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The Rise of Serious Injuries and the Proportion of Aging Workers in the Workplace

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Introduction

Since 2005 the incidence of serious injuries, those requiring lengthy periods of time off duty or restricted duty, has been on the rise as documented by numerous sources, including those cited below. In general, these increases are irrespective of the age of the worker. At the same time though, the number of aging workers in the workplace has increased. Data about the injury patterns of older workers indicate that, while the frequency of their injuries is lower than the proportion of the workforce they represent, they suffer from serious injuries more often than their younger counterparts. Finally, the recent economic downturn has virtually assured that the retirement plans of many workers in their late 50's and early 60's will have to be put on hold as they no longer possess sufficient resources to support themselves both in the interim period before they are eligible for Social Security and afterwards. This will result in an increase in the numbers of workers in the 55-64 and 65+ age groups; those who have the more serious and costly injuries as well as higher fatality rates.

In exploring these issues, this paper will present the idea that safety programs that lack the standard principles of effective occupational safety and health management systems (OSHMS), such as are outlined in ANSI/AIHA Z10-2005, may be contributing to both issues. A plan of action that encourages a significant review and revision of occupational safety and health programs to line up with such standards will be discussed as a means to proactively deal with both issues. This includes, among other items, the development of enhanced incident investigations and a stronger safety by design processes.

Review of Data

In his recently published book, *Advanced Safety Management*, Fred Manuele flushes out data that reviews the total number of days away from work cases. In a data table , he demonstrates that for days away cases involving 10 or fewer days away, the percentage of total injuries decreased by varying percentages based upon categories of 1 day away (down 15.4%), 2 days away (down 13.4%), 3-5 days away (down 9.1%), and 6-10 days away (down 5.2%).

But for days' away cases that exceed 10 days, the percentage went up and not down. For days away injuries of 11-20 days the increase was 1.8%; for days away injuries from 21-30 the

increase was 4.8%; and for 31+ days the increase was a startling 35.2%. (Manuele 2008) The latter day count would be most likely representative of serious and disabling injuries.

In addition to the data above on the incident of serious injuries, three reports from the National Council on Compensation Insurance (NCCI) have demonstrated several trends among older workers.

- The first report notes the increase of the average indemnity and medical costs in the period 1995-2005. During that time frame indemnity costs rose 88% while medical claims were up 137%. In addition, during the time frame of 1997-2007, the average cost of a workers compensation claim doubled while workers compensation costs per worker increased by only 26% (NCCI 2005).

- A second report notes a continuation of the trend of frequency reduction across all industrial sectors. In the past 20 years, frequency has declined 38%. (Shuford 2008). Shuford argues in his presentation of this data, and this author would agree, that the decline in the numbers of incidents are fairly equally correlated with the assumption that the rise of safety programs beginning in the early 1970s after the passage of the Occupational Safety and Health Act have worked to find workplace hazards, fix workplaces hazards and train employees on how to work safely. For that the safety professionals should be proud.

- The third trend noted by NCCI looks at workers aged 65+ (Wolf 2010). Until recently this age group, while showing similar injury frequency and severity patterns as their next closest cohort (55-64), was such a small proportion of the workforce that the focus was on "aging workers" who were more frequently defined as those between ages 45-64. Workforce characteristic data demonstrates that this age group increased by nearly 50% since the late 1980s, from 11% of the workforce to 17%. However, the recession that began in 2007 took a heavy toll on those workers who were nearing retirement and may have planned to leave the workforce in their early and mid 60s. Says Wolf "Simply put, for many persons in their late 50s and early 60s, whose life savings have been severely depleted and whose homes are now worth far less than anticipated, the idea of a "normal" retirement is now more in the realm of wishful thinking than an achievable reality (Wolf 2010, page 1).

Wolf's analysis of injury and claims data for the oldest members of the aging workforce leads to a number of conclusions:

- Falls comprise the highest category of injury among older workers. Nearly half (47%) of claims from workers 65+ results from slips, trips and falls, which is nearly twice that of all other workers combined.
- While the indemnity severity for older workers is lower due to their lower average weekly wage, medical severity is higher. Costs for workers aged 65+ are 26% higher than claims costs for all workers. The average cost for all age groups is roughly $9,000.00. Workers aged 40-44 are the first age group where the average costs for the age group exceeds the average cost for all age groups. This increase shows a slow but steady increase with age.

Recently published Bureau of Labor Statistics Data (BLS) for 2008 provides further details regarding the types of injures and fatalities experienced by older workers, along with making continued comparisons to their younger cohorts. The following tables represent data compiled from the BLS website using 2008 statistical data.

