical practice when electricians are climbing over box truss. It's easy for them to claim they cared about his safety after he falls. I hope that the Kravis CFA will pay dearly to Andy's family for this needless loss of fellow stagehand.

Reply

Anonymous September 11, 2014 at 4:11 PM

The Kravis Center did not have to pay dearly, really nothing more than the $3500.00 OSHA fine. The family has been trying to endow a scholarship fund in his name, and nearly 5 years later still has not been able to. Campaigns have been set up however,
http://thefentonfoundation.wix.com/info
and
http://www.gofundme.com/RememberFenton

Reply

by you or your co-workers must be continually examined to see if there is a better practice, procedure, or equipment to get the job done. Actions have consiquences. *So do inactions.*

You can't teach safety in a few of hours once a year. You have to continually discuss safety topics to keep them in the forefront of people's minds. The theatre is a dangerous place that is a mix of many different job descriptions, so rules and laws have to be researched and understood from many different sources. When you are loading a truck, you need to be a materials handling specialist, when you are flying scenery, you need to be a rigger, and when you are in the scene shop, you are on a construction site. Different skills sets and tools are required for each.

"Play Safe"
Not "Play at your own risk"

Blog Archive

- 2017 (3)
- 2016 (1)
- 2015 (19)
- 2014 (2)
- 2013 (58)
- 2012 (83)
- 2011 (61)
- 2010 (82)
- 2009 (66)

Appendix O: *SDS In-Class Activity – Redacted SDS sheet given to student groups (Goo Gone)*

SAFETY DATA SHEET

Confirms to OSHA Hazard Communication Standard (CFR 29 1910.1200) HazCom 2012

Product: **Revision Date:** 29-Jul-2019

SECTION 1 – IDENTIFICATION

Product Identifier
Product Name:

Product Code:

Recommended Use of the Chemical and Restrictions for Use
Recommended Use: Cleaner

Restrictions for Use: Use only as directed.

Details of the Supplier
Manufacturer:

Emergency Phone Number
24-Hour Number:

International:

SECTION 2 – HAZARDS IDENTIFICATION

Classification

Hazard Class	Category
Flammable Liquid	4
Skin Sensitization	1
Aspiration Hazard	1

Label Elements

Hazard Symbols(s):

Signal Word(s): Danger

Hazard Statement(s): Combustible liquid. May cause an allergic skin reaction. May be fatal if swallowed and enters airways.

Precautionary Statement(s): Keep away from flames and hot surfaces. No smoking. Avoid breathing fume/mist/vapors/spray. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/eye protection/face protection. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If on skin: Wash with plenty of water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical advice/attention. Store in a well-ventilated place. Keep cool. Store locked up. Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other Hazards
None known

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Wt %
Petroleum distillates, hydrotreated light	64742-47-8	60-100
D-Limonene	5989-27-5	1-5
Orange, sweet, extract	8028-48-6	0.5-1.5

The exact percentage (concentration) of composition has been withheld as a trade secret in accordance with paragraph (i) of §1910.1200.

SAFETY DATA SHEET

Confirms to OSHA Hazard Communication Standard (CFR 29 1910.1200) HazCom 2012

Product: **Revision Date:** 29-Jul-2019

SECTION 4 – FIRST AID MEASURES

First Aid Measures

Inhalation: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.

Eye Contact: Rinse immediately with water for at least 15 minutes. Remove contact lenses, if worn. If irritation persists, seek medical attention immediately.

Ingestion: If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical advice/attention if you feel unwell.

Skin: In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash with soap and water. If irritation persists, seek medical attention.

Most Important Symptoms and Effects (Acute and Delayed)

Inhalation: May cause respiratory track irritation.

Eye Contact: May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.

Ingestion: May be harmful if swallowed. May cause stomach distress, nausea or vomiting.

Skin: May cause skin irritation. Symptoms may include redness, drying, defatting and cracking of the skin. May cause sensitization by skin contact.

Indication of any Immediate Medical Attention and Special Treatment Needed

Note to Physician: Treat symptomatically.

SECTION 5 – FIRE FIGHTING MEASURES

Extinguishing Media

Suitable: Treat for surrounding material.

Unsuitable: None known.

Specific Hazards Arising from Chemical

Products of combustion include but are not limited to: oxides of carbon.

Protective Equipment and Precautions for Firefighters

Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA). As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Personal Precautions: Use personal protective equipment as required.

Environmental Precautions: See Section 12 for ecological information.

Methods and Material for Containment and Cleaning Up

Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in a suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment (PPE). For cleaning up scoop up material and place in a disposal container. Provide ventilation. Wash the area with soap and water.

SECTION 7 – HANDLING AND STORAGE

Precautions for Safe Handling

Handling: Keep away from sources of ignition. No smoking. Avoid contact with skin and eyes. Avoid breathing fume/mist/vapors/spray. Do not swallow. Handle and open container with care. When using do not eat, drink or smoke.

General Hygiene Advice: Launder contaminated clothing before use. Wash hands before eating, drinking, or smoking.

SAFETY DATA SHEET

Confirms to OSHA Hazard Communication Standard (CFR 29 1910.1200) HazCom 2012

Product: **Revision Date:** 29-Jul-2019

Conditions for Safe Storage, Including any Incompatibilities

Storage Conditions: Keep container closed when not in use. Store in a dry, cool, and well-ventilated area. Keep out of reach of children.

Incompatible Materials: None known.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Exposure Guidelines:

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Petroleum distillates, hydrotreated light (64742-47-8)	200 mg/m^3	100 ppm	Not available
D-Limonene (5989-27-5)	Not available	Not available	Not available
Orange, sweet, extract (8028-48-6)	Not available	Not available	Not available

Appropriate Engineering Controls

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, etc.) below recommended exposure limits.

Individual Protection Measures

Respiratory Protection: None required under normal use conditions. In case of insufficient ventilation, wear suitable respiratory equipment.

Skin and Body Protection: Wear suitable protective clothing.

Eye/Face Protection: Safety glasses or goggles are recommended when using product.

General Work/Hygienic Practices: Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking. Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Yellow clear liquid

Odor: Citrus

Odor threshold: Not determined

pH: Not determined

Melting point/freezing point: Not determined

Initial boiling point and boiling range: Not determined

Flash point: 85°C (185°F) TCC

Evaporation rate: Not determined

Flammability (solid, gas): Flammable

Upper/lower flammability or explosive limits: Not determined

Vapor pressure: Not determined

Vapor density: Not determined

Relative density: 0.80

Solubility(ies): Not determined

Partition coefficient (n-octanol/water): Not determined

Auto-ignition temperature: Not determined

Decomposition temperature: Not determined

Viscosity: Not determined

SECTION 10 – STABILITY AND REACTIVITY

Reactivity: Not reactive under normal conditions.

Chemical stability: Stable under recommended storage conditions.

SAFETY DATA SHEET

Confirms to OSHA Hazard Communication Standard (CFR 29 1910.1200) HazCom 2012

Product: **Revision Date:** 29-Jul-2019

Possibility of hazardous reactions: None under normal use.

Conditions to avoid: Heat. Incompatible materials. Sources of ignition.

Incompatible materials: None known.

Hazardous decomposition products: May include and are not limited to: oxides of carbon.

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Likely Routes of Exposure: Inhalation, skin contact, eye contact, ingestion

Information Related to Physical, Chemical, and Toxicological Effects

See section 4 of this SDS.

Delayed and Immediate Effects as well as Chronic Effects from Short and Long-term Exposure

Carcinogenicity: **NTP:** No **IARC:** No **OSHA:** No

Numerical Measures of Toxicity

Product	
ATE (oral)	>2000 mg/kg, rat
ATE (dermal)	>2000 mg/kg, rabbit
ATE (inhalation)	Not available

Component Information:

Chemical Name	**Oral LD50**	**Dermal LD50**	**Inhalation LC50**
Petroleum distillates, hydrotreated light (64742-47-8)	>5000 mg/kg, rat	>2000 mg/kg, rabbit	>5.2 mg/l/4h, rat
D-Limonene (5989-27-5)	4400 mg/kg, rat	>5000 mg/kg, rabbit	Not available
Orange, sweet, extract (8028-48-6)	>5000 mg/kg, rat	>5000 mg/kg, rabbit	Not available

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not established

Persistence and degradability: Not established

Bioaccumulative potential: Not established

Mobility in soil: No additional information available

Other adverse effects: No additional information available.

