

THE ECONOMICS OF HEALTH AND SAFETY IN CONSTRUCTION

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Contractors and workers agree that money is what drives health and safety conditions in construction. This article summarizes the economic forces working in the construction industry, shows how they impact on health and safety and develops proposals for creating economic conditions which will result in safer work sites.

First, a look at the realities of construction work.

Nature of the Work

Construction work is dangerous. Seven percent of the nation's workforce is employed in construction, yet, in 2004, 1,224 construction workers were killed on the job, 21.5 percent of all job-related fatalities (BLS, 2005). The risk of an injury with days away from work or a job restriction/transfer is about 36 per 1,000 full-time workers in construction, over 38 percent higher than the rate for private industry (26 per 1,000). Although this rate has been declining for several years and is now lower than the rate for manufacturing plants, lost work-day rates are higher for several individual construction trades and for certain types of injuries (like sprains and strains). Moreover, rates for small- to medium-sized construction companies are higher than similarly sized manufacturing plants. While injury rates for construction have been declining, fatality rates have not; this raises questions about the accuracy of injury reporting and the validity of the injury rate decline.

Construction work is by its nature temporary (Ringen, et. al., 1995). A structure or road is built, the job is finished and the contractors and workers move on to another project. Jobs can last a day or several years (power plants, major highway projects). On large job sites, as many as 25 or more subcontractors may work the project, and each will only be on the site for a limited time. Painters, for example, may only be on the site for the last few weeks. It has been estimated that construction workers change jobs every six weeks, although there is huge variability by trade and by type of project. Work may also be seasonal, such as road work in the northern part of the U.S. Some workers, such as roofers, work outdoors, and that work is also weather dependent. If it rains or if the winds are too strong, construction workers do not work. Workers may also change employers frequently. While some workers stay with the same employer for many years, others change jobs frequently. One worker reported getting 13 W-2 forms in one year; in other words, he worked for 13 different employers that year. Job tenure in construction is lower than in other industries, averaging only about three to four years (CPWR, 2002, p.22). Workers may be out of work for extended periods during a recessionary period and, then, during a building boom,

may work 60-hour weeks for months straight. Excessive overtime is common among segments of the construction industry such as asbestos abatement, where the work is often done over weekends, holidays or summers because the project has a time-sensitive deadline for reoccupancy. Night work is growing for jobs like highway work, where the priority is on minimizing delays for the traveling public.

In essence, construction work is transient and workers have extreme uncertainty about how much work they will get, who they will work for and how much they will earn each year. Construction workers do not get sick days. If they are sick, they do not work and do not get paid. In one recent study, 40 percent of workers surveyed said that a major work-related problem was “working while hurt” (Cook, et. al. 1996). They also do not get paid vacation days, although some union contracts include vacation pay. Contracts may also include some minimal compensation for showing up on a day with a cancellation due to weather.

Construction workers are dependent on contractors to provide work for them. Most employers are small, with 81 percent having less than ten employees (CPWR, 2002, p. 2, table 2b). In addition, the industry has witnessed a phenomenal rise in “independent contractors” (CPWR, 2002, p. 21, chart 21c), individuals for hire on a contractual basis who have no formal employer and are thus exempt both from OSHA regulations and other regulations involving workers’ compensation insurance and employment taxes. Also, the use of “temporary workers” from temp agencies has risen dramatically. Increasingly, construction work is managed by “construction managers” who have no direct construction employees and merely contract out all the work to subcontractors and independent contractors. Use of temporary workers and independent contractors can reduce economic pressures for safety. Workers that are injured are easily replaced and do not affect compensation.

Profit margins in the construction industry are generally small (about three to four percent) and competition is intense among firms trying to outbid one another. Often, they underbid jobs. One result is enormous production pressures to get the job done on time and under budget. Many contracts include clauses with rewards for finishing a job early, an added incentive to rush the work that leads to periods of intense overtime. An analysis by the Center to Protect Workers’ Rights (CPWR, 2002, p. 48, table 46a) demonstrates that the direct costs of injuries can be a substantial burden on employers given the small profit margins in the industry. A \$10,000 injury can wipe out the profit margin from a \$333,000 job that has only a three percent profit margin.

