CONNECTICUT DEPARTMENT OF LABOR
Partner of the American Job Center Network

# CONN-OSHA QUARTERLY

March 2016

## Hazard Analysis Methodologies

***Safety & Health Management Systems; Taken from www.OSHA.gov eTools***

Hazards analysis can get pretty sophisticated and go into much detail. Where the potential hazards are significant and the possibility for trouble is quite real, such detail may well be essential. However, for many processes and operations — both real and proposed — a solid look at the operation or plans by a variety of affected people may be sufficient. The easiest and possibly most effective method is using the step-by-step process of the Job Hazard Analysis (JHA). JHA, sometimes referred to as a Job Safety Analysis (JSA), is covered in good detail in the Job Hazard Analysis, OSHA Publication 3071 [499 KB PDF*, 51 pages].

However, if you are faced with fairly sophisticated and complex risks with a reasonable probability of disaster if things go wrong, you may want some help with some of the other hazards analysis methodologies. What follows is a very brief look at the common ones. If you decide to try one of the approaches, check with your local OSHA Consultation office or call an engineering firm which specializes in hazards analysis.

**WHAT - IF Checklist:** *The what - if* checklist is a broadly-based hazard assessment technique that combines the creative thinking of a selected team of specialists with the methodical focus of a prepared checklist. The result is a comprehensive process hazards analysis that is extremely useful in training operating personnel on the hazards of the particular operation.

The review team is selected to represent a wide range of disciplines — production, mechanical, technical, safety. The team is then provided with basic information on hazards of materials, process technology, procedures, equipment design, instrumentation control, incident experience, previous hazard reviews, and so on. A field tour of the process is also conducted at this time, assuming the process is in operation.

The review team methodically examines the process from receipt of raw materials to delivery of the finished product to the customer's site. At each step the group collectively generates a listing of *what - if* questions regarding the hazards and safety of the operation. When the review team has completed listing its spontaneously-generated questions, it systematically goes through a prepared checklist to stimulate additional questions.

Subsequently, answers are developed for each question. The review team then works to achieve a consensus on each question and answer. From these answers, a listing of recommendations is developed specifying the need for additional action or study. The recommendations, along with the list of questions and answers, become the key elements of the hazard assessment report.

**Hazard and Operability Study (HAZOP):** *HAZOP is* a formally structured method of systematically investigating each element of a system for all of the ways in which important parameters can deviate from the intended design conditions to create hazards and operability problems. The hazard and operability problems are typically determined by a study of the piping and instrument diagrams (or plant model) by a team of personnel who critically analyze the effects of potential problems arising in each pipeline and each vessel of the operation.

Pertinent parameters are selected — for example, flow, temperature, pressure, and time. Then the effect of deviations from design conditions of each parameter is examined. A list of key words such as *more of, less of, none of, part of*, are selected for use in describing each potential deviation.

The system is evaluated as designed and with deviations noted. All causes of failure are identified. Existing safeguards and protection are identified. An assessment is made weighing the consequences, causes, and protection requirements involved.

**Failure Mode and Effect Analysis (FMEA):** The failure mode and effect analysis is a methodical study of component failures. This review starts with a diagram of the process that includes all components which could fail and conceivably affect the safety of the process. Typical examples are instrument transmitters, controllers, valves, pumps, and rotometers. These components are listed on a data tabulation sheet and individually analyzed for the following:

- Potential mode of failure, open, closed, on, off, leaks, etc
- Consequence of the failure.
  - Effect on other components.
  - Effect on whole system.
- Hazards class ... *high, moderate, low.*
- Probability of failure.
- Detection methods.
- Compensating provision/remarks.

Multiple concurrent failures are also included in the analysis. The last step is analysis of the data for each component or multiple components failure and development of a series of recommendations appropriate to rick management.

(Continued on page #2)

# *Hazard Analysis Methodologies, cont.*

**Fault Tree Analysis: (seen below)**

A fault tree analysis is a quantitative assessment of all of the undesirable outcomes, such as a toxic gas release or explosion, which could result from a specific initiating event. It begins with a graphic representation (using logic symbols) of all possible sequences of events that could result in an incident. The resulting diagram looks like a tree with many branches — each branch listing the sequential events (failures) for different independent paths to the top event. Probabilities (using failure rate data) are assigned to each event and then used to calculate the probability of occurrence of the undesired event. A simple example of a fault tree analysis chart is shown below.

This technique is particularly useful in evaluating the effect of alternative actions on reducing the probability of occurrence of the undesired event.

