

-----Original Message-----

From: nderinger@cuhillapts.com [mailto:nderinger@cuhillapts.com]

Sent: Thursday, December 16, 2010 11:47 PM

To: zzMSHA-Standards - Comments to Fed Reg Group

Subject: RIN 1219-AB71

2010 DEC 16 P 12:17

Please see attached.

AB71-COMM-10

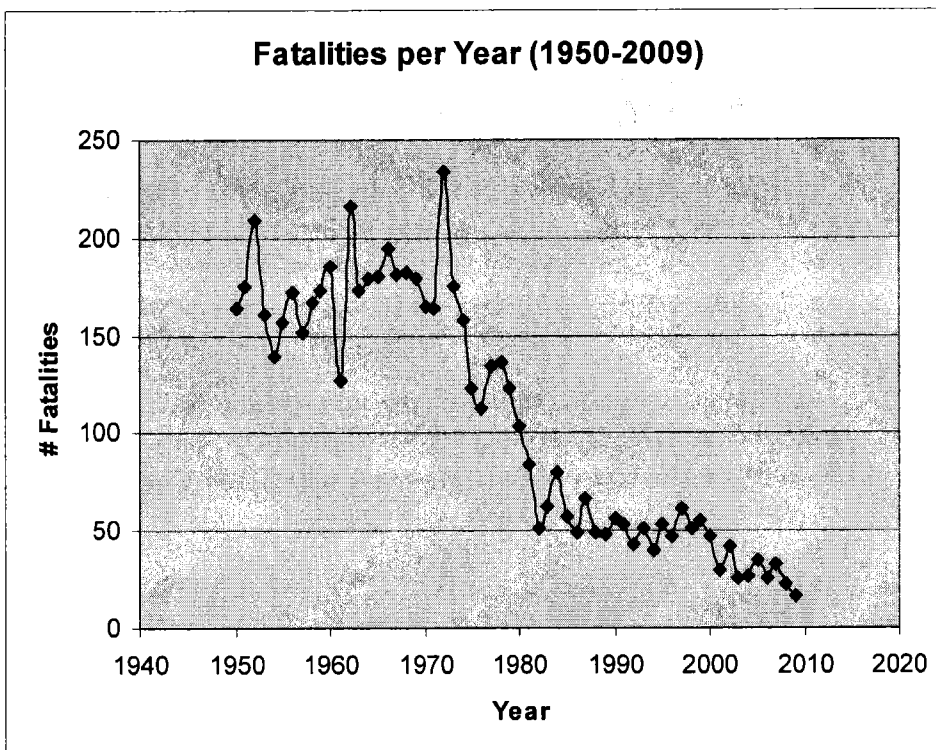
P. O. Box 772  
Lead, SD 57754  
December 16, 2010

Department of Labor  
Mine Safety and Health Administration  
Office of Standards, Regulations, and Variances  
1100 Wilson Blvd.  
Room 2350  
Arlington, VA 22209-3939

Attn. Ms. Patricia W. Silvey

Re: RIN 1219-AB71

Below is a graph showing the mining fatalities for years 1950 to 2009 for metal mines. MSHA began in the late 1970's. MSHA is often perceived as the police officer that is there to ticket miners for trivial things. I have not found that to be the case and the graph shows otherwise. I would like to take this opportunity to publicly say thank you to the men and women who have been involved in MSHA. Because of them and the work of the Mine Safety and Health Administration, each year around 100 families at metal mines have not lost loved ones to mining accidents. Thank you.



The question you are addressing with RIN 1219-AB71 's best practices survey is: "Mine Safety is an achievable goal .... So, why do some mines not achieve it?"

In much the way a speeding ticket has the effect of slowing a driver from their speed before the ticket, MSHA can only regulate a certain amount of safety. Often the driver will return to his previous behavior once the officer is gone. This tendency is a key factor in the plateau in the graph from 1980 to 2000. Deming introduced the concept of Kaizen to Japan in the 1950's. By 1989 the concept had taken hold in the United States to the point the Deming Prize was awarded to Florida Power and Light (see <http://en.wikipedia.org/wiki/Kaizen>). Scott Ward in his *Professional Safety* article "One Size Doesn't Fit All: Customizing Helps Merge Behavioral and Traditional Approaches" (2000) states: "In the early 1990's, several factors prompted FMC to re-examine its safety management process." Mining began developing "Continuous Improvement" programs around 2002. About the same time, Behavioral Based Safety began to make it's way to the mining industry.