Wages

Within the construction industry, enormous pressures operate to keep wages low. In part, this is achieved by hiring immigrant workers at low wages for most of the unskilled work. This is countermanded on large projects by federal and

state regulations, such as the Davis-Bacon Act, which require payment of “prevailing wages” for an area so that governmental contracts will not drive wages down. Although these laws have been criticized by special interest groups who contend that they increase the cost of construction – and Congress continually considers efforts to repeal or weaken them – recent studies show that these laws actually save money and have other beneficial effects, such as increased safety and improved training of workers (Azari-Rad, 2005). Immigration restriction acts in Congress, on the other hand, have helped boost wages during periods of labor shortages like the economic expansion in the U.S. during the late 1990s.

The supposition that wages in construction are higher than other industries is often cited as an example of wage differentials given to workers in dangerous jobs (Viscusi, 1983.). This is thought to be another way that market forces regulate safety by making unsafe work more expensive. Yet, injury rates, while dropping in recent years, have not paralleled wage rates in general. Also, wages in blue collar work are lower than in white collar occupations which are much safer. In fact, this has created a major problem for the recruitment of workers into the construction industry. Although the starting wage for apprentices may be at \$9 or \$10 an hour, they can now get comparable wages in much safer and less physically demanding jobs. It is increasingly difficult to attract people into construction, especially those with more education and skills. Also, philosophically speaking, wage differentials are objectionable because they provide financial rewards for people to take risky jobs instead of making the jobs safer for everyone.

Careers in Construction

With no “seniority” in construction, more senior workers generally do not get more compensation than newer workers and are forced to compete with younger workers as projects wind down. A union construction worker’s career has two formal phases: apprentice and journeyman, although sometimes, there is also a temporary, “pre-apprentice” phase. Apprentices earn about two-thirds the journeyman’s wage and are expected or required to go to classes at night for a three- to five-year period. Often, union contracts specify a certain number of apprentices for each journeyman. Apprentices tend to get the most unskilled and manual jobs until they learn the craft from the journey-level workers and instructors. Many construction apprentices drop out of the program before completion because the work is too hard. Later in their careers, many construction workers become “worn out” and cannot do the heavy work they once did or have had several injuries and developed chronic conditions which impair their abilities. Some move into management roles (foreman, superintendent), but only a limited number of such jobs exist. The result is that many construction workers drop out of the work force or “retire early.”

Retirement

Many union contracts now allow retirement on full pension after 30 years of work or when the sum of a worker's age and years in the union equals 80. This means that a member who starts at age 20 can retire on full pension at age 50. This is enormously costly to the pension system which must pay benefits until that member dies. However, while members can get a full pension, they may not get other benefits, like health insurance, which are dependent on working so many hours per month. After retirement, most will have to wait 10-15 more years to be able to benefit from Medicare and Social Security (and Congress keeps discussing raising the age of retirement to as high as 70 which will just aggravate the situation for construction workers). Unlike other professions where can work well into "old" age, many construction workers just cannot last at the trade that long. Thus, retired union construction workers may draw a pension payment for many years yet have no health insurance. As they age and health problems develop, they may encounter serious financial hardships.

On the other hand, many union pension funds benefit from this system because, after years of paying into the funds, many workers die early and never realize their full benefits. This is acutely the case in the asbestos insulators union, where a large percentage have died as a result of asbestos-related cancers and lung diseases and never collected much from their pensions. Those that actually do get to retirement age and collect their pensions, however, are often disabled by their years at the trade and suffer from impaired quality of life. The most common example of this is hearing loss. Most construction workers have suffered substantial loss of hearing after 15-25 years on the job (CPWR, 2002, p. 43, Schneider, 1995) and have to live with a significant loss of hearing for the rest of their lives. Hearing aids can increase the sound levels, but do nothing to increase comprehensibility or decrease problems like ringing in the ears. Hearing loss is rarely compensated among construction workers (Daniell, 1998).

Workers Compensation

Workers' compensation is ostensibly designed to compensate individuals who have suffered occupational injuries and illnesses. But there are enormous flaws in the system, particularly as it applies in construction and especially as it applies to chronic conditions, including occupational diseases (like hearing loss) or injuries (such as musculoskeletal injuries) which can often be cumulative. Workers' compensation laws assume there is a specific date and known employer when the injury occurs, but in construction these are not always clear. With workers changing contractors regularly, who is responsible for chronic injuries and illnesses? Normally, where there is a documented "injurious exposure," it is the current employer. In theory, all employers are equally affected and pay amounts commensurate with their records, but this system creates incentives for contractors not to hire workers who may be more susceptible to injuries, like workers who have had previous injuries, are new or

are older (although they have more experience and may be more valuable, older workers tend to have more disabling injuries) (Mitchell, 1988; Windau, 1999).

