



MARY KAY O'CONNOR PROCESS SAFETY CENTER

TEXAS A&M ENGINEERING EXPERIMENT STATION

19th Annual International Symposium
October 25-27, 2016 • College Station, Texas

Mentoring New Plant and Process Safety Engineers

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Abstract

Within a matter of months, I was the PHA leader and most experienced of five process safety engineers in our chemical park. Of the other five, 4 had limited process safety experience. The new engineers were of varying backgrounds and cultures. Since I myself have been an HSE professional for 30 years, and grew up with process safety from the beginning, I had limited experience with how to grow process safety competence in someone else. I looked forward to the challenge. This paper is a discussion of the ideas, processes and experiences I had along the way to developing competence in others. It is a case study and includes lessons learned.

Key words: Training, competence, culture, innovation, hazard assessment

Introduction

This paper is a case study in training new people to be process safety engineers. But also, this is a study in mentoring for the non-mentor.

This paper is not for charismatic management types; the one who wants to be the captain of a ship and be the much loved leader. It is for the ones who work with people but don't manage them and whose primary focus is on developing substantive expertise rather than on motivating and mentoring others.

I have been an HSE professional for 30 years. I've always been a person focused primarily on technical skills, responsible more for implementing solutions than supervising people. However, in a very short period of time, our department changed from 6 competent people with years of experience to two people with experience and 5 people new to process safety management. I found myself suddenly having to look out for new people and find a way to train them.

In plunging into the task, I found that the people I was supposed to be training were not happy with me and my methods. I didn't know what the problem was until I took a step back and did some reading about mentoring, at which point I realized I had made numerous mistakes. This paper is about what I learned from the mistakes than about amazing success.

What is meant by mentor? It is true the main goal of my involvement with these new process safety engineers is training them to do PHAs, MoCs, and hazard analysis. It is also true the bigger picture of their life and career is involved because process safety engineering is a profession as well as a specific job.

I am uncomfortable with the word "mentor." I prefer the word resource because a resource is only responsible for information. I realized that I am uncomfortable with ensuring initiative or accountability in another person.

The problem was I really hadn't catalogued all the various things which I learned from 30 years of experience; and had no idea how to teach my experience.

Learning to be a process safety engineer is not as simple as going to a course. Much of process safety management practices are based on OSHA interpretations gleaned from years of paying attention to the industry; there is no definitive place where all these dos and don'ts are written down.

A new process safety engineer is usually someone who has come to the position from another point in their career. Along with the variety of ways a person ends up in process safety, there are a variety of attitudes towards the work. There are barriers to overcome when you are faced with performing a totally new type of work. While I am enthusiastic about process safety, a trainee may be wondering what sort of strange world they have gotten themselves into.

In my journey over the course of a year, I learned about myself, about the others, about how to bridge the gap. This case study is organized into five topics, or areas of learning: knowing yourself, change management, understanding your mentee, structuring the relationship, solution ideas.

A. Know Yourself

Physician heal thyself! (a proverb found in Luke) Mentor, know yourself!

a) What do you stand for? I stand for technical expertise. I love the details of HAZOPs. I love pondering the meaning of each number in each box. To me, it is more of a mosaic, a work of art than a HAZOP. To a new person, it is like looking at a foreign language.

Once you know what you stand for, training becomes much easier because then everything you do to help the new person will be based in the common theme. Then the common theme becomes the thing that motivates the other person. If I had recognized my own love for the meaning behind the cryptic (almost symbolic) language of the HAZOP spreadsheet itself, it would have

been easier to teach. My enthusiasm would have been communicated to the mentee and helped the mentee gain interest in this new profession.

b) What do I know? After we realized that we had to train some people, we made a list of what was important. Besides the 14 elements of Process Safety Management, there is working knowledge of 50 other topics. The list clearly showed that a competent process safety engineer has a wealth of knowledge which is difficult to teach. For instance, there are applicable EPA regulations. There is working knowledge of the equipment in the process. There is working knowledge of the chemistry involved. There is working knowledge of functional safety, National Fire Protection codes (NFPA), general safety, pressure safety (ASME), industrial hygiene, safety data sheets (SDSs), how to read P&IDs, how to use various custom software, where knowledge is stored in the computer. Then maybe you can move on to hazard identification and how to create and lead a HAZOP. If you have been at a plant for several years, you are already storing historical information that has to be passed on to a new person. I learned what I know in bits and pieces as the regulatory environment evolved. Prior to needing to train someone, I never even considered the catalog of information I carry in my head.

c) How did I learn? I first entered the HSE arena as an environmental engineer. This was before such a specialty existed in schools. I was given a Code of Federal Regulations and told to read it and do it. Over a couple of years, the same thing happened as I gained responsibility in the safety arena. Process Safety Management had not yet been invented when I became responsible for both safety and environmental. I first read about Process Safety Management in the Federal Register, 1992. The new process safety engineer may not have read legal documents ever. My impression was the new people wanted to be quickly taught in a class room type setting. But the knowledge I gained over the course of my career cannot be transmitted in this manner. I didn't realize the time and methodology which would work at the outset.