Table 1. Percent Distribution of Non-fatal Injuries and Illness by Age Group Compared to Overall Percent of Workforce (Total Non-fatal Injuries = 1,078,140)
(*Source:* BLS 2008)

Worker Age	Percent of Total Injuries	Percent of Overall Workforce
16-24	12.9	14.3
25-34	22.2	21.6
35-44	23.3	22.7
45-54	24.2	23.3
55-64	13.2	14.0
65+	2.6	4.0

Table 1 indicates that the only age group with a higher frequency of injuries when compared with their percentage of the workforce is those aged 16-24, perhaps owing to lack of experience and other factors that make them more prone to minor injuries. Also of note, is that the frequency percentage begins to decline when compared with the age group percentage at age 45 and shows a marked difference for those over age 65. This data indicates, at least on its face, that older workers get hurt less frequently,. Untested hypotheses for this trend have been discussed in many papers and presentations and include ideas that older workers are more experienced and less likely to take risks which may lead to an injury, that they have self-selected out of the riskier positions which expose them to a greater overall number of risks, and that older workers are less frequently represented in higher hazard occupations such as construction and transportation. It is also noteworthy to mention the finding from BLS that total injuries to workers aged 55-64 increased by 3% and for those aged 65+ by 13% in 2008.

Table 2. Median Days Away from Work (*Source:* BLS 2008)

Worker Age	Median Days Away from Work
All Age Groups	8
<19	4
20-24	5
25-34	6
35-44	9
45-54	10
55-64	12
65+	15

Table 2 reinforces the data from Table 1 above that the severity of injuries in general, regardless of injury type, increases with age. Also noted by BLS was the finding that the only age group with an increase in the days-away-from-work rate was those workers aged 65+, where a 6% increased was noted.

Table 3. Fatalities by Age Group and Percent of Workforce
(Total Fatalities = 5071) (*Source:* BLS 2008)

Worker Age	Percent of Total Fatalities	Percent of Overall Workforce
16-24	8.4	14.3
25-34	16.5	21.6
35-44	21.4	22.7
45-54	25	23.3
55-64	17.4	14.0
65+	11	4.0

Table 3 shows that fatality rates remain below the percentage of the workforce through age 34. After that the rate begins to increase showing its greatest discrepancy in the 45-54 age group, followed by the 55-64 age group. Interestingly, fatalities return to a lower rate than that of the percentage in the workforce in the oldest workers.

While no significant hypotheses are suggested by this author, it is interesting to note that the total fatalities for 2008 was the smallest total since fatality records have been kept (1992). Also of note was the significant decrease in fatal falls in 2008; declining by 20% from a high of 857 in 2007 to 680 in 2008. Also of significance is the finding that, as noted above, falls represent the highest category of overall injuries types for workers aged 55+.

Rethinking the Paradigms

For years the writings and theories of H. W. Heinrich dominated the practice of safety. His "injury pyramid" was a mainstay of many safety professionals, postulating that injury frequency could be viewed as a pyramid where for every 330 potential injury accidents one would find 300 resulting in no injury, 29 resulting in minor injuries, and 1 in a major lost-time injury. Heinrich believed that the largest injury group, no injury, provided safety professionals with the greatest clues to accident causes and the greatest overall potential for improvement in workplace safety.

In numerous analyses, the statistics behind the pyramid numbers have not held up to scrutiny. In addition, in *Advanced Safety Management* Manuel holds a microscope up to the wording in earlier and subsequent editions of Heinrich's book *Industrial Accident Prevention*, where this pyramid appears. He notes that in the latest edition of the book, Heinrich suggests that the ratios apply only to the same number of accidents involving the same person, not across the board among all workers (Manuele 2008, pages 53-57). That simple difference in wording represents a sea change in how the number actually applies to any given workplace. It would also help explain why the statistical data behind those numbers has never held up to scrutiny.

Heinrich's other paradigm, the "Domino Theory," has been another mainstay of safety professionals, particularly with regard to incident investigation. This paradigm suggests that workplace incidents have one "first proximate and easily preventable cause", which, if discovered, can break the entire chain of dominoes, thus preventing the final outcome – the incident; as if no other causes that may happen in the full chain of events were of similar importance to the end result of the incident.

While this author would not disagree with the importance of finding the first and most proximate cause, focus on this creates two additional problems. The first is that too often the first and most proximate cause is "operator error" or "employee carelessness" or some variation which places the entire "blame" for the incident on employee behavior. While human error and the reduction of it in the workplace is an important activity, this author would argue that employee behavior will always play some role in every incident investigated. When an incident occurs, an employee's actions almost always starts the chain of events, either by something they did that they should not have done, something they should have done that they did not, or some combination of both. Humans, being what they are in every workplace on any given day, distracted, tired, and poorly trained, will always make mistakes.