Claims for Occupational Disease

Construction workers have high workers' compensation injury rates for acute injuries but file very few claims for chronic diseases. Disease claims have been hampered by employers contesting claims they believe are not work-related or by statutes of limitation, which run out so many years after "the injury." Many of these laws have now been changed to limit claims to a certain number of years (typically, two) after a condition has been diagnosed.

One indication of this problem is the enormous flood of third party litigation against asbestos manufacturers for diseases that workers claim resulted from an inherently dangerous product about which they were never warned (workers' compensation does not allow law suits against an employer, except in the case of negligence, but actions can be brought against manufacturers). This litigation had bogged down the court system so much that Congress may impose a legislative solution that creates a fund to compensate victims, similar to the fund for miners with black lung disease. Congress recently created a compensation system for construction workers who contracted beryllium disease or radiation-induced cancers in the course of building and renovating the country's nuclear facilities.

Claims for Occupational Injuries

For several reasons, workers are often reluctant to file workers' compensation claims. Because they generally have to wait several days (up to seven, depending on the state) to file a claim, they prefer not to miss out on the pay, if they can work despite the pain and suffering. Workers also may not want to be labeled as complainers, and they may be concerned about being blacklisted by employers for filing claims. Though contractors sometimes object to a rush of claims as a job ends, these often result from a worker's expectation that the coming period of unemployment will allow him or her to finally file a claim that had been postponed to avoid the loss of pay. Sometimes, employers bring workers who are injured back to the jobsite to sit idle in the trailer to avoid a lost-workday claim (keeping injury rates artificially low and inaccurate) and a workers' compensation claim.

Because of the reluctance to file claims and the difficulty in getting claims for chronic conditions paid, it is a high probability that health plans are paying a significant amount of money for conditions that are work-related. This cost-shifting has not been adequately researched and could represent a significant cost to health care plans.

Some companies, even in construction, have instituted return-to-work policies wherein injured workers are brought back to less strenuous jobs and gradually returned to their original positions. These programs have had great success in reducing disability, e.g. preventing an injury from becoming a disability. But in construction, where few light duty jobs exist and where most projects are short term, return-to-work programs are scarce. More often, the employer would sooner replace the worker with someone new from the hiring hall who can work at 100 percent capacity. In this regard, construction workers are expendable. In a tight labor market (or among higher skilled trades), incentives exist for employers to bring back good employees through a return-to-work program – and get some productivity out of them – rather than try to hire a replacement who has to be trained.

Premiums

Workers' compensation premiums in the construction industry are high. For trades like carpenters and masons, they are 14 to 17 percent of hourly payroll (CPWR, 2002, p. 49). However, for unusually hazardous jobs such as structural steel erection, they average 35-36 percent and, in some states, are as high as 157 percent of payroll. This last mentioned example means that for every dollar paid their workers, contractors have to pay \$1.57 to the insurance company (Hunter, 2005)! The high rates should act as an incentive for companies to reduce their injury rates, but they often do not. In many cases, companies are willing to roll the dice because, as small businesses with few employees, their injury rates can vary substantially from year to year. If an employee happens to suffer a serious injury, the insurance premium will shoot up. On the other hand, if no serious injuries and fatalities occur, a company can go several years with no rate increase.

Workers' compensation premiums are experience rated, meaning that companies get an experience modification rate (EMR) which is multiplied against the base rate for the industry (NCCI, 1998) to establish a company's actual premium. EMR is generally calculated on a three-year rolling average to iron out annual fluctuations, but in construction experience rating is particularly difficult. It also tends to be weighed towards larger companies where claims rates are statistically significant. Individual losses are also capped at about \$5,000, which tends to place more emphasis on reducing accident frequency than on reducing accident severity. Many of the larger companies – which often can afford and have the best safety programs – self-insure, that is, pay injury expenses out-of-pocket. On large projects which will last several years, there may be a “carve out” where the companies will self-insure as a group. Many of the larger contractors have banded together to form insurance groups (like the American Contractors Insurance Group) which provide catastrophic coverage for claims over \$1 million. This leaves the small contractors, who generally have higher injury rates, to fend for themselves. If they get in trouble and have a lot of injuries, they may go out bankrupt (perhaps reincorporating under a different

name) or they may end up in a state insurance risk pool where they get insurance coverage but at a high rate.