SECTION 13 – DISPOSAL CONSIDERATIONS

See section 8 of this SDS for exposure controls and personal protection.

Dispose of the product and container in accordance with all applicable local, state, and federal regulations.

SECTION 14 – TRANSPORT INFORMATION

Note: Classification changes based on quantity, packaging, and method of shipment. See current shipping paper for most up to date shipping information.

DOT (Ground): Not Regulated- See 49 CFR 173.150(f)(2) as the product is not bulk packaged.

IATA (Air): Not Regulated

IMDG (Vessel): Not Regulated

SECTION 15 – REGULATORY INFORMATION

All ingredients in this product are listed or are excluded from listing on the US Toxic Substances Act (TSCA) Chemical Substance Inventory.

SAFETY DATA SHEET

Confirms to OSHA Hazard Communication Standard (CFR 29 1910.1200) HazCom 2012

Product: **Revision Date:** 29-Jul-2019

This product is labeled in accordance with regulations administered by the Consumer Product Safety Commission (CPSC). The use pattern and exposure in the workplace are generally not consistent with those experienced by consumers. The requirements of the Occupational Safety and Health Administration (OSHA) applicable to this Safety Data Sheet differ from the requirements of the CPSC and as a result, this SDS may contain additional health hazard information not pertinent to consumer use and not found on the product label.

SECTION 16 – OTHER INFORMATION

Issue Date: 23-Aug-2017

Revision Date: 29-Jul-2019

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designed and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Appendix P: *Subpar Student Summitted HazCom Project*

– HazCom Assignment

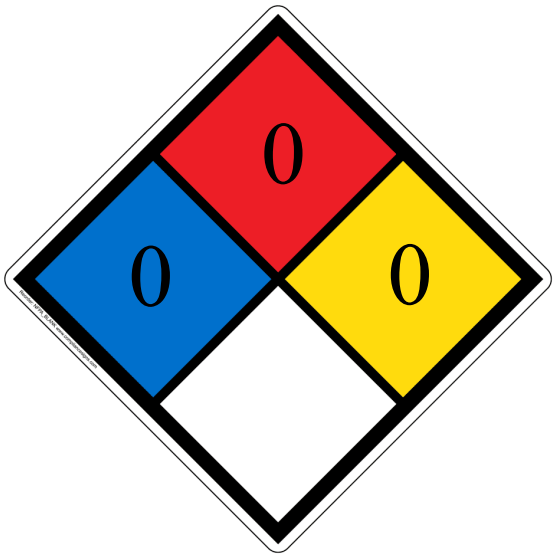
STEEL

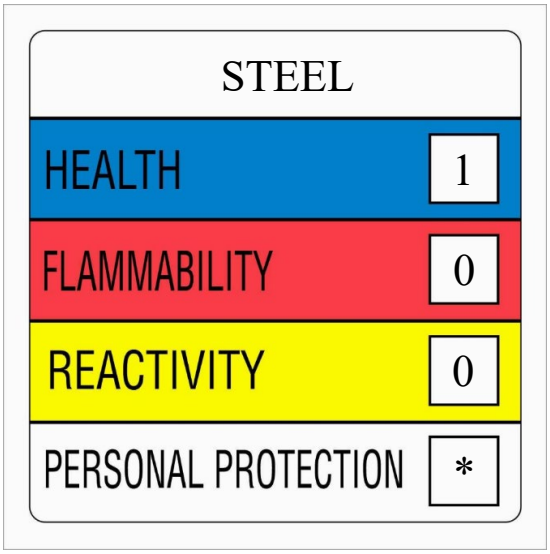
Danger

May cause cancer. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Causes damage to organs through prolonged or repeated exposure. Harmful if swallowed. May cause allergic skin reaction. May cause respiratory irritation. Causes eye irritations.

Not applicable to steel in solid state. Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust. No special storage conditions for steel in solid state. Store away from acids and incompatible materials.

PPE: Leather gloves for basic handling, and as being manipulated use appropriate PPE such as, safety goggles, welding/grinding shield, or hearing protection.





Appendix Q: *Outstanding & Detailed Student Summitted HazCom Project (Company Label Version 1)*

This material is classified as hazardous under OSHA regulations.

Lacquer Thinner

CAS No. 82343

DANGER

Keep away from heat, sparks, flame and all other sources of ignition. Vapors may cause flash fire or ignite explosively.
Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms and small, enclosed areas. Whenever possible use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of
moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness – STOP –
ventilation is inadequate. Leave area immediately.

Potential Health Effects (Acute and Chronic)

Inhalation Acute Exposure Effects:

Vapor harmful. May cause dizziness; headache; watering of eyes; irritation of respiratory tract; weakness; drowsiness; nausea; numbness in fingers, arms and legs; depression of central nervous system; loss of appetite; fatigue; hallucinations; light headedness; visual disturbances; giddiness and intoxication; sleepiness; cough and dyspnea; cold, clammy extremities; diarrhea; vomiting; dilation of pupils; spotted vision. Severe overexposure may cause convulsions; unconsciousness; coma; and death. Intentional misuse of this product by deliberately concentrating and inhaling can be harmful or fatal.

Skin Contact Acute Exposure Effects:

May be absorbed through the skin. May cause irritation; numbness in the fingers and arms; drying of skin; and dermatitis. May cause increased severity of symptoms listed under inhalation.
Eye Contact Acute Exposure Effects:
This material is an eye irritant. May cause irritation; burns; conjunctivitis of eyes; and corneal ulcerations of the eye. Vapors may irritate eyes.

Ingestion Acute Exposure Effects:

Poison. Cannot be made non-poisonous. May be fatal or cause blindness. May cause dizziness; headache; nausea; vomiting; burning sensation in mouth, throat, and stomach; loss of coordination; depression of the central nervous system; narcosis; stupor; gastrointestinal irritation; liver, kidney, and heart damage; diarrhea; loss of appetite; coma and death. May produce symptoms listed under inhalation.

Chronic Exposure Effects:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause conjunctivitis; gastric disturbances; insomnia; dizziness; headache; weakness; fatigue; nausea; heart palpitations; skin irritation; numbness in hands and feet; permanent central nervous system changes; some loss of memory; pancreatic damage; giddiness; visual impairment or blindness; kidney or liver damage; and death. May cause symptoms listed under inhalation.

Target Organs: Central Nervous System, Liver, Kidney, Heart, Stomach, Respiratory System

Primary Routes of Entry: Inhalation, Ingestion, Skin Absorption
Signs and Symptoms Of Exposure
See Potential Health Effects.
Medical Conditions Generally Aggravated By Exposure
Diseases of the skin, eyes, liver, kidneys, central nervous system and respiratory system.