**Other Hazard Evaluation Procedures:**
Additional information on the hazard evaluation procedures outlined above and descriptions of other hazard evaluation procedures, as well as information concerning the selection of an appropriate procedure, are contained in ***Guidelines for Hazard Evaluation Procedures***, prepared by The Center for Chemical Process Safety of the American Institute of Chemical Engineers.

**Routine Hazard Analysis:**

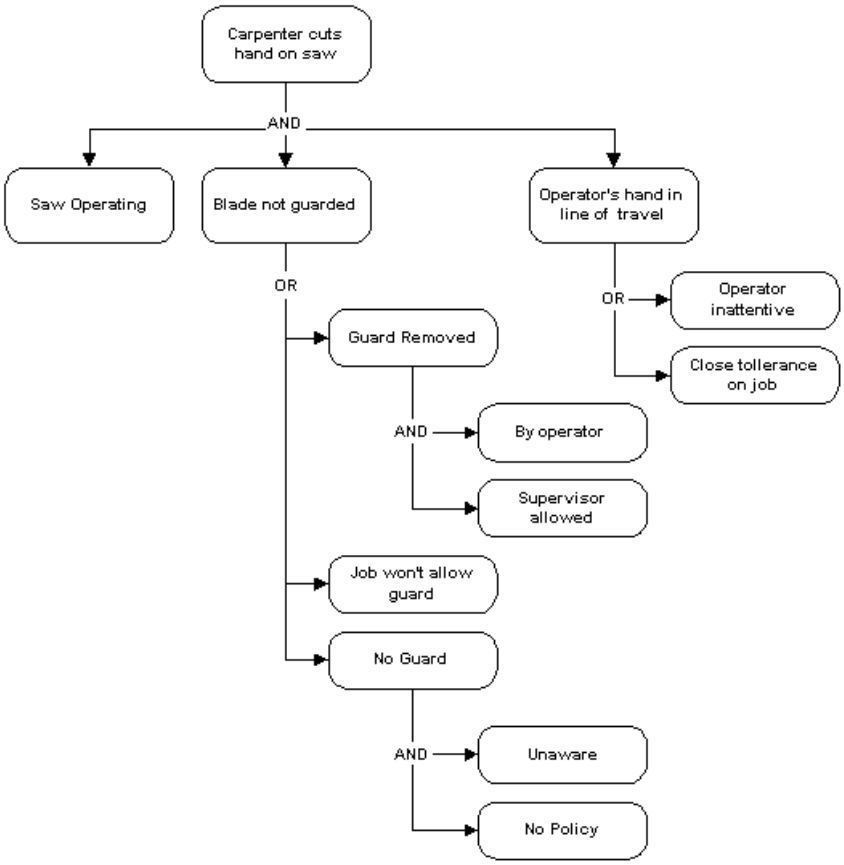
Even simple processes are complex — they are impacted by human behavior, workplace variables, other business and natural forces, raw material variables, normal wear and tear, and more.

It's a given — jobs once designed for safety may now have hazards or improper operations.

The hazards analysis process — called a *Job Hazards Analysis (JHA) or Job Safety Analysis (JSA)*— pulls processes back on the safety track periodically.

Done for every job, a JHA or JSA ensures safe steps, teaches new workers, eliminates or controls hazardous materials, and much more.

- Some companies have work teams complete JHAs or JSA on every job or process and then use them as the guide for how to do the job.




Effective immediately, the e-mail addresses of all CONN-OSHA personal has been changed to:
**First name.last name@ct.gov**

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To receive the *Quarterly* electronically or to make suggestions on how to improve this newsletter, contact Grayson.gregory@ct.gov In the subject line type *"subscribe"* and provide your e-mail address. You may also reach us by phone at (860) 263-6900 or visit us at: www.ConnOsha.com

## *Connecticut Department of Labor's new Commissioner….. Scott D. Jackson*

A graduate of Cornell University, from which he holds a Bachelor's degree in Government, the Hamden resident, while in school served as secretary of the Cornell Civil Liberties Union and was on the editorial staff of the Cornell Political Forum. While at Cornell, he was awarded a Mellon Foundation Fellowship to study demographic trends in municipal government at Yale University and received one of two Minority Student Achievement Awards from the Cornell University College of Arts and Sciences.

From 1993 to 2000, Commissioner Jackson was a member of U.S. Senator Joseph Lieberman's staff in Hartford, where he handled citizen outreach and casework duties and served as Systems Administrator.