Employers can reduce their premiums by instituting safety programs to reduce their injury rates and, eventually, their EMR, but, too often they take easier routes to reduced premiums, such as misclassification of workers. For instance, by claiming workers are laborers instead of steel erectors, contractors pay much lower premiums. They can also lower premiums by lobbying the state legislature to reduce benefits, which has been very effective lately in states which are competing to attract businesses.

In general, the workers' compensation system does not provide much incentive to reduce injuries in construction, especially for small contractors, despite the high premiums. Hinze (2000) has argued that the limits placed on EMR reductions for small businesses (they generally do not go below 0.8) reduces the impact of this incentive for them.

OSHA

OSHA standards – and their enforcement – are supposed to help make jobs safer by providing the threat of fines for non-compliance and, thus, a financial incentive for compliance. Yet, the probability of an OSHA inspection is very low. Federal OSHA conducts about 22,000 construction inspections each year, which covers about half the states. State OSHA programs, which cover the rest, perform about 27,000 construction inspections each year (<http://www.osha.gov/as/opa/oshafacts.html>). Thus, nationwide, about 50,000 construction inspections take place each year. However, on multi-employer worksites, an OSHA visit usually produces several inspections, one for each subcontractor, so in reality OSHA inspects far fewer than 50,000 sites per year. Nationwide (in 1997, the most recent year for which data is available), an estimated 656,000 construction “establishments” (meaning contractors) with payrolls operate (CPWR, 2002, p. 2, table 2b), and each had multiple sites both at any given time and over the course of the year. Thus, the nation has millions of construction sites in operation each year, and only a small fraction, probably less than two percent, are inspected.

Even if a company is inspected, the small probability that it will be cited, fined and actually pay the fine diminishes the potential safety incentive dramatically. A serious citation on a federal OSHA construction inspection (in FY 2004) resulted in an average of \$884 in fines. Federal OSHA statistics also show that if a company is cited and fined, on average the penalty is reduced by half.

OSHA inspections are also hampered by their poor targeting system, which makes it difficult to locate and inspect small firms and sites. They tend to focus on the larger sites, where there are multiple contractors and which will be operational for a longer period. Unfortunately, these tend to be the safer jobs.

Investments

One consequence of these factors is that contractors tend only to consider of health and safety improvements that result in short term paybacks, in other words, relatively inexpensive fixes. They cannot afford to make large investments unless large and relatively quick paybacks are assured. They are less apt to be able to capitalize their safety investments. Sometimes, small investments are also shunned by contractors who are reluctant to buy good tools because they will “walk off the job.”

SOLUTIONS

The Business Roundtable, representing the largest construction owners in America, commissioned a study in the early 1980s called the “Construction Industry Cost Effectiveness Project.” Their report, “Improving Construction Safety Performance” (January 1982), argued that accidents in construction cost the industry 6.5 percent of the total costs. The report reviews the direct and indirect costs of accidents and the cost of safety programs concluding that a dollar spent on safety returns 3.2 dollars in reduced costs. The report makes numerous recommendations, including that owners and contractors place a higher emphasis on safety and that they can do so by placing safety requirements in the contract, pre-qualifying contractors on the basis of their safety records, and taking an active role in safety at the site. A similar study, done for the Construction Industry Institute (Hinze, 2000), estimated that, on a small project, an investment of \$26,125 would yield a net gain of \$5,627 in savings – a 21.5 percent return on investment – just through lowered workers’ compensation and associated labor costs. On a larger project, a \$725,420 investment would result in \$36,628 in savings, a five percent return on investment. So for both small and large projects, Hinze argues, safety pays.

Workers’ Compensation

As we have seen, many economic forces tend to result in less investment in safe construction practices. One solution may be to encourage workers to file more compensation claims, thereby internalizing the costs for injuries which employers are not now paying. But non-union workers (e.g., the vast majority of workers in construction) will be even more reluctant to file claims than union workers because of fears of being blacklisted and unemployed. Also, the inadequacy of the workers’ compensation system is such that many of the claims will be contested and never paid. When compensated, the benefits are significantly lower than full time wages, let alone periods of overtime.