COMPOSITION / INFORMATION ON INGREDIENTS
63231-51-6 Aromatic hydrocarbons 30-75
*MIXTURE Ketones 0-60
**MIXTURE Aliphatic hydrocarbons 0-60
***MIXTURE Acetates 0-17
763-69-9 Ethyl 3-ethoxypropanoate 0-17
68475-56-9 Alcohols, C1-3 0-12
****MIXTURE Other alcohols 0-10
*****MIXTURE Chlorinated solvents 0-1
Component Information/Information on Non-Hazardous Components

Bob's House O' Solv'nts

684 W. Trafalgar Drive
Shreveport, LA 70072

1-800-Solvnts (765-8687)
Emergency 1-800-555-1212

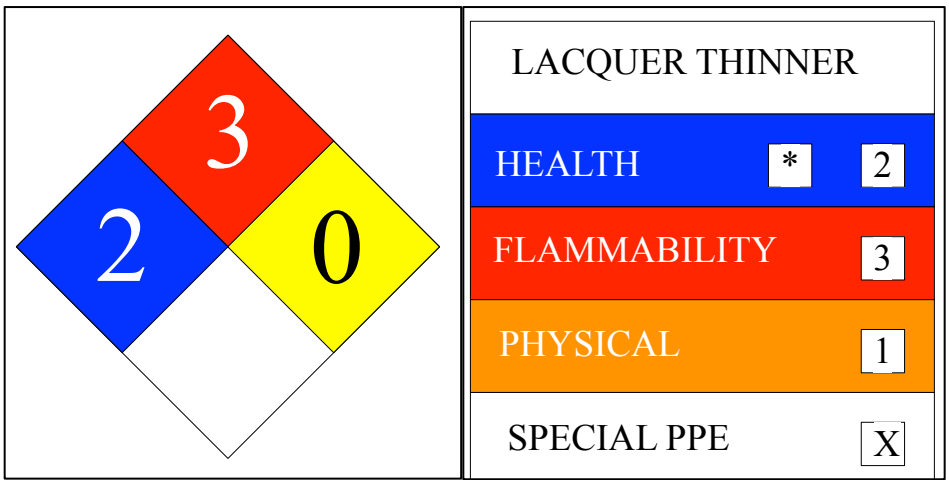
FIRST AID MEASURES

Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin
Eyes
Ingestion
IF SWALLOWED: Aspiration hazard. Do NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Rinse mouth. Immediately call a POISON CENTER or doctor/physician.
Most Important Symptoms/Effects Acute
May be fatal if swallowed and enters airways. Fatal if inhaled. Harmful if swallowed or in contact with skin. Causes skin irritation, central nervous system damage, liver damage, respiratory tract irritation, central nervous system depression, eye burns, kidney damage, blood damage, lung damage (from aspiration).
Delayed
Mutagenic effects, cancer, reproductive effects, and central nervous system, nervous system, kidney, liver, blood, respiratory system, and lung damage.
Indication of any immediate medical attention and special treatment needed
IF exposed: Call a POISON CENTER or doctor/physician. Treat symptomatically and supportively.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin
irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
exposure.

FIRE FIGHTING MEASURES

Suitable Extinguishing Media Carbon dioxide, regular foam, dry chemical,
water spray, or water fog.
Unsuitable Extinguishing Media
Do not use high-pressure water streams.
Special Hazards Arising from the Chemical SDS ID: 82343
Highly flammable liquid and vapor. Vapors may form explosive mixture with air. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Fire may produce irritating, poisonous and/or corrosive fumes. Runoff may create fire or explosion hazard. Empty product containers may retain product residue and can be dangerous. Containers may rupture or explode.
Hazardous Combustion Products
Burning may produce: Phosgene, chlorides, chloroacetylenes, formaldehyde, peracetic acid, carbon
monoxide and unidentified organic compounds.
Fire Fighting Measures
Keep storage containers cool with water spray. Move container from fire area if it can be done without risk. Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. Stay away from the ends of tanks. Do not scatter spilled material with high-pressure water streams. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile). Stay upwind and keep out of low areas. Dike for later disposal.
Special Protective Equipment and Precautions for Firefighters
Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Continued – Outstanding & Detailed Student Summitted HazCom Project – NFPA 704, HMSI, & Company Label Version 2 (created on a label generator)



Lacquer Thinner

CAS No. 82343

DANGER

Extremely flammable gas. Heating may cause a fire or explosion. May be corrosive to metals. Fatal if swallowed. Toxic if swallowed. May be harmful if swallowed and enters airways. Harmful in contact with skin. Causes skin irritation. Causes serious eye irritation. Harmful if inhaled. Suspected of causing cancer. This Product has is a Category 1B carcinogen. May damage fertility or the unborn child. Unknown This Product has a Reproductive Toxicity Category 2.

Keep away from heat/sparks/open flames/hot surfaces – No smoking. Leaking gas fire – do not extinguish unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. Store in a well ventilated place. Keep/Store away from Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up. Keep only in original container. Wear protective gloves and goggles, as well as a apron and mask. In case of fire: Use Wear protective gloves/ clothing, eye, face, and respiratory protection. for extinction. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Store in a well ventilated place. Keep cool. Store at temperatures not exceeding 27 °C/ 80 °F. Store away from other materials. Dispose of contents/container to Dispose in accordance with applicable local, state and federal regulations. Absorb spillage to prevent material damage. Store in a closed container. Wash hands and skin thoroughly after handling. Do not eat, drink or smoke when using this product. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Specific treatment (see Skin: Immediately begin washing the skin thoroughly with large amounts of water and mild soap, if available, while removing contaminated clothing. Seek medical attention if irritation persists. Eyes: Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes, then seek immediate medical attention. Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Ingestion: If swallowed, do not induce vomiting. Seek immediate medical attention. Call a physician, hospital emergency room, or poison control center immediately. Never give anything by mouth to an unconscious person. on this label). Rinse mouth. Store locked up. Do NOT induce vomiting. IF ON SKIN: Wash with soap and water. Call a POISON CENTER or doctor/physician if you feel unwell. Specific measures (see Poison. This product contains methanol. Methanol is metabolized to formaldehyde and formic acid. These metabolites may cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used as an antidote. Methanol is effectively removed by hemodialysis. Call your local poison control center for further information. on this label). Wash contaminated clothing before reuse. IF skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. Get medical advice/attention. Avoid breathing fumes or vape. Use only outdoors or in a well-ventilated area. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. IF exposed or concerned: Get medical advice/attention.

See SDS for further information

Bob's House O' Solv'nts • 684 W. Trafalgar Drive • Shreveport , LA 70072 • 8005551212

Continued – Outstanding & Detailed Student Summitted HazCom Project – Bullet point list detailing chemical

Bob's House O' Solv'nts
Lacquer Thinner:

Label Element

- Identifer
  - Lacquer Thinner
- Signal Word
  - DANGER
  - EXTREMELY Flamable
  - Poison
  - Vapor Harmful
- Pictogram
  - Flame, Health Hazard, Acute Toxicity, Exclaimation Mark, and Corrosion
- Hazardous Statement
  - Flammable Liquids - Category 2
    Aspiration Hazard - Category 1
    Acute Toxicity - Oral - Category 4
    Acute Toxicity - Dermal - Category 4
    Acute Toxicity - Inhalation - Vapor - Category 2 Skin Corrosion/Irritation - Category 2
  - Serious Eye Damage/Eye Irritation - Category 1 Germ Cell Mutagenicity - Category 1B
    Carcinogenicity - Category 1B
    Reproductive Toxicity - Category 2
  - Specific Target Organ Toxicity - Single Exposure - Category 3 Specific Target Organ Toxicity - Repeated Exposure - Category 2
- Precautionary Statement
  - Danger! Extremely flammable.
  - Poison. May be fatal or cause blindness if swallowed.
  - Vapor harmful.
  - Use only with adequate ventilation to prevent buildup of vapors. If the work area is not well ventilated, do not use this product.
  - Keep away from heat, sparks, flame and all other sources of ignition.
  - Vapors may cause flash fire or ignite explosively.
  - Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms and small, enclosed areas.
  - Whenever possible use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness – STOP – ventilation is inadequate. Leave area immediately.
- Contact Info
  - Bob's House O' Solv'nts
    - Robert Johnson
      - 684 W. Trafalgar Drive, Shreveport, LA 70072
      - Emergency 1-800-555-1212
      - Business 1-800-Solvnts (765-8687)

Appendix R: *NFPA Journal Article – The Great Boston Fire, 1872*

◀ UNSTOPPABLE. A depiction of the fire in its early stages as it moved through Boston's downtown. Witnesses marveled at the speed of the fire and how quickly buildings ignited.

FIRE HISTORY

A 'Splendid and Terrible Sight'

As wildfire losses draw comparisons to urban conflagrations of old, a new book, *The Great Boston Fire: An Inferno That Nearly Incinerated the City*, recounts the story of the landmark 1872 blaze. In this excerpt, **author Stephanie Schorow** guides us through the harrowing early moments of the fire.