Commissioner Jackson left Senator Lieberman's office in 2000 to serve as Project Manager and Technical Director for the Connecticut Policy and Economic Council, an entrepreneurial non-profit dedicated to improving the delivery of government services. In 2003, he returned to Senator Lieberman's office as Deputy State Director for Constituent Services. He also became a member of the Town of Hamden's Community Development Advisory Commission. A year later, he was appointed to manage the town's Office of Housing and Neighborhood Development, which was charged with overseeing the Community Development Block Grant. In 2005, he was appointed Chief Administrative Officer for the Town of Hamden. Scott Jackson himself was elected Mayor of Hamden in 2009, leaving the office in 2015 to become Connecticut's Under Secretary for Intergovernmental Policy.

In 2014 he was appointed by Governor Dannel P. Malloy to serve on – and was chairman of – the Governor's Sandy Hook Advisory Commission. The 16-member panel was charged with investigating the tragic December 14, 2013 shooting deaths of 20 first graders and six educators at Sandy Hook Elementary School.

He is married to Mandi Isaacs Jackson, and they have two sons, Maxwell, who is nine years old, and Elijah, who is seven.

## *We also have a new Deputy Commissioner….. Kurt Westby*

Kurt Westby brings a strong background of union involvement with him to his position as Deputy Commissioner at the Connecticut Department of Labor. A graduate of Penn State University, the central Pennsylvania native majored in sociology and German, traveling to Germany where he studied abroad for a year in 1978. It was while in college that Westby's initial interest in union matters took root.

"While attending university, I had several jobs, including work as a cook in an Italian restaurant, in construction, and as both a school and city bus driver," he remembers. "I also became active in the union, and continued doing that for another year after college."

Following Penn State, Westby went on to graduate school at Cornell University in New York. There, he studied organizational behavior and received a Master's degree in Sociology and Industrial Labor Relations. In his spare time, Westby also played squash, a sport he still counts as his favorite.

While at Cornell, he also met his future wife, Ana, at a party. "We hit it off because she liked the fact that I would invite her out on a weeknight," he smiles. "She is Spanish, and in her native country, everyone is more accustomed to going out frequently."

The couple married in 1988 and moved to Middletown, where Ana had found a job at Wesleyan. At the same time, Kurt began working for the Service Employees International (SEIU) Union, "which is devoted to fighting for low-wage workers." he explains "I continued that work as the union grew and working standards improved."

In 2013, the Westby family – which by now included a son, David, currently a student at Tufts University; and a daughter, Hanna, 14, a student at Middletown High School, relocated to Spain for a year, where Ana directed a student-abroad program. Kurt enjoyed his time there, too. "I had fun mountain biking, cooking and improving my Spanish speaking skills," he said.

The family returned home to Middletown in 2014 and Westby went back to work for the SEIU. This past January, he was appointed by Governor Dannel P. Malloy as Deputy Commissioner of the Connecticut Department of Labor.

"I'm still settling in, but have been impressed by what I have seen so far, the folks who work here, and their sense of commitment to the people of Connecticut," he said. "I'm happy to join you in this work."

## *Do you have a Question? The Department of Labor Webhelp can help you find the answer.*

We live in a time that some people call the "information revolution". When we have a question, we can access an almost infinite number of resources to help us find our answer. The internet is one of those resources and at first glance, this speedy resource is wonderful. But if you are looking for specific information or the answer to a specific question the internet can become a maze. This can be especially true if you are using a government website.

The Connecticut Department of Labor (CTDOL) is committed to protecting and promoting the interests of Connecticut workers. If, for example, you are looking for information on: unemployment benefits or services, Connecticut Labor Laws, are an employer with questions on unemployment taxes or are looking for a job ; you can use webhelp.

On the CTDOL's home page http://www.ctdol.state.ct.us/ under the "Contact Us" tab users will find the CTDOL's main address and telephone number. They will also find the e-mail application dol.webhelp@ct.gov. Open the link, type your question and it will be routed to the appropriate department. Once there, it is assigned to the individual that is best suited to answer your question. The U.S. Department of Labor (U.S.DOL) offers a similar service that can be accessed by e-mailing your question to webmaster@dol.gov.

