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Prevention through Design (PtD) from the Insurance Perspective

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Thank you to Rick Rinehart, and the National Institute for Occupational Safety and Health (NIOSH), for hosting what we believe to be a very important opportunity for us all to become involved in a seminal event in safety. I want to take a few minutes to give you some insight into an insurance company's perspective on the fundamental value of safety or prevention through design (PtD). Of course, we all know that insurance is about risk transfer. It is the foundation we depend upon to feel secure that events will not terribly undermine the security of our families, homes, and businesses. When someone is injured, at home or at work, the initial cost of treatment and indemnification is borne by insurance companies. The insurance products are the vehicle by which our economy spreads business and injury risk across the society. Insurance companies are essentially the stewards of our policyholders' pooled money. In this society, what we hold as one of our highest values is the health and well being of not only the people closest to us, but also the public as a whole. In many ways we expect businesses and our government to protect us from the products we use.

Insurance companies recognized many years ago – decades before the Occupational Safety and Health Administration or NIOSH – that the designs of buildings, machinery, tools, and production processes were root causes of injuries and illnesses. Many property, product, and industrial safety initiatives were developed by insurance industry supported organizations, such as Underwriters' Laboratories, the American Society of Safety Engineers, the American National Standards Institute, and the National Fire Protection Association. In fact, early machine guard designs, in use to this day, came from work done by Liberty Mutual Engineers in the 1940s and 50s.

You may not be aware of this, but Liberty Mutual safety engineers built a prototype safety car in the 1950s, with seat belts and padded dashboards and dozens of other innovative safety devices, long before Ralph Nader wrote *Unsafe at Any Speed*.



In the early 1950s, Liberty Mutual partnered with Cornell University to develop Survival Cars I and II. These prototype cars helped illustrate to the world how safety features, such as collapsible steering columns, arm and headrests, air bags, and seatbelts

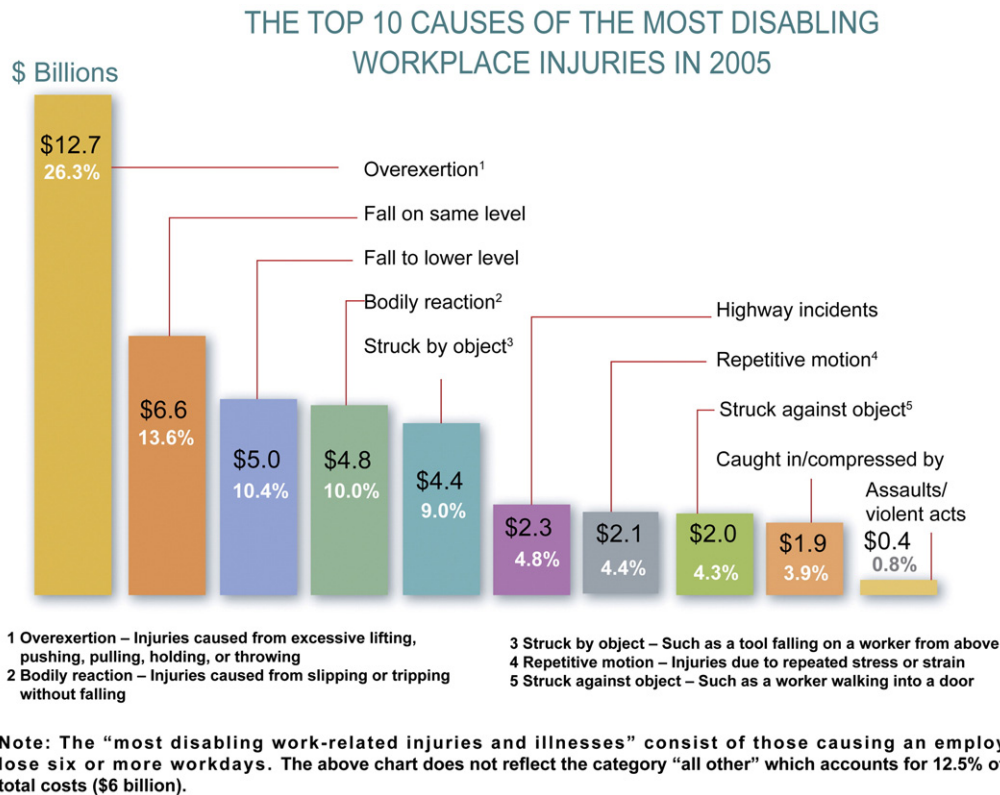
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could reduce crash-related injuries and save lives. Seventeen of the then innovative features have since become standard in all U.S. automobiles (From the History Section of the Liberty Mutual website).