What follows from that flawed approach is often that further evaluation of other causes through robust incident investigations procedures, including system design, procedural flaws or management practices is rendered moot. Corrective action plans are significantly reduced in their effectiveness, virtually assuring that, given enough time, the incident will repeat itself, with perhaps different and possibly more disastrous consequences.

Safety professionals would do well to incorporate the theories and ideas of V. F. Pareto and W. E. Deming into their overall safety and health management systems. Pareto, an Italian industrialist, economist and philosopher is known for his "Pareto Principle" also called the "80-20 Rule" or the "Law of the Vital Few" which states that, for many events, roughly 80% of the effects comes from 20% of the causes (Wikipedia 2010).

W. E. Deming, an American consultant, is credited with substantial changes in fundamental business management concepts. His Plan-Do-Check-Act continuous improvement model will be addressed in later sections of this paper; however, of applicability in this discussion is what is often called his "85-15 Rule". Similar to the Pareto Principle, this rule suggests that 85% of problems in an organization are systems-based while only 15% can be attributed to an individual worker. Deming postulated that system changes were the only real key to improving product quality and reducing production errors (Wikipedia 2010).

What this author and others take from these paradigms are that incidents that result in severe injuries, when properly and fully investigated, provide an organization with substantive areas for corrective action that will both drive down frequency as well as severity. In other words, even if the end result of the chain of events was a severe injury, the multitude of causal factors provide rich ground for major safety and health management system improvement. And by focusing on Heinrich's insistence on frequency reduction to drive our safety programs, we have ignored the "elephant in the room" so to speak. And by ignoring the 85% of the incident causes being system-related, we have created corrective action plans that focus heavily on human error

reduction to the detriment of those corrective actions that will result in system improvement, thus reduction in *both frequency and severity reduction*.

Safety and Health Management Systems and Severity Reduction

The previous sections have attempted to first develop an understanding of the data that points to an increase in severe injuries, despite the efforts of traditional safety programs that have been very effective at reducing frequency, thus leading to some possible complacency on the part of safety professionals. Coupled with an increase in the proposition of older workers, whose injury pattern generally tends toward more severe injuries, a case can be made for a worsening of the situation unless a different method of managing safety in the workplace is accepted and implemented. Previous paradigms that focused on frequency reduction as well as incident investigations that are limiting in scope will often serve to compound the problems. However, safety and health management systems based upon a continuous improvement model of Plan-Do-Check-Act (PDCA) have the potential to provide a means to focus the change effort.

Two operational systems models exist and provide a benchmark for any organization wishing to remake or revise its safety program into one that is system-based and focuses more directly on design changes as a method of corrective action. The first is the ANSI/AIHA Z10-2005 standard. This guidance document is primarily used by organizations to self-certify their safety and health management system; although in the past few years several registrars have been approved for third party certification. The second is the OSHAS 18001:2007, which is a Certification Standard published by the British Standards Institute and is more commonly utilized by organizations who wish to focus their efforts on a third party certification process. Both models require a substantial effort on the part of an organization to implement the various required components. Organizations whose safety and health management systems are not fully operational, may wish to use the ANSI document first as a gap analysis which can often provide a solid understanding of where the problems lie, thereby leading to a better understanding of how to bring the existing program up to the model system.

Note: At this juncture that while this author does not have any statistical information as to how many organizations currently have comprehensive safety and health management systems in place, the experience of the consulting company owned by the author as well as professional networking across the country, is that very few do. Those that do have solid systems in place are typically those organizations with large workforces (1000+), multiple locations nationally and perhaps internationally, and dedicated safety personnel directed by a professional with many years experience in implementing system-wide safety programs. This does not represent the majority of the workforce in this country, many of whom work for organizations with less than 50 employees and with no dedicated safety professionals on the payroll.

According to Manuele (2008), organizations performing gap analyses of their organizations often find similar missing components to their safety and health management systems, including limited safety through design concepts. Also often found lacking are Management of Change (MOC) procedures. Finally Manuele says “The quality of incident investigation is one of the principal markers in evaluating an organization's safety culture.” And “Safety professionals would better serve their client’s interests…if they viewed incident investigation as a prime source

of selecting leading indicators for improvements in safety management systems" (Manuele 2008, 341).