The change when MSHA was formed is apparent on the graph as is the introduction of Behavioral Based Safety programs. A second plateau has formed. Note the data point for 2010 reflects only 6 months of time and projects out to roughly the same rate as the plateau. This reflects the point that Topf (1998) recognized: "While using positive reinforcement can be a powerful way to increase the frequency of desired behaviors (when it is used as an immediate consequence of those behaviors), it is limited as a overall strategy for change." In the article "Behavioral Safety: A Multifaceted Approach", Michael Topf (1998) articulated the goal of every safety program. "A primary goal of this process is to produce self-motivated, self-managed employees who behave in a safe manner "even when no one is looking" – When no rewards or punishment are in the offing. When employees understand and are motivated by the value of safety and environmental excellence for themselves, their coworkers, families and communities, they will strive to do what is necessary to ensure their health and well-being." The October 2007 article by Blair and Seo in *Professional Safety* quote Friend and Kohn who state: "It is important to recognize that conformance to legislation is not enough to create a safe and healthful working environment. It merely creates a baseline". They conclude with the following question about the focus of a training safety program: "Is your training customized and aligned with your mission, vision, and key performance indicators? Is the program missing important elements or strategies for connecting safety training to performance?"

I would contend that mining still needs to make the transition to high performance culture (six sigma culture) where the individual accountability is included into the key performance indicators and bonus structure. Cooper, Phillips, Sutherland, and Makin (1994) in their review of English construction workers found that goal setting reduced accidents. "The Cullen report (1990) specifically mentions the use of goal setting as a technique that might be more widely used to address failures of management control with in safety management systems. Cooper et al.(1994) further quote Locke, Shaw, Saari & Latham (1981): "Goal setting affects performance by directing the attention and actions

of individuals/ groups; mobilizing effort; increasing persistence; and by motivating the search for appropriate performance strategies.” The *Professional Safety* article by Turnbeaugh “Improving Business Outcomes” talks about the culture of an organization. According to Turnbeaugh (2010): “Six Sigma integrates accountability, measurement of results and regular feedback as key elements.” Also in Turnbeaugh’s article is a quote of Schein indicating “that leaders/ managers can change culture by:

- \* what they pay attention to, measure and control on a regular basis;
- \* how they react to critical incidents;
- \* how they allocate scarce resources;
- \* how they role model, teach and coach;
- \* how they allocate rewards and resources;
- \* how they recruit and select new members.”

This is a problem for everyone in the industry. When high profile accidents occur, the industry is perceived as needing more regulation when it would benefit from more consistent enforcement and adoption of best practices from other industries. I have worked at mines in Alaska, Montana, Nevada and South Dakota. When the inspecting agents have changed, so has the focus. Things that I knew would have been cause for alarm in one state are considered not an issue in another. The industry would benefit from cross training of MSHA agents and more standardization in what they are focused on. I believe that “Rules to live by” is a step in the right direction for addressing this issue.

This is a widespread problem affecting all segments of the industry in locations throughout the world. Paul and Maiti (2008) reviewed the fatality statistics for Indian coal miners and compared it to United States Coal mine fatalities and found both groups experienced roughly the same fatality rate. “Although the fatality rate in Indian coal mines is on par with that of US coal mines, the number of deaths per year in Indian coal mines is more than three times as many.” The variation in the number of fatalities is due to the US coal mines being more automated and thus requiring fewer workers. Paul and Maiti (2008) also state: “The safety management of the mines should discard their age-old belief that accidents/injuries are due to the hazardous nature of mining and only engineering control and regulation monitoring are sufficient for improving the safety of the mines. Elimination of negative behaviors must be focused on and appropriate remedial measures need to be taken by the mine safety management,” Weyman, Clarke and Cox (2003) examined English coal miners risk taking behavior. Results from their study indicate: “Study findings highlight the salience of three factors, time pressure, managements’ commitment (to safety) and confidence in the ability to deal with risk on miners’ disposition to engage in volitional risk-taking.” In their review of the “Predictors of occupational injuries among coal mines: causal analysis” Gosh and Bhattacharjee(2007) reviewed injuries at three coal mines in India. The focus of their study was an examination of the human factors that are causative factors in occupational injuries as based on a United States Bureau of Mines study that found: “human error was the most significant contributing factor and accounted for 93% of the total injuries.” Gosh and Bhattacharjee (2007) also stated: “According to the supervisors, individual production bonus sometimes encouraged workers to take risks.”