WHAT IF, IN THE SPACE OF two days, everything in the heart of Boston's bustling commercial district disappeared? The cafés, the department stores, the restaurants, the theaters, the condos, the offices…the people. Gone. What if you emerged from the city's subway to find what appeared to be a nuclear wasteland? Swaths of twisted wreckage, granite snapped into pieces like china, bricks piled as carelessly as the remains of a sandcastle gleefully demolished by a child. Among the ruined streets are odd bits of buildings—arches rising like remnants of the Roman Empire, the stripped-down bones of once-elegant structures—that leave no hint of the furnishing and merchandise once housed inside. The devastation goes on for blocks, covering a half-mile to Boston Harbor, where the tide laps the charred posts of once-bustling wharves. ▶

A 'Splendid and Terrible Sight'

▲ A map showing the spread of the fire over the course of about 22 hours. Firefighting crews from across New England rushed to Boston to battle the fire. In some cases transporting fire engines to the city by train. Facing page, calamitous headlines from a local newspaper.

The common term for this kind of fire is conflagration or firestorm or fire that creates its own wind, becoming a small hurricane of sparks and smoke. But let's use the term that the politicians, pundits, and reporters used so lavishly and literally in November of 1872: the "Fire Fiend."

From November 9 to 11, 1872, the Fire Fiend ruled Boston. Igniting in a building at the corner of Kingston and Summer streets, fire rampaged through the city, scorching nearly 65 acres and obliterating 776 buildings. A quickly overwhelmed Boston firefighting force called for help, and companies from surrounding communities, as well as from Connecticut, Rhode Island, New Hampshire, and Maine, rushed in, bringing in fire engines by train as needed. The Fire Fiend took out warehouses, factories, stores, and apartments. It destroyed the Trinity Church and two newspaper offices. It nearly destroyed the Old South Meeting House and burned to within three blocks of City Hall. It left thousands homeless or out of work, and it left others financially ruined. The assessed value of the destroyed properties was nearly $13.5 million, and personal property loss totaled $60 million—losses equal to about $1.6 billion today. It remains one of the most expensive fires per acre in American history.

At least 11 firefighters and one former firefighter died fighting the blaze. The total number of deaths is difficult to determine, which was not uncommon in large fires of the 19th century, but likely totaled 20 to 25. That the toll was not higher is surprising, given not only the extent of the destruction but also the crowds of people who thronged the fiery streets to retrieve property or watch the mesmerizing Fiend rising over the skyline. Bostonians witnessed their city burn with horrified awe. In her diary, *Little Women* author Louisa May Alcott described the fire as a "very splendid and terrible sight." Oliver Wendell Holmes, Sr., the poet and physician, saw the fire "dissolve the great high buildings which seem to melt away in it." Abolitionist William Lloyd Garrison, himself a fire buff, found it "a sad, wonderful, and fascinating sight to see the ruins from Washington street, extending from Summer to Milk streets, thus sweeping broadly to the water."

The Fire Fiend was finally halted by an effort involving firefighters from across New England. Boston reeled and the nation mourned as headlines around the country blared the news. Perhaps the most telling of all declarations was this: "SECOND CHICAGO."

PREVIOUS: FRANK LESLIE'S WEEKLY, NOV. 23, 1872. ABOVE, USED HERE WITH PERMISSION COURTESY OF BRUCE TRICKEY. BOCKRA.BOSTON1872.SOCIETY6.COM/INDEX.HTML

BOSTON SUNDAY HERALD, NOV. 10, 1872

THE FIRE FIEND!

Terrible Conflagration in Boston!

FAINTFUL GLOW TO THE HUMAN INTERESTS OF THE CITY!

The Most Costly and Valuable Warehouses and Mercantile Establishments Laid in Ashes!

THE LOSS ESTIMATED BY MILLIONS!

The Calamity Attended by Loss of Life!

THE STARTING POINT ON SUMMER STREET.

Uncontrollable Progress of the Flames!

THE FIREMEN POWERLESS TO SAVE.

A Tornado Created by the Intense Heat.

FLAMES AND SPARKS BLOWN IN ALL DIRECTIONS.

Buildings Lapped Up by the Flames and Reduced to Ashes in a Moment.

...ING SCENES IN THE ...TREETS.

That's because the country had seen this before, less than 11 months prior. From October 8 to 10, 1871, a conflagration consumed two-thirds of the city of Chicago, burning 2,000 acres and destroying 17,500 buildings. An estimated 300 people lost their lives. Supposedly the fire started when a cow kicked over a lantern; that tale is doubtful, but the myth remains powerful, underscoring an unsettling truth that widespread devastation can result from a single careless event.

News of the fire sent a shudder through urban firefighters around the United States, including the chief of the Boston Fire Department, John S. Damrell. Soon after the Chicago Fire, Damrell boarded a train to Illinois to review the damage with fire officials and General Philip Sheridan, the Civil War hero who played a significant role directing fire efforts. What Damrell learned chilled him. Before his trip to Chicago, he knew Boston's growth had far outstripped its firefighters' ability to keep the city safe. Now, he believed, time was running out.

"GENTLEMEN, ARE YOU AWARE THAT THE WHOLE CITY IS IN FLAMES?"

He returned from Chicago and redoubled his efforts to convince Boston city officials that they were sitting on a tinderbox. He renewed his call for replacing the aging water mains in the downtown to provide enough pressure for water to reach the tops of the tall buildings in the district. He advocated for more fire houses downtown, a fire boat, and a prohibition against building with wooden Mansard roofs, a popular architectural embellishment. He also sought new building codes and better code enforcement. Most of his recommendations were ignored.

This, then, is the real issue of the Great Boston Fire of 1872. All that destruction was a disaster foretold, a tragedy largely caused not by capricious nature or an unfathomable deity, but by the determined ignorance of men who, like far too many figures in history, supposed nothing would go wrong. It is a lesson in hubris and in the courage of those who doggedly, determinedly, do what they know is right despite criticism and disgrace.

November 9, 1872, has been rapturously described by contemporary chroniclers as a lovely autumn day in Boston, with mild temperatures, a light breeze, clear and exhilarating air, a cloudless sky, a rosy sunset, and a brilliant full moon. Was the day that the Great Fire began as stunningly beautiful as those writers would have us believe? Or like any Hollywood screenwriter, did they wish to paint a calm portrait of Pleasantville, USA, before the monsters began to roll in?

The truth is that even if that Saturday were a nice autumn evening, Boston was not exactly resting easy. Many of the

Continued - NFPA Journal Article – The Great Boston Fire, 1872

A 'Splendid and Terrible Sight'

'POSSIBLE, PERHAPS INEVITABLE'

Understanding Boston's 1872 conflagration using the NFPA Fire & Life Safety Ecosystem

▲ 'THIS FIRE WILL GO TO THE WATER': A depiction of the devastation in the aftermath of the fire, from *Frank Leslie's Weekly*.

THE EXACT IGNITION OF THE GREAT BOSTON FIRE of 1872 remains a mystery. Even if we knew the genesis of the original spark, however, it would be difficult to explain why this conflagration reached such epic proportions. But we know enough about the fire and the conditions surrounding it that when we consider it through the lens of the NFPA Fire & Life Safety Ecosystem™, we can begin to explain why this massive fire was not only possible but perhaps inevitable.

Government Responsibility / Investment in Safety
In the years before the fire, Boston Fire Chief John S. Damrell was very clear about what the city should do to improve fire safety. He specifically warned city officials about a lack of pressure in aging water mains in Boston's fast-growing commercial district; he decried the popularity of wooden Mansard roofs; and he called for more fire houses to be located downtown. All of his warnings, with the exception of a request for a fire boat, were brushed aside. Even Chicago's historic 1871 blaze failed to prod the city to action. In the Great Boston Fire, Damrell's fears were realized: water failed to reach the tops of burning buildings, fire spread from Mansard roof to Mansard roof, and Boston's fire force was quickly overwhelmed. The fire boat went into service two months after the fire.