Safety through design is a concept receiving substantial amounts of attention in the safety community in recent years and with good reason. The foundations of this approach to safety through design mimic those established in ANZI/AIHA Z10-2005 under Section 5.1.2. Safety design reviews are formal processes for evaluating and reviewing design attributes and applications as well as problems that may occur through the use of the design process including human interactions. Implementation of a strong safety through design processes requires formal risk assessments that provide clear valuations of the hazards, determinations of acceptable risks and application of strategies designed to close the gap between the two. Application of a sound hierarchy of controls, focusing on engineering solutions to eliminate hazards when feasible is also critical to the effort. Anecdotally in this authors' experience, this concept receives limited attention in many organizations, which choose instead to utilize personal protective equipment as the most effective means to control hazards and reduce risk to the workforce.

MOC processes and procedures in strong safety and health management systems have several key components and are also found in ANZI/AIHA Z10-2005 Section 5.1.2. They include:

- Policies are detailed and rigorous so that all participating staff in the organization have a clear roadmap to follow during implementation. The policies also detail clear review points that trigger additional and higher level oversight.
- Accountability mechanisms are inherent in the procedures to assure an organizational representative with sufficient authority oversees the process and assures its proper implementation.
- Criteria are established which trigger the use of the process so that situations requiring MOC aren't overlooked.
- Final decisions of the working groups are brought up in the organization to a level that generates sufficient management approval.
- A built-in audit process assures the ongoing implementation of the existing processes are reviewed and revised on a periodic basis.

Specific trigger points for MOC in many organizations include the use of external contractors for routine maintenance, major repairs or system rebuilds. Contractor safety programs require a thorough vetting and selection process; formal pre-job hazard identification and corrections meetings and procedures; onsite observation and management of contractors with enforcements of policies that occasionally require removal from the site; and a review of contractor performance following the end of the job to ascertain the desire to use the contractor for future work.

Additional MOC uses include unusual work pre-planning meetings and review along with post work reviews for corrective actions and procedure revision. Also essential is the creation of MOC procedures that are initiated when new technology, equipment or facilities are implementation within the organization. Traditional risk assessment methodologies are utilized to identify risks, define acceptable risk levels, and create controls to minimize or eliminate the identified risks.

Finally, as noted in several sections above, the lack of a thorough and robust incident investigations process within an organization is a common scenario. While incidents reflect the fundamental failure of safety program since the program failed to discover and correct the hazard before injury, illness or property damage occurred, the use of such situations to fully identify causes and develop corrective action plans cannot be ignored or given short-shrift. Below are some key components of incident investigations programs:

- Incident investigations programs must be comprehensive with clear policies and procedures that have been fully explained to all levels of staff who will implement them.

- All incidents, including near misses and those involving only property damage, must be investigated. Staff time must be accounted for when an investigation is needed so that the process is not minimally accomplished allowing production to resume.

- The investigations process must require multiple staff layers and work groups, including the traditional EH&S staff, Human Resources and production.

- Forms completed during the report and investigation processes must be user-friendly, intuitive to complete and audited to assure both proper and timely completion.

- Organizational investigators must be fully trained in completing an incident investigation including the internal process as well as general concepts of investigation.

- The results of the investigation must flush out all causal factors ("Operator error" should never be accepted as the only identified cause.) and develop sound corrective action plans that identify an action by a responsible person with an identified time frame for completion.

- A process for reporting out to the workforce any significant findings should be built in through safety contacts, tool box talks or other written documents.

- An oversight process of each investigation as well as the overall system must be put in place. Often Safety Committees can fulfill this task well, but only if the meetings spend time reviewing the investigation report and whether or not the procedures were followed and not simply provide a cursory review of numbers and statistics.

- Finally, trend analysis must be conducted to identify systemic problems that require significant management involvement for correction.

Summary

This paper is a summary of the materials that will be presented at the American Society of Safety Engineers Professional Development Conference in Baltimore, Maryland on June 15, 2010. It has covered the topic of the management of serious injuries. In light of recent data analyses that demonstrate a rise in serious injuries despite over 30 years of implementation of safety programs, coupled with an increase in older workers that is not expected to ebb soon rising to the number of

older Americans as well as recent economic recessionary times, a revised framework appears necessary to address these issues.

This paper identified several paradigm shifts safety professionals should consider that shift away from a focus on frequency reduction and human error reduction and more strongly consider system changes through the use of comprehensive Safety and Health Management Systems as are found in the ANSI/AIHS Z10-2005 Standard. Organizations need to refocus their efforts on processes that employ prevention through design, sound MOC procedures and robust incident investigation programs.

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