d) What's in it for me? Maybe nothing. Do I even want to train this new person? I am a technical person. I may not be interested in motivating someone. I may be undertaking this training assignment simply because there is no one else. I may be training someone who is at a higher grade level and getting paid more. I may be covering several jobs and also expected to train people. These type of issues cause me to become stressed and resentful which lead to difficulties in relating to the new colleagues and my manager.

e) How are you relating to the trainee? It is one thing to be a highly competent, knowledgeable, technical expert. It is quite another to be able to help someone else along in a non-technical area. Helping another person involves developing a give and take relationship with someone from another gender, race, generation, knowledge base. The person arrives in the job as your colleague and not your subordinate. Generational and knowledge related norms which you take for granted come into question and friction may arise. You may be powerless over that friction until you realize how it is happening.

What assumptions have I made? It is very easy to assume if a person is an engineer with a few years of experience there are certain things they know. Often, people don't know what I assumed they should know. I had to realize this and find a way to bridge the gap. How can knowledge be

transferred in a short time to bridge the gap? Timing is critical as the plant needs a qualified person to do hazard analysis now, not 3 years from now.

One of my assumptions relates to being a pioneer woman in a predominantly male profession and the challenges of excelling in a predominately male professional field. I was self-taught, and was motivated to “go find out” on my own so the male colleagues would not disrespect me. It baffles me when the newer process safety engineers who don’t know how equipment works expect to be handed knowledge rather than going out to learn; especially since the internet is now at our finger tips and you don’t have to go to the engineering library and look at a pump book.

B. Change Management

Where do new process safety engineers come from? Few new hires are experienced process safety engineers. Frequently, the new person is not coming from a safety background and may not currently have a career type interest in safety. Many aspects of change affect their initial performance. Situations in someone’s life affect the amount of energy they are able to bring to the new job. Friction can be created if the mentee is suddenly confronted with a mentor who is trying to push them along too quickly.

What changes affect the new person’s initial outlook and attitude? If they are a new hire, they are dealing with changes involved with a new company and new location. We have experience with people just getting married or just coming off maternity leave. A mature employee may have difficulty starting a whole new area of expertise after they were the expert in their previous position.

People outside of process safety don’t realize the huge volume of technical and regulatory information necessary for a process safety engineer to be able to successfully facilitate a HAZOP. Suddenly being confronted with having to do a job which involves a completely new expertise can be overwhelming to the point of needing some time out for the brain to catch up. Then the mentor wonders what is wrong with mentee. We forget learning new things takes a lot of energy.

On the other hand, I’ve worked with people who are highly excited to learn new things and interested in technical details. Mentoring such a person is really easy because they engage with you. They run off and try to learn on their own. I didn’t need to write this paper for these people.

C. What about them?

a) New people can be frustrated by the details. Process Safety practices and HAZOPs contain extremely detailed information. As I stated earlier, I enjoy the meaning of the details. But to a new person, a HAZOP looks like a lot of boring boxes that need to be filled in. It is a different language. The meaning of the details is not grasped. New people often want to follow rules without understanding why that rule came to be. It is often tedious to methodically check and edit a HAZOP. This level of detail does not come naturally. The detailed aspect of the job comes as a surprise to many people.

Another surprise is that the detail comes with a great responsibility. Whenever something happens at our plant, upper management often looks first at the HAZOP to see if it addressed the incident. When OSHA comes to inspect, the HAZOP is inspected in detail.

b) The problem of equipment knowledge and mechanical aptitude.

Some engineers have never seen chemical equipment in operation and so they lack the understanding of how it actually works. They need this understanding to perform hazard analysis correctly.

I am continually asked questions I think an engineer with a few years in the plant should know.

- Is carbon steel brittle?
- What is a canned pump?
- Does a compressor add heat?
- How do you read a P&ID?

I look at a P&ID and “see” a process. Not everyone does this. For some, they have no intuitive feel for what is happening. I don’t know how to teach that intuitive feel other than to encourage new process safety engineers to sit and look at the P&IDs and think about each line until the understanding comes. None of my mentees really wanted to do this.

c) Legal Intuition. I have been through OSHA inspections. I have been deposed in a court. I’ve heard numerous lectures from lawyers explaining what OSHA thinks is correct. I’ve searched the internet and OSHA.gov for information related to interpretations. Over a long career, your head is filled with do this / don’t do that as it relates to the details of completing HAZOPs. How do you explain to a new person something like why do we copy this but not that in a HAZOP document?

d) Many different learning styles. Learning has changed. Telling someone to read a technical document is ineffective. The willingness to take the time to read and digest information appears low among people who consume information in short bursts.

The mentor/mentee relationship can be viewed in several ways. I had to look inside myself and determine how I wanted it to feel. Looking at the following list of labels, I feel different with each one. Which one felt right to me?