> *He specifically warned city officials about a lack of pressure in aging water mains in Boston's fast-growing commercial district; he decried the popularity of wooden Mansard roofs; and he called for more fire houses to be located downtown.*

Preparedness and Emergency Response
Beginning in late September 1872, an aggressive and mysterious influenza struck horses in nearly every major urban center in North America, lasting nearly a year. This so-called epizootic was not necessarily fatal, but horses became too sick to work. Horses pulled Boston's fire engines, and Damrell and his assistants scrambled to develop a plan to protect the city by having men pull engines and to limit responses on first alarms. This meant fewer engines initially responded when Box 52 was struck in the commercial district at the outset of the Boston fire, giving the blaze a head start. It didn't help that human-pulled engines were up to 10 minutes slower than horse-drawn engines. Just as the COVID-19 pandemic revealed flaws in our health system, the horse epizootic underscored the fragility of an equine-based transportation system.

Development and Use of Current Codes / Code Compliance
Damrell himself was a master builder, and among the causes he championed was the establishment of stricter building codes. Due in part to his advocacy, the city passed a new building code, Chapter 280 of the Acts of 1871, which gave the city the authority to establish a bureau of survey and inspection of new construction. However, "the bureau had little power to require changes in procedures or materials. Its power was of a persuasive nature primarily," noted scholar Diane Rudnick observed in her thesis on the fire. Even after the Great Fire, it took years—and more fires—before codes and standards were brought up to what Damrell would consider an adequate level. Tellingly, after leaving the fire service, Damrell served as Boston's building commissioner for the next 25 years.

Skilled Workforce / Informed Public
Boston's fire service was considered one of the best in the country. During the fire, however, civilians jumped into action with good intentions but little knowledge. Under pressure to "do something," Damrell hastily gave permission for citizens to use gunpowder to blow up buildings to create fire breaks. This not only proved ineffective, but since gas mains could not be shut off at the street, some of the gunpowder explosions ignited the still-flowing gas. Damrell had to finally send out orders that the use of gunpowder be halted on pain of arrest.

Informed Public
While Boston's citizens were vocally proud of their fire force, many of them demonstrated a reluctance to spend extravagantly on public works. A newspaper editorial prior to the fire sneered at Damrell's push for more fire houses downtown, opining: "What matter to the city of Boston whether Hose Company No. 1 or Hose Company No. 100 should succeed in getting a stream of water on to Mrs. Muldoon's feather bed in advance of the other?" NIMBYism was also an issue. Patrick Donahoe, the publisher of Boston's Catholic newspaper *The Pilot*, insisted that a fire hydrant be removed from outside the publication's fine new downtown headquarters. During the Great Fire, he watched as the building burned to the ground. —S.S.

CITY IN RUINS Local photographers rushed to the scene of the fire to record the destruction. Nearly 800 buildings were destroyed in the heart of Boston's commercial district, making the blaze one of the costliest per-acre fires in American history.

city's horses were sick from a mysterious equine flu spreading through the country that made them unfit for work. The city's steam fire engines were pulled by horses, and a contingency plan had been set up: men would pull the engines themselves in a throwback to a time of hand-pumped machines, and the number of engines downtown available to respond to first and second alarms was reduced to ensure other parts of the city would have coverage. To Damrell and his engineers, it was the best they could do under the circumstances.

Downtown on East Street, home to Engine Company 7, Foreman Daniel Marden and Engineman Charles Riley were on duty. "Looks like it will be a dull night," Marden remarked to Riley, who was cutting off a plug of chewing tobacco. Just over the Charles River, in Charlestown, police officers on duty at the Prison Point drawbridge noticed a glow in the sky shortly after 7 p.m. "Must be a fire in Boston," one of them casually remarked.

The Boston Press Association's annual meeting was being held that night. Among the guests were two young reporters delighted at the chance to mix with the grand old men (and, yes, they were all men) of the city's half-dozen daily newspapers, including the upstart *Boston Globe*, which had just launched in March of that year. Sylvester Baxter, a 22-year-old reporter for the *Boston Daily Advertiser*, and his fellow scribe, Stephen O'Meara, barely 18, were thrilled to be invited.

The ink-stained class gathered at the Revere House, a hotel on Bowdoin Street just north of Beacon Hill and almost under the shadow of the Commonwealth's gold-topped State House. Speeches, poems, skits, stories, quips, and puns circled the room. The men heard fire bells ring in the distance, but fire bells were always ringing, so they continued their dining. On hand was Patrick Donahoe, the publisher of Boston's Catholic newspaper, *The Pilot*. He was extremely proud of the fine new building that housed *The Pilot* and had demanded the removal of a fire hydrant at Franklin and Hawley streets because—we will speculate—it distracted from the imposing façade or created too much activity in the area.

A 'Splendid and Terrible Sight'

He would watch his building burn to the ground later that night. Donahoe rose at the conclusion of the dinner to give his annual rendition of "The Star-Spangled Banner."

As Donahoe finished, a reporter burst in. "Gentlemen, are you aware that the whole city is in flames?" he called out.

Everyone dashed for the door. Outside, a terrible glare lit the streets with a brightness as intense as daylight, while a crimson glow veiled the stars overhead. The sullen granite walls of the nearby gothic Bowdoin Square Baptist Church were now bathed in golden light. The young reporters Baxter and O'Meara could see sheets of flame rising to the left of Beacon Hill. "Our young hearts fairly jumped to our throats," Baxter would recall decades later. The pair sprinted in the direction of the glowing sky. Baxter was about to cover the story of a lifetime.

John Damrell, chief engineer of the Boston Fire Department, whose warnings of a conflagration went unheeded. *Little Women* author Louisa May Alcott described the fire as a "splendid and terrible sight."

There are many mysteries associated with the 1872 fire, but there's little doubt about the ignition point: the Tebbetts Building, a six-year-old structure at 83–85 Summer Street at the corner of Kingston Street. The five-story building, owned by businessman Seman Klous, housed a wholesale dry goods business and a small clothing factory. A small steam engine in the rear of the basement provided heat and power to run an elevator, which ran from the basement to the top floor. Built about 1866, the building was topped by a Mansard roof and cornices made from wood because, as the architect John R. Hall would later explain, using wood saved construction costs. By 7 p.m., the owners of the businesses located in the building had left for the day. The maintenance man, William Blaney, had checked the furnace and gas before departing. All would later say everything was in perfect order when they left the building.

Alas for doggerel writers, there was no bovine perpetrator to blame for what happened next. Subsequent investigation showed that likely something in the basement caught fire, and heat rose up the wooden elevator shaft to the ceiling under the handsome but combustible Mansard roof. No one will know for sure what caused that initial spark. The rest is a matter of record.

A little after 7 p.m., Major Augustine Sanderson, an Army veteran and a clerk at Boston's Custom House, was walking on Washington Street toward Winter Street. He stopped to chat with an acquaintance, John S. Holmes, a lawyer; the men almost immediately saw smoke rising about four blocks away on Summer Street. "There must be a fire," Holmes cried. The two ran down Summer Street and, as they neared Kingston Street, they started shouting, "Fire, fire!" Sanderson was astonished that no one else was "hallooing fire," since a half-dozen people seemed to be watching the blaze. Through the building's windows, Holmes could see a globe of fire in the basement. Flames were bursting out of the building's elegant Mansard roof; to Sanderson they seemed to burn with a fierce glee. The fire appeared to be spreading across a passageway to the roof of another building at its rear on Kingston Street. Holmes was mesmerized by the shocking speed of the blaze; the flames traveled bizarrely fast, almost at right angles, as if by direction, human or divine.