Decision makers that develop the bonus programs do not realize the unintended consequences of the rewarded behaviors. One mine I worked at presented the bonus system as a component of our base pay to augment the travel costs. There was no component for personal safety. When I got there the safety was atrocious. Individual workers did not exhibit any personal accountability for their own welfare. While I was there I was privilege to see a new mine general manager turn the safety around (3.82 incident rate down to 0.28) by being personally engaged in the safety process and implementing near miss investigations. Near miss investigations, implemented in 2008, at another mine I have worked at have also reduced the incident rate. In 2009 the mine experienced a zero lost time accident record. A third mine I worked at has a mixed record. Each time a new mine general manager came in the incident rate climbed. The record did show a significant drop after the 2002 introduction of behavior based safety. The program was slow to take off, but by 2004 it was showing results.

Perception that the programs will decrease productivity and profitability of a company are countered with an examination for the costs for the fines the mines experienced.

In summary, I would say that increasing fines has started to drive home the importance of increasing a safety culture at a mine, but it is not the whole picture. Key factors that I have noted include:

- Mine managers must be personally engaged in the process.
- Individual miners need to have increased accountability for their own actions.
- Bonus structures need to reflect personal accountability as well as group accountability.
- Near miss investigations help increase awareness of situations and improve accountability.
- Cross mine site planned general inspections (PGI's) increase awareness.
- Individual mine operators should be setting safety goals and holding the individuals at their properties accountable for the safety performance.

Again, I would state that this needs to be driven by the individual mine operators and can only in part be controlled by MSHA through their enforcement efforts.

Thank you for the opportunity to provide comment on this very serious issue facing the mining industry.

Sincerely,  
Natalie Deringer, P.E.  
Nevada Mining Engineer License # NV 019827

## References

- Schermerhorn, J., Hunt, J., & Osborn, R. (2008) *Organizational Behavior*, 10<sup>th</sup> ed., John Wiley & Sons, Inc.
- Ghosh, A. K., Bhattacharjee, A. (2007). Predictors of occupational injuries among coal miners: causal analysis. *Mining Technology*, 116, 16- 24.
- Turnbeaugh, T. (2010) Improving Business Outcomes, *Professional Safety*, March 2010, 41-49.
- Cooper, M., Phillips, A., Sutherland, V., and Makin, P., (1994) Reducing accidents using goal setting and feedback: A field study, *Journal of Occupational and Organizational Psychology*, 67, 219-240.
- Weyman, A., Clarke, D. and Cox T., (2003) Developing a factor model of coal miners' attributions on risk-taking at work, *Work & Stress*, 17,306-320.
- Choudhry, R., Fang, D., and Mohamed, S. (2007) Developing a model of construction safety culture, *Journal of Management in Engineering*, October 2007, 207-212.
- Paul, P., And Maiti, J. (2008) The synergic role of sociotechnical and personal characteristics on work injuries in mines, *Ergonomics*, 51, 737-767.
- Blair, E. and Seo, D. (2007) Safety Training, *Professional Safety*, October 2007, 42-48.
- Geller, S. (2006) The human dynamics of injury prevention (part1), *Occupational Hazards*, October 2006 78-82.
- Ward, S. (2000) One Size Doesn't Fit all: Customizing helps merge behavioral and traditional safety approaches, *Professional Safety*, March 2000, 33-36.
- Topf, M. (1998) Behavioral safety: A multifaceted approach, *Professional Safety*, 43, 34-36.
- United States Department of Mine Safety and Health (MSHA). (2010, May). Basic Mine Info. Statistics compiled by mine site name. Retrieved from <http://www.msha.gov/drs/ASP/BasicMineInfostatecounty.asp>

## Wikipedia

<http://en.wikipedia.org/wiki/Kaizen>

[http://en.wikipedia.org/wiki/W.\\_Edwards\\_Deming](http://en.wikipedia.org/wiki/W._Edwards_Deming)