- Training
- Apprentice
- Teaching
- Coaching
- Mentoring
- Oxford style Tutor
- Advisor
- Resource

We are both in both roles. I am learning how to guide someone from the mentee. The mentee is learning new information and to accept the mentor as they are.

e) Is performance my problem? It is, because my manager expects me to achieve something with this person. Does the mentee have the initiative? Sometimes, it seems not. When I feel like initiative is lacking, I need to figure out why. A new mother might be struggling to get back into the swing of work while managing a new child. A person from another company is struggling with all new people, surroundings, commutes, internet pages. Someone who just got married is struggling with a new living situation and trying to keep up at work. Someone from a different job within the company is struggling to understand that they have no expertise in this new professional area.

Or my perception of the mentee's performance could be entirely a misunderstanding. I didn't understand the knowledge gap between me and the mentee.

Notice what is going on. Do not take initiative away from a person that has it. Find a way to encourage a person without initiative to get it; even if you don't want to.

D. The Agreement

a) Develop a structure first. I never thought to frame the mentor activity at the outset; hence I formed false expectations and tried to use methodologies which wouldn't work. Have a discussion with the new process safety engineer.

- Does the new person want to be a process safety engineer? Discuss career goals. Frame training based on whether they are passing through or planning to stay.
- Have mutual expectations been discussed?
- Mentor and mentee need to find common ground
- Is the Mentor/ Mentee relationship formalized?
- Does the Mentor have the resources?

b) Flexibility

People can adjust enough to make the learning happen. If the relationship is started with a frank discussion of structure, then it is easier to discuss problems and make adjustments as time goes on.

Sometimes, the generational gap really could play a part. People are different now: corporate uniformity vs today's individuality. Today's corporate workplace does not have strict behavior standards of dress, working hours, work product output, punctuality and attentiveness in meetings. I enjoy the greater flexibility myself; but still might not understand exactly how flexible today's workforce can be.

Both trainer and trainee have to change. While it seems that I am the one leading, this should only be true regarding technical expertise. In the relationship itself, we are equals. Equality should be openly discussed or the relationship will degenerate into a power over relationship; and become less fun for both the mentor and mentee.

E. Solutions

a) What is competency? Assess competency earlier on. Identify knowledge gaps and clearly outline the learning goals. Think about what you are trying to accomplish.

b) Patience. Training a new person will not happen overnight. No matter how urgently I wanted colleagues who were competent, the process takes time.

c) Learning Models. Consciously check yourself and your mentee. How is the learning supposed to go?

- Banking Model. Am I teaching rules and expecting rules to be followed? Somewhat yes. But also, the meaning behind the rules has to be taught.
- Row boat analogy. Am I in the boat with the mentee? Do I realize what hard work rowing is and know that I have to help? What if I am in another boat doing my own rowing and just occasionally yelling to the mentee in another boat? During a long training period, I am probably also trying to do my own job. I find it easier and more pleasant to deal with the stress over a long period of time if I think about this picture consciously.
- Communication. Don't just tell; discuss. It is all a discussion between equals. Make sure the mentee speaks up. Two way communications is another way to avoid an unpleasant authoritarian relationship.

d) From judgment to acceptance. As a mentor, know that you will go through these stages.

- Yes I am an information booth.
- Things that need to be learned come up in the course of time. Time produces the product and I really don't know how to rush things unless the person themselves want to rush.
- I needed a mentor. It never occurred to me to get a mentor; or at least a neutral party to talk things out with.

e) Ideas

- Set up the change management structure with specific actions
- Give the experienced person the time resource
- Start with management of change. It allows a person to learn hazard analysis on a small scale; to learn the chemical process and its equipment, how to read P&IDs, how to read a HAZOP, what are the rules and regulations.
- Encourage the mentee to set up a collaboration space, like a wiki or a OneNote, where information can be located and both the mentor and mentee can add to it.
- Re-writing procedures. In our company, the experienced people never looked at the procedures since they knew what to do. But new people actually do read them. So update them.
- More frequent collaboration meetings. The manager of the department can develop a vigorous and vibrant experience sharing discussion on all the topics. This helps the new person gain knowledge of the unwritten aspects like OSHA intuition.

- Quality control process. Develop ways to check the work of new people.
- Internal training department. Some aspects of the process safety job, like equipment knowledge or chemical knowledge, are not directly process safety. It is too much to expect the process safety mentor to teach basic engineering. Have the training department organize these parts.
- External training. Yes, new process safety engineers need to go to outside courses on process safety management.
- Mini-training. Maybe a topic can be taught in-a-nutshell so it takes fewer time resources.
- Encourage in depth reading.
- Make engagement happen. If necessary, the new person's manager should be helping the mentor with engagement.

Conclusion

- Being aware and understanding the personalities of other people (and your own personality) will enable you to improve your interaction and understanding.
- Each personality type brings its own talents, gifts and experience.
- Individual circumstances determine how you need to adapt to the different personalities.

Take your time and have fun.