At that time, fire alarm boxes were kept locked to prevent false alarms, and police and nearby "responsible" persons had keys. Police officer John M. Page of Station Number Four was walking his nightly beat when he heard shouts of "fire." Peering down Summer Street, he saw flames staining the night sky with streaks of red and orange. Although a building blocked his full view of the fire, he knew immediately this was a serious burn. He was near Alarm Box 52, at the intersection of Summer, Lincoln, and Bedford streets. He quickly opened the box with his key, cranked the handle inside, and heard a welcoming ticking sound indicating that the alarm had been sent.

About a mile away on School Street, Charles Stearns, the officer on duty at the fire alarm headquarters atop Boston City Hall, was reading a newspaper when he noticed a glow in the dark city streets. He was preparing to trigger the striking of the city's bells when the signal from Box 52 came in. Stearns triggered the bells: five tolls, a pause, followed by two tolls, indicating fire in the area of Box 52. The time was 7:24 p.m. He waited, watching the glow grow brighter, and another signal arrived. At 7:29 p.m., he triggered the second alarm to call in additional men. By that time, however, the fire likely had been burning for 45 minutes to an hour.

At the Engine Company 7 firehouse, Foreman Marden's optimistic forecast for the evening vanished like smoke as someone rang the doorbell, yelling, "Fire on Bedford Street!" Marden, Riley, and other men on call, plus volunteers from the street, grabbed the draglines and hauled the 8,970-pound Amoskeag steam engine and hose reel the four or five blocks to the burning Tebbetts Building, arriving in about two minutes. Marden could see right away that his men faced a dangerous fire. The hose was quickly attached to a hydrant on Bedford Street and then plugged into the steamer, its coal-fired engine already churning. The men pointed a stream of water toward the building, but soon shifted their attention to a nearby building that was smoking; Marden could see that the Summer Street building was gone and he wanted to focus on limiting the fire's spread. He could also see the streams from Engine 7, while strong, did not reach the top of the building. Even so, firefighters continued to attack the fire as best they could.

About a minute after Engine 7 arrived, Hose Company 2, the Union, appeared, its 3,080-pound Hunneman hose reel pulled by men from its station at 85 Hudson Street, over a quarter of a mile away. Foreman Nathan S. Brown plugged the hose into a hydrant at Bedford and Kingston streets; grabbing the nozzle, or "pipe," he dragged the hose toward the Summer Street building, planning to send a stream of water into the cellar. But the fire scene was already getting out of control. Burning debris flew through the air; one piece struck a fireman and knocked off his hat. Brown had to turn around and wet the hose behind him to keep it from catching fire from the flying sparks. A 12-year veteran of the fire department, Brown had never seen a fire move so quickly; it seemed to run like lightning from window to window.

Engine 4 arrived about 7:30 p.m. and plugged into a hydrant near Kingston and Summer streets. Now streams were hitting the Tebbetts Building from several sides, but it made no difference; water seemed to make no impression on the flames, and simply turned to steam. Bits of burning clothing, particularly flaming hoop skirts, were driven upward by the heat. The very bones of the building were coming apart. Many of the buildings in downtown Boston were built of granite, seemingly stern stuff. But the material actually contains pockets of moisture, and when superheated the water seeks escape and can cause the granite to explode. Hot chunks of granite were sailing skyward, joining the burning debris that was raining down on firefighters. The fire continued to spread.

Chief Engineer John Damrell was in his home on Beacon Hill when he heard the fire bells ring for Box 52. He knew the location; it was considered a "bad box," one situated in the area of downtown that he was most concerned about. Grabbing his helmet, he raced across the Boston Common; when he came to Winter Street, he could see his nightmare coming true. The Tebbetts Building was blazing from the basement to the roof, as if it were one vast furnace. In his decades of firefighting, Damrell had never seen anything like this.

To his great relief, he saw that his companies were already at work. Damrell called over one of his men and told him to strike the third alarm. At the alarm headquarters, Charles Stearns noted the time, 7:34 p.m., and set the fire bells ringing. Stearns also struck a fourth alarm, on his own volition, at 7:45 p.m., to call in all fire companies.

Damrell saw foreman Brown in an alleyway behind the Tebbetts Building and ordered him to take his line into an adjoining building, which was already burning. Brown ran with the hose to the building's third floor to get water on the windowsills and frames that were covered with flames. He and his men stayed until their water was cut off; another engine had plugged into their hydrant and the pressure dropped. "Get out of the building!" came the command, and Brown complied. Within 10 minutes the walls of the Tebbetts Building collapsed, soon followed by those of the building Brown had just vacated.

Summer Street was now so hot that firefighters had to lie in the gutters, directing their water streams from behind makeshift fire shields and barriers of wet crates. Coming upon the scene was Thomas Leighton Jenks, a member of the Board of Aldermen, who called out to Damrell, with a kind of nervous irony, "Captain, you have got a fearful fire!" Damrell's reply was blunt: "Yes, and the city is doomed; this fire will go to the water, for I have not sufficient force at my command to stay its progress."

"Do you mean what you say?" Jenks said, caught off guard.

"I do, and know whereof I speak," Damrell responded.

Damrell ordered Jenks to go to the Union Telegraph Office and request help from every city and town within 50 miles of Boston. Damrell was seeing the Chicago fire unfold in front of him. From the speed and ferocity of what was fast becoming a firestorm, he knew the city's fate depended on responding with everything that could be mustered. He also knew that commanding such an effort would require every bit of his firefighting knowledge. He did not yet know that his every action, and every twist and turn of the next 22 hours, would be scrutinized, critiqued, and fiercely debated. ♦

STEPHANIE SCHOROW *is a Boston-based writer and the author of* Boston on Fire: A History of Fires and Firefighting in Boston. *Her new book,* The Great Boston Fire: An Inferno That Nearly Incinerated the City, *is due out in the fall.*

Appendix S: *Student Submitted Assignment – Code Analysis*

Code Analysis: **Rhythm Club Fire**

After going through a deep deep rabbit hole of fires throughout history in U.S and elsewhere, I decided to settle on the Rhythm Club Fire. This fire occurred in Natchez Mississippi on April 23rd, 1940 and killed 240 people. An interesting piece of history with this fire is that it happened during segregation era in the US, and this night club was a venue for black people. At the time it happened it was considered the second deadliest fire in U.S history. However, today it is considered the fourth deadliest.

CONTEXT

For context, the building housing the club was a one story wooden building, with all of its exterior walls framed in corrugated steel. The Building had 24 windows, and 21 were boarded and nailed shut the day of the fire, to prevent people from viewing or listening to the music. There were two exits in the building, one backstage and the main entrance. However, the back exit was padlocked and board shut, so there was only one functioning entrance/exit, with an inward opening door, which lead to a main entrance foyer that had yet another set of inward opening doors.

The night of the fire there were 746 people at the club, and there was a somewhat famous band called *Walter Barns and His Royal Creolians* performing.

The managers placed several decorations for the band around the club, some of which included Spanish Moss that had been draped over interior rafters on the main entrance door. The Spanish Moss had also been sprayed with a petrolatum-based insecticide to keep bugs away.

1

There wasn't a dedicated fire department at Natchez at the time, only a couple of volunteer firefighters who were full-time on call and worked for the Phoenix Fire Station. The closest one lived 4 blocks away from the club.

FIRE

The fire broke out at 11:00pm, and it is believed the source of the fire was a carelessly disposed of match or cigarette. The match or cigarette ignited the dry Spanish Moss hanging from the entrance, which as previously mentioned was covered in petroleum-based bug spray. The fire thus, quickly spread out to the rest of the moss hanging from the ceilings, and the structure itself, all within a few minutes. Burning Moss fell from the ceiling creating a barrier between the dance floor and the exit, trapping people in the building. The dry moss impregnated with the bug spray also produced flammable methane, intoxicating the environment and aiding the rapid ignition/propagation of the fire. There was also a big fan located near the entrance, which was on at the time the fire started, most likely strengthening the fire.