We read so often that 85% of injuries are caused by unsafe acts, and this persists as a rallying cry that people are the problem, not our designs. This is what we have to fight against; the assumption that people will not make human errors, reach into a hazardous machine, or fall off the edge of a building. At the heart of this is the assumption that we really would not have to design for safety if people would only be more careful. And that thought, that concept, often has as an endpoint, human misery and death.

How much does it cost this country just for workers' compensation (WC) injuries? A staggering \$48.6 billion in direct cost, or about \$1 billion per week, according to the Liberty Mutual Workplace Safety Index. General consensus among business financial people is that the indirect cost could range from 3-5 times that, or \$150 to \$250 billion. Indirect costs are the result of down time, lost production, training replacement workers, scheduling changes, damaged equipment, filling out forms, and so on.



Overexertion accounts for 27.9% of the WC costs. Overexertion and falls on the same level combined are more than 40% of the costs from a WC perspective.

All of the top 10 sources of injury on the workplace safety index can be addressed through PtD interventions, which we base on many of the seminal studies conducted at the Liberty Mutual Research Institute. Examples of design interventions are as follows:

- Overexertion— addressed through ergonomics (we want to design work so a large percentage of the population can do a task without overexertion)
- Slips and falls— addressed through tribology (we have conducted research into preventing slips and falls)
- Bodily reaction— addressed through architecture and workstation design based on anthropometry
- Falls to lower level— addressed through anchorages, harness design, railings, stair design
- Machine accidents— addressed through the design of controls and safeguarding systems.

Consensus standards are a significant source of performance and prescriptive recommendations on PtD for many machines and other pieces of equipment. Liberty Mutual has about 100 people that serve on safety standards committees to promote the PtD concept.

I've talked about the financial burden on employers for WC injuries, but recall that injuries in the home and community are more frequent. Though this workshop is focused on occupational safety and health, the data tell us that our homes and communities are more dangerous than our worksites. Non-occupational injuries and illnesses can find their way to insurance companies under the other lines of coverage besides workers' compensation.

Insurance coverage for trucks and cars is also an avenue where a lack of design for safety can manifest as claims. I know I was shocked to learn that one large trucking company makes over 40 modifications to brand new trucks, so they conform to their internal safety by design requirements.

“How do we measure or forecast the return on investment (ROI) for safety interventions?” This is a question that we get all the time. Although one might assume that the value of human life and importance of well-being are unarguable, we still are dealing with business, and businesses exist to make a profit on their investments.

Insurance companies base premiums on a prediction of losses through actuarial analysis. Through state reporting we know for an industry class code what the expected losses are and use that information, along with a company’s experience, to help develop a premium for WC coverage.

Insurance companies are good at predicting losses in aggregate, but it’s difficult to predict loss for a specific intervention. There are few predictive loss models for calculating the impact of design change, and the models that do exist rely a great deal on professional judgment applied to hard data. Liberty Mutual has a program called the Liberty Savings Equation, which estimates the ROI and net present value (NPV) for a safety or health intervention. ORC WorldWide™ has an excellent model called ROHSEI™ (Return on Occupational Health, Safety, and Environment Investment). There are also Internet calculators that are easy to use.

There are many examples of financially significant outcomes from interventions. Let’s take a real life case. A manufacturing company had 29 injuries per 100 workers (more than two times the industry average). Management recognizes the problem and implements ergonomic changes and installs machine guards. Frequency goes down to 12.4 injuries in one year. Severity of injury is down 62%. The direct savings, after subtracting the cost of the redesign, was \$145,800. This result was possible because management became involved and had the right participation on the safety teams.

In another case, a multi-location metal former reduced injuries by 34% by installing guards on presses, and installed/improved roll former guards. This happened because management recognized the value of engineering controls – PtD.

When we think about the value of prevention, there are many stakeholders. Customers derive value in that they are using safer products. The value to employees is going home uninjured and supporting their families. Shareholders get more ROI, growth of share value, and pride in ownership. The societal impact is positive economic contribution, low environmental impact, and increased public goodwill.

From the point of view of Liberty Mutual, PtD pays. We are strongly invested in promoting PtD as a means to help people live safer, more secure lives.