A promising trend is the increase in alternative dispute resolution or collectively bargained workers’ compensation programs. In these programs, employers and

workers collectively design a system for dealing with injured workers that minimizes litigation and helps settle claims fairly and efficiently. These programs generally include an ombudsperson to help the claimant, medical networks that steer workers to competent doctors, patient advocates to make sure they get good treatment and mediators and arbitrators to settle the more difficult claims. Over 90-95 percent of claims normally are settled without mediation or arbitration and are paid quickly and efficiently. This can reduce legal costs and get workers back to work sooner, saving on disability and long term medical costs as well. Ten states currently allow these programs, and in other states, many of these elements can be negotiated.

Major changes are needed to the workers' compensation system to allow for the filing of more claims for chronic conditions. This may necessitate some pooling of claims and premiums and apportionment of the costs based on size or hours worked. While this reduces the incentives for safe contractors, some experience rating could be instituted. Single payer systems operate in six states in the U.S. and in the provinces of Canada. This allows for programs like the one in British Columbia where all construction workers get free hearing tests each year paid for by the contributions of employers into the Workers Compensation Board. It also enable for centralized record keeping, which allows for epidemiological analysis of the data to spot trends and measure progress.

Return-to-work programs will work much better if they include some tax incentives to rehire injured workers. Such a program has worked well in Sweden, where the Galaxen has put hundreds of construction workers back on the job (Oxenburg, 1991).

Joint Funds

Joint union-management health and safety funds have been started in the past 15-20 years by several unions. They are funded by contributions of so many cents per hour into the fund, often through the health insurance plan, and provide health and safety consultation services to both contractor and union members. This is based on the very successful joint program, called Bygghalsan, set up in the 1970s in Sweden. For 25 years, it provided extensive, direct health and safety services to the industry while doing extensive, pioneering research. This program fell apart in the 1990s when the Swedes elected a more conservative government and a recession hit, leading employers to question the value of the program. A similar industry-wide program called Arbouw exists and is thriving in The Netherlands. The Swedish program succeeded, in part, because Sweden is heavily unionized (about 95 percent) in construction. Nevertheless, the model exists where labor and management can join together to provide safety and health services through private sector contributions. The Laborers' Health and Safety Fund of North America (LHSFNA), serving the Laborers' International Union of North America (LIUNA) and its signatory employers, has proven a successful example of this type of fund in the United States and Canada. Other

similar regional private sector organizations are also successful, such as the Construction Safety Association of Ontario and the Chicagoland Construction Safety Association.

Ergonomics

Ergonomics is another area which holds enormous promise for economic and health and safety improvements. About 38 percent of lost workday injuries in construction are sprain and strain injuries, mostly musculoskeletal injuries like back strains or carpal tunnel syndrome (BLS, 2004). Experience has shown that investments in ergonomic improvements often generate rather quick payback periods (several months). The construction industry is ripe for ergonomic improvements which can include better materials handling, better planning of the job and better designed tools (Schneider, 1999). Some contractors who have invested in ergonomic improvements in their equipment have found that their workers are more productive and that they can attract better workers, pay them higher wages and still make a profit. More research is needed to document the economic benefits of such improvements.

Economic Incentives

In those cases where short term paybacks are not available and it is difficult to get contractors to invest, a possible solution is a health and safety improvement fund to subsidize improvements. Examples of such funds include the Oregon Worksite Redesign Grants program and the Ohio Occupational Safety Loan Program, both funded by the workers' compensation funds in those states (Burson, 1994). Ohio has had several successes with this program in the construction industry (Hamrick, 2002). Another possible solution is to get the insurance companies to give incentives or discounts to contractors who implement successful programs. One such example is a project called Fall-Safe, an auditing program for fall hazards developed by West Virginia University. Contractors agree to implement a comprehensive fall prevention program complete with regular internal audits. They also get quarterly audits from a third party. Contractors that participate get a five percent discount on their workers' compensation premiums from St. Paul Insurance Company.