Many victims burned due to the falling moss, igniting their clothing and hair. After the fire fighters received the call (15 minutes after the fire had started), they were at the scene within a few minutes, but they weren't able to much and some of their actions made things worse. For instance, when water from their hoses hit the metal walls on the outside of the building, it created steam on the inside that scalded many victims. There was also a lack of ventilation because of the windows been shut, so fire fighters couldn't get water into the building, and the trapped heat and smoke inside the building with metal walls, basically created an oven inside the building. Even with all of these factors against the victims, most of the deaths were ruled to have been smoke inhalation or crushing by the crowd.

NFPA CODES NEGLECTED

There weren't really enforced fire codes back then, or at least not strict ones. By that time's standards the codes I could see broken were:

- insufficient fire exists (even though there were two, one was locked)
- blocked windows
- insufficient ventilation

By today's standards there are many other NFPA Codes broken:

- means of egress
- number of exits per occupancy level
- door openings
- exit access
- emergency signage
- discharge of egress
- fire resistive material
- flame retardant
- smoke control & roof vents
- emergency action plans

FUTURE CODE ALTERATIONS

This fire prompted many fire code alterations:

- building occupancy limits
- requirement for doors to open outwards
- building requirements (especially for night clubs) such as;

- installation of fire protection systems
- provisions for safer building finishes & decorations
- provisions for better egress systems
- clubs are required to have trained crowd managers on duty
- stricter fire laws addressing overcrowding.

OTHER FIRES IN THE AREA

I could only find mention of a couple of recent (2020) house fires in the area, but not any others in public/entertainment venues.

References

Accessibility to Theater for Deaf and Deaf-Blind People: Legal, Language and Artistic Considerations – Conference of Interpreter Trainers. (n.d.). Conference of Interpreter Trainers. Retrieved 2021, from https://cit-asl.org/accessibility-to-theater-for-deaf-and-deaf-blind-people-legal-language-and-artistic-considerations/

Aerial Safety. (n.d.). Firetoys. Retrieved 2021, from https://www.firetoys.com/aerial-safety

American National Standards Institute. (n.d.). American National Standards Institute - ANSI. Retrieved 2021, from https://ansi.org

Andone, G. C. C. A. D. (2021, July 19). *Nationals Park shooting: At least 3 shot outside stadium during baseball game Saturday night, police say*. CNN. https://edition.cnn.com/2021/07/17/us/washington-nationals-park-shooting-saturday/index.html

B. (2010, September 26). *Chicago's E2 nightclub disaster*. HubPages. https://hubpages.com/travel/e2nightclubdisasterchicago

Bahr, S. (2021, February 2). Broadway Theater Owner Cited by OSHA in Stagehand's Fatal Fall. *The New York Times*. https://www.nytimes.com/2021/06/02/theater/death-winter-garden-theater-shubert-organization.html

Benedictus, L. (2017, November 29). *Hajj crush: how crowd disasters happen, and how they can be avoided*. The Guardian. https://www.theguardian.com/world/2015/oct/03/hajj-crush-how-crowd-disasters-happen-and-how-they-can-be-avoided

Bergland, C. (2019, January 4). *Big Crowds Flow Like Water in Amazing (and Terrifying) Ways*. Psychology Today. https://www.psychologytoday.com/au/blog/the-athletes-way/201901/big-crowds-flow-water-in-amazing-and-terrifying-ways

Bersin, Josh. *The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned*. Jossey-Bass, 2004.

Bowman, B. R. (n.d.). *Womack and Bowman*. Womack and Bowman. Retrieved 2021, from http://www.womackandbowman.com/safety-aerial-arts/

Boston University. (n.d). *Center for Teaching Learning RSS.* Retrieved 2021, from https://www.bu.edu/ctl/

Breen, M. (2017, August 4). *Using the DIM-ICE Matrix to Plan Safer Events*. Safe Events. https://www.safeevents.ie/blog/safer-events-using-dim-ice

Carnegie Mellon University. (n.d.). *Diversity Statement on a Syllabus - Eberly Center - Carnegie Mellon University*. CMU.Edu. Retrieved 2020, from https://www.cmu.edu/teaching/designteach/syllabus/checklist/diversitystatement.html

Center for Disease Control and Prevention. (n.d.). CDC.Gov. Retrieved 2021, from https://www.cdc.gov/

Center for Safety in the Arts. (1983). *Reproductive Hazards in the Arts and Crafts*. NontoxicHub. https://www.nontoxichub.com/reproductive-hazards

Code of Massachusetts. (n.d.). Retrieved 2021, from https://casetext.com/regulation/code-of-massachusetts-regulations/department-780-cmr-state-board-of-building-regulations-and-standards/chapter-10-means-of-egress

Commonwealth of Massachusetts. (n.d.). *Crowd Managers*. Mass.Gov. Retrieved September 28, 2021, from https://www.mass.gov/service-details/crowd-managers

Curland, C. (2018, December 5). *Painting While Pregnant: Reproductive Hazards in the Scenic and Props Artist's Workplace*. Technical Tools of the Trade. http://www.techtoolstraining.org/spotlight/2018/12/5/painting-while-pregnant-teproductive-hazards-in-the-scenic-and-props-artists-workplace

Diversity & Inclusion Syllabus Statements | Sheridan Center | Brown University. (n.d.). Brown University. Retrieved 2020, from https://www.brown.edu/sheridan/teaching-learning-resources/inclusive-teaching/statements

Earl, J. (2018, March 19). *Deadly Cirque du Soleil accidents, from hand slips to wire mishaps*. Fox News. https://www.foxnews.com/us/deadly-cirque-du-soleil-accidents-from-hand-slips-to-wire-mishaps

Electrical Safety. (n.d.). Princeton. Retrieved 2021, from https://ehs.princeton.edu/book/export/html/75

Fall protection for the entertainment industry under the OSH Act of 1970. | Occupational Safety and Health Administration. (1997, January 28). Occupational Safety and Health Administration. https://www.osha.gov/laws-regs/standardinterpretations/1997-01-28

Electrical Safety Basics. (2018, December 6). YouTube. https://www.youtube.com/watch?v=KhWlMqyPn5A

Essential Guide to Safety & Security - Emergency Action Planning and Crisis Management. (n.d.). MPIWeb. Retrieved 2021, from https://www.mpi.org/essential-guide/emergency-plan

eTool: Evacuation Plans and Procedures - Emergency Action Plan | Occupational Safety and Health Administration. (n.d.). OSHA EAP's. Retrieved 2021, from https://www.osha.gov/etools/evacuation-plans-procedures/eap

Exit Discharge Requirements (Definition, Level & Exceptions). (2021, March 30). Lapeyre Stair Blog. https://blog.lapeyrestair.com/exit-discharge

FCS Course. (n.d.). Crowd Risk Analysis Ltd. Retrieved 2021, from https://crowdrisks.com/fcs.html

Fireworks Safety in Manufacturing and Retail Sales. (2018, July 16). YouTube. https://www.youtube.com/watch?v=te5nrX_50OY

First Place Rental. (2002). *Equipment Rental in Oswego IL | New Equipment Sales in Oswego Illinois*. https://www.firstplacerental.com/

Friend, E. (2009, December 7). *actsafe Event Safety Conference 2017*. Theatre Safety Blog. https://theatresafetyblog.blogspot.com/

Garskof, J. (2020, July 6). *Electrical Problems: 10 of the Most Common Issues Solved*. This Old House. https://www.thisoldhouse.com/electrical/21015244/10-wiring-problems-solved

General Industry | Occupational Safety and Health Administration. (n.d.). OSHA. Retrieved 2021, from https://www.osha.gov/training/outreach/general-industry

Get Enough Sleep. (2021, April 21). Centers for Disease Control and Prevention. https://www.cdc.gov/sleep/features/getting-enough-sleep.html

GME Supply Co. (2021). *Fall Protection Safety Gear & Equipment*.

Google Images. (n.d.). Google. Retrieved 2021, from https://www.google.com/imghp?hl=en&tab=ri&authuser=0&ogbl

Gravitec. (n.d.). *Full Body Harness* [Illustration]. Protection Workers at Height.

"Greek Theatre Backstage Page." *National Theatre*, 20 Apr. 2018.