## *Fatality & Casualty Reporting*

**State & Town:** CONN-OSHA (860) 263-6946 (local) or 1-866-241-4060 (toll-free)
**Private Employers:** Report to Federal OSHA at 1-800-321-OSHA(6742)

## *Hazard Corner….Firefighting 101* By: Jim Fusaro Occupational Safety Officer

First, I would like to start by stating that I love firefighters and I have the greatest respect for them. I hope that I don't upset too many of them that I'm sure will read this article. I love my job and look forward to coming to work every day, well almost. You see, my job entails performing safety inspections in all branches of the State and Municipal governments, as well as investigating untimely work-related accidents and deaths (we call them Fatalities/Catastrophes (FAT/CATS)). That is the part of my job that I hate to do, but it's the crux of it. Our goal here is to help all State and City/Town employees go home at the end of the day in the same physical condition in which they reported to work.

We operate under the Code of Federal Regulations (29 CFR Parts 1910 and 1926), which, when added up, totals approximately 1,700 pages. The sections regarding Fire Brigades account for about 2 pages of this 1,700.

2 PAGES for FIREFIGHTING!, are you kidding? No, I am not.

I was tasked with investigating the untimely death of Firefighter Kevin Bell in October 2014. My job is not that of a Fire Marshal, Arson Investigator or Medical Examiner, mine is to figure out what went programmatically wrong that resulted in his passing.

My first impression when I saw the two-family house in which Mr. Bell perished. I thought "Why did someone die here?". I've seen much bigger fire scenes where no one was injured, let alone died.

What we found was that some of Hartford's bravest: had not had their annual physical as required, some had not been annually fitted for their breathing apparatus, some were not wearing their helmets properly, most were not wearing fire/heat resistant hoods, and that some air tanks had not been hydrostatically tested as required by the regulations. I'm not trying to pick on the City of Hartford; we've found similar violations in many other fire departments of all different sizes.

The City has paid their penalties to us, but that's not going to bring Kevin back to his family, friends, or to his brothers at his fire house on Blue Hills Avenue. Now, as we allow the dust and lawsuit(s) to settle; don't you think it would ultimately have been less expensive to have kept up with proper equipment, training, and preventive medical care? I think so.

I understand that there isn't a City, Town, or Volunteer fire department in this state that doesn't have a tight budget, but they all need to realize that these brave men and women are risking their lives every time they answer the call from a neighbor in need and none expect to die in the process of doing so. This wasn't a big industrial chemical plant that exploded because they were storing their chemicals improperly, it was a relatively small fire in a relatively small house, which could have existed in any size town, manned by any sized fire department.

CONN-OSHA's Consultation department is available to help Connecticut employers with their health and safety programs. Call 860-263-6900 or visit the CONN-OSHA web site.

## *CONN-OSHA~ Training Update…*

***Construction Site Safety*** ***March 23, 2016 from 10:00 a.m. to noon*** Construction managers, first line supervisors, and construction employees will be provided with an overview of four areas of concern on the construction site. Program contents include: fall protection, scaffolding and ladder safety, electrical hazards, and excavation & trenching safety.

***OSHA Recordkeeping*** ***March 30, 2016, from 10:00 a.m. to noon*** At this workshop the OSHA Recordkeeping and Reporting Occupational Injuries and Illnesses standard, 29 CFR 1904, will be reviewed.

***Work Zone Safety*** ***April 6, 2016, from 10:00 a.m. to noon*** Basic guidelines for work zone traffic control and the requirements of Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) with particular emphasis on short term work sites on roads and streets in rural and small urban areas will be presented.

***Hazard Communication*** ***May 11, 2016 from 10:00 a.m. to noon*** At this workshop the Hazard Communication Standard (HCS) will be reviewed along with the major changes of 29 CFR 1910.1200: hazard classification, pictograms and safety data sheets.

***Confined Space Safety*** ***June 8, 2016 from 10:00 a.m. to noon*** This workshop discusses the basic requirements and procedures involved with permit-required confined spaces as detailed in 29 CFR 1910.146 and 1926.1200 – Subpart AA

***Breakfast Roundtable*** This discussion group meets the third Tuesday of every month from 8:15 am to 9:45 am. Pre-registration is required. Visit our web page for more information: http://www.ctdol.state.ct.us/osha/Breakfast/index.htm To be placed on the e-mail distribution list, contact John Able at John.able@ct.gov

Classes are free and are held at 200 Folly Brook Boulevard, Wethersfield, CT in Conference Room A/B (unless otherwise noted). To register, contact Catherine Zinsser at catherine.zinsser@ct.gov Pre-registration is required. A Photo I.D. is also required to allow entry into a public building. For more training information, visit the CONN-OSHA web site www.ConnOsha.com