Contract Specifications

Aside from economic incentives mentioned above, several other federal changes could be helpful. First, putting health and safety requirements into contract specifications, beginning with federally-funded or state-funded work (e.g., highway and bridge work), has been suggested because it builds the costs of safety into the contract as a line item and provides a level playing field for contractors, since all have to comply. It also gives the government a way to enforce safety standards other than sole reliance on OSHA. Such contract specifications can also be used by or pushed by other large owners. Many large

owners and government agencies are now making safety a precondition of working on their projects (e.g., requiring a certain safety record or an experience modification rating below the national average). A recent proposal for the Federal Acquisitions Regulations would include safety records as a precondition for government contracts. Roelofs (1996) suggested that contract specifications may be the best solution to compensate for the failure of market incentives to prevent occupational diseases, like lead poisoning. AIHA has recently published a guide to including health and safety in contract documents (AIHA, May 2005). The recently passed highway bill (SAFETEA-LU) includes a requirement that safety be a specific pay item in highway contracts to make sure that contractors do not skimp on safety at the bid stage.

OSHA Standards

Another potential requirement is the OSHA proposal to require a comprehensive safety and health program for all construction contractors. Such a requirement exists in California in the state's written illness and injury prevention program standard and may be a way to get more contractors to institute a formal program where none exists. Unfortunately, the Construction Safety and Health Program Rule at OSHA has been stalled for many years. Other possible mandates would be to give the General Contractor or Construction Manager more responsibility for safety and health and for policing their subcontractors. OSHA began doing this with a proposal in its record keeping rule to require a "site-wide" log of injuries and illnesses, but this proposal was dropped.

OSHA currently has incorporated in many places in its regulations the requirement for a "competent person" to oversee various hazardous operations like scaffold erection. However, this requirement has not been widely enforced, and no specific training requirements exist for such a person. OSHA needs to clarify and enforce these provisions. Alternatively, it should consider a requirement for a full time safety and health person on all job sites over a certain size, e.g. over \$1 million or over a certain number of workers.

Design Rules

Another potential avenue to improve safety in construction is to pass a rule placing more responsibility for safety on the architect and designers. Such a rule, known as Construction Design and Management rules (CDM), has existed in England for ten years. While it has had mixed success so far, it holds enormous promise since as safety is built into the design of the building, it makes compliance easier for contractors and lowers the cost of safety for them. This approach ensures that hazards understood by the architects and engineers are communicated to the contractors, leading to greater constructability considerations in programming and design phases (Hecker, et. al, Professional Safety Sept 2005 pg. 32-44). Similarly, the move to use "green" building materials, which the federal government is supporting, could also have safety

ramifications as less toxic or lighter weight materials are used or, for example, low noise emission equipment is employed.

Enforcement

Stronger and better-targeted OSHA enforcement could also act as a significant incentive to contractors to invest in safety. However, construction inspection targeting problems has never been solved. A recent study (Weil, 2004) suggested various alternative targeting schemes, including project level targeting, risk-based targeting and efficacy-based targeting (e.g., targeting those contractors where the enforcement effort will have the biggest impact). One potential solution is to develop a national registration program for construction sites so OSHA would know in advance where all sites are and they could all be liable for inspection. This is unlikely in the current atmosphere where paperwork is constantly under siege and being cut, but with electronic submission of notifications, the paperwork burden would be minimal. It might even be possible to collect data from local building permit systems. The EPA already has a registration system for most asbestos abatement jobs, and several states and localities have even more elaborate systems for asbestos jobs. Reregistration is also required by EPA when the start date for the job is changed. An alternative is to educate construction workers to recognize dangerous situations and call them in to OSHA more regularly. With so few inspectors, OSHA needs outside help to find and inspect the most dangerous sites.

CONCLUSIONS

Construction work is dangerous. Though some economic incentives are in place to promote safety in construction, such as workers compensation and OSHA inspections, these incentives have not worked well because of the nature of the construction industry. We need to develop new economic incentives that work better. This paper has proposed a number of solutions which make safety a higher economic priority for contractors and deal with the realities of the industry. Only by such changes will we see dramatic improvements in job safety in construction.

Having made the case for economics driving health and safety in construction, I have to end on a cautionary note. In March, 2001, Secretary of the Treasury and former CEO of Alcoa Paul O'Neill addressed the Georgetown University Safety Summit and said that as head of Alcoa he told his staff:

If any of you ever calculate how much money we save as a consequence of being excellent in safety and health, you're fired. And the reason you're fired is because we're not going to be able to accomplish the zero that I intend for us to accomplish if the people think this is another management scheme to make money or save money. This needs to be about human value.

So while economics will inevitably drive many contractors' safety and health programs – and we must acknowledge that making money is the bottom line – we need to also include some discussion of human values in our efforts to improve construction safety and health. It won't be easy, but it is essential.

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