Health benefits of exercise. (2020, April 30). NHS Inform. https://www.nhsinform.scot/healthy-living/keeping-active/health-benefits

History.com Editors. (2019, December 27). *Fire breaks out in Chicago theater*. HISTORY. https://www.history.com/this-day-in-history/fire-breaks-out-in-chicago-theater

How Crowds Can Kill You. (2016, April 28). YouTube. https://www.youtube.com/watch?v=ldOprmqSt7o

L. (2019, August 15). *DANGEROUS - Meaningfully Assessing Risk in Aerial Arts | Aerial Silk Classes & Cirque-Style Training in NYC | Laura Witwer, Professional Aerialist and Aerial Instructor*. Laura Witwer, SassyPants Aerial Arts. https://www.laurawitwer.com/2019/08/15/dangerous-meaningfully-assessing-risk-in-aerial-arts/

Levenson, M. (2021, July 29). *Shooting Outside Nationals Ballpark in Washington Halts Game*. The New York Times. https://www.nytimes.com/2021/07/17/us/washington-nationals-shooting.html

Lukasik, T. (2021, February 16). *Remembering the Station Nightclub Fire*. Building Safety Journal. https://www.iccsafe.org/building-safety-journal/

Madonna MDNA Girl Gone Wild Tour. (2012, December 22). YouTube. https://www.youtube.com/watch?v=_89VQHacpCU

Managing Travel for Planned Special Events Handbook: Executive Summary - Planning, Implementing, Operating, and Evaluating - FHWA Office of Operations. (2017, February 1). US Department of Transportation. https://ops.fhwa.dot.gov/publications/fhwahop07108/pl_imp_op_eval.htm

Massachusetts Coalition for Occupational Safety And Health | Standing together for Safe and Healthy Work. (n.d.). Masscosh. Retrieved 2021, from http://masscosh.org/

McCann, Ph.D., C.I.H., M. (2021, June 30). *Industrial Ventilation for a New Art Building*. NontoxicHub. https://www.nontoxichub.com/

N. (2021). *NFPA 160: Standard for the Use of Flame Effects Before an Audience, 2011 Edition* (2021st ed.). NFPA.

National Fire Protection Association. (2011). *NFPA 101 Life Safety Code 2012 (Nfpa Life Safety Code)* (2012th ed.). Natl Fire Protection Assn.

National Institute for Occupational Safety & Health | NIOSH. (n.d.). NIOSH. Retrieved 2021, from https://www.cdc.gov/niosh/index.htm

NFPA 1126: Standard for the Use of Pyrotechnics Before a Proximate Audience, 2021 edition (2021st ed.). (2021). NFPA.

O. (2020). *29 CFR 1910 OSHA General Industry Regulations & Standards January 2020 Edition*. Mancomm.

OSHA. (2011, March 4). *US Department of Labor's OSHA cites Spider-Man Broadway musical production company following injuries to cast members*. US Department of Labor - OSHA. https://www.osha.gov/news/newsreleases/region2/03042011

Occupational Safety and Health Administration. (n.d.). Occupational Safety and Health Administration. Retrieved 2021, from https://www.osha.gov/

OSHA Training Institute Education Center of Keene State College. (2017). *OSHA 511: Occupational Safety and Health Standards for General Industry*. Keene State College.

Outreach Training Program | Occupational Safety and Health Administration. (n.d.). OSHA. Retrieved 2021, from https://www.osha.gov/training/outreach

People and Crowd Management Planning | Safety & Security for Meetings & Events. (2019, October 4). YouTube. https://www.youtube.com/watch?v=lE-GNcr1nxs

Pressley, N. (2011, December 2). *Monica Lijewski remains hospitalized after fall from Olney stages*. The Washington Post. https://www.washingtonpost.com/

Prichard, K. (2020, September 1). *The 6 Steps of Lockout/Tagout*. OMAG. https://www.omag.org/news/2020/9/1/the-6-steps-of-lockouttagout

Reporter, D. (2021, September 21). *Rusted staircase removed near JFK/UMass Red Line station where BU professor died*. BostonGlobe.Com. https://www.bostonglobe.com/2021/09/20/metro/rusted-stairwell-removed-near-jfkumass-red-line-station-where-bu-professor-died/?event=event12

Respiratory Protection in General Industry. (2012, February 7). YouTube. https://www.youtube.com/watch?v=p1yYmABesZE&t=2s

Respirator Safety. (2009, December 16). YouTube. https://www.youtube.com/watch?v=Tzpz5fko-fg

Respirator Types. (2012, February 7). YouTube. https://www.youtube.com/watch?v=u_Dovk_khLw

Reynolds, W. J. (2020). *Safety and Health for the Stage: Collaboration with the Production Process* (1st ed.). Routledge.

Ronan, P. (2016). Company Cited for Safety Violations a Month Before Wollaston Theatre Wall Collapse. *Wicked Local - Kingston*, 1–3.

Rosebrand.com. (n.d.). *Flame Retardant from Rose Brand*. RoseBrand. Retrieved 2021, from https://www.rosebrand.com/subcategory16/flame-retardant.aspx

Rossol, M. (2011). *The Health & Safety Guide for Film, TV & Theater, Second Edition* (Second Edition). Allworth.

Rossol, M. (2013). Theatrical Fall Protection. *Strategies for Protecting Performers*, 1–4.

Rossol, Monona & Hinkamp, David. (2001). *Hazards in the theater. Occupational medicine (Philadelphia, Pa.). 16. 595-608, iv.*

Royal Caribbean Oasis of the Seas - Aqua Theatre: Aqua 80 (Underwater). (2020, May 9). YouTube. https://www.youtube.com/watch?v=NAoHeDTQicA

Schorow, S. (2021). A “Splendid and Terrible Sight.” *NFPA Journal - The Magazine of The National Fire Protection Association*, 64–71.

Study.com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers. (n.d.). Study.Com. Retrieved 2021, from https://study.com/academy/lesson/safety-in-gymnastics-techniques-equipment.html

Suef, B. (2005). *32 Dead in Egypt Theater Fire*. CNN. https://www.cnn.com

Systems: Everything You Wanted To Know. (n.d.). Cleaning Services Group Inc. Retrieved 2021, from https://www.csginc.com/

The Hazards of Bloodborne Pathogens | ATrain Education. (n.d.). A Train Education. Retrieved September 29, 2021, from https://www.atrainceu.com/content/1-hazards-bloodborne-pathogens

Types of Collective Behavior – Sociology. (2016, April 8). Pressbooks. https://open.lib.umn.edu/sociology/chapter/21-1-types-of-collective-behavior/

University of Ottawa. (2020, January). *Project Hazard Analysis*.

U.S. Bureau of Labor Statistics. (n.d.). BLS.Gov. Retrieved 2021, from https://www.bls.gov/

U.S. Department of Labor. (n.d.). US Department of Labor. Retrieved 2021, from https://www.dol.gov/

Which Type Of Fire Extinguisher And When To Use Them | Red Box. (n.d.). Red Box Fire Control. Retrieved 2021, from https://www.redboxfire.co.uk/blogs/what-type-of-fire-extinguisher-do-i-need

Work Life Balance. (n.d.). Mental Health America. Retrieved 2021, from https://www.mhanational.org/work-life-balance

Working With Crowds. (2020a, June 1). *AC DC Salt Lake City crowd crush*. https://www.workingwithcrowds.com/ac-dc-salt-lake-city-crowd-crush/

Working With Crowds. (2020, June 1). *Working with crowds crowd disasters by year*. https://www.workingwithcrowds.com/crowd-disasters-year/

Wynn-Moylan, P. (2017). *Risk and Hazard Management for Festivals and Events* (1st ed.). Routledge.

3M. (2009, July). *Half Facepiece Respirator 6000 Series, Reusable* (No. 4100). https://www.grainger.com/ec/pdf/6000-Series-Sell-Sheet.pdf

5 Ways to Prevent Workplace Falls. (2019, January 7). YouTube. https://www.youtube.com/watch?v=Qpowg5Ynh0w