

Safety: Raising the Bar

Think about your commitment to safety and how you can make that a standard operating procedure.

Karen Wilhelm

The thirty-five ton hammer forge does 36 strokes per minute on an ingot being forged into shape. At every thud the ground shakes and a deep dent is made in the mass. At every blow the dull red of the mass flushes up vividly and the brightness of the glow throws the surroundings into gloom, and at each angry flush of the glowing bar a little lad leaps forward with a broom and sweeps the anvil free of scale.

Among nearly 10,000 men hardly a day passes without someone having his arm crushed, his hand nipped, or his leg broken; and though everything is done that can be done for the prevention of accidents, carelessness will assert itself and claim its average of victims. To provide against these accidents an accident compensation fund exists, whose latest report shows the injuries only reach 7.4 percent per year of the men engaged.

The year was 1890; the place was Newcastle upon Tyne, where a furious wind and bitter rain brought down flakes of soot upon the head of W.J. Gordon. He had come to visit the great Armstrong's foundry, forge, and factory to see how it built 40-foot long, 110-ton guns and 9000-ton ships. Manufacturing then was truly dirty, dark, and dangerous. The 7.4 percent injury rate was counting catastrophic disabling accidents, not the "recordables" we measure today. The fatality rate isn't mentioned.

More than a century later, we shudder at such a story. The bar is raised year by year by social consciousness, laws and regulations, union contracts, competitive advantage, and customer requirements. At Armstrong's, people were considered "careless" if they were hurt. Today's ideal lean manufacturing system, with safe equipment, standard work, and training, is tuned to make it increasingly difficult for anyone to be injured.

In Brief

Although the dramatic, sometimes-frequent workplace injuries from earlier eras may no longer be commonplace, leadership needs to reexamine its commitment to safety. Expectations about safety have risen. Improving safety for employees and customers must be part of organizational policy development.

Management Commitment

As in any other aspect of an organization's culture, the beliefs and actions of top management will make or break a safety management system. For companies in pursuit of perfection, Toyota being an example, safety is just one aspect of its core

management system. At the other end of the scale, a company's leaders may show no commitment at all, resulting in costly and tragic consequences for employees and the organization. There are many companies still operating this way.

Many companies are somewhere in the middle. Some merely aim to comply with laws and regulations, with inspection and enforcement as the reasons for good safety practices. More proactive is the risk management orientation. These companies recognize the financial benefits of maintaining a safe workplace and work to continuously reduce risk.

There's always a place to start on the road to a true safety management system. Working your way up through the levels of safety commitment, clearing higher and higher hurdles, you and your company can stand with the best.

Guidelines for ensuring safety are not hard to find. Any textbook or handbook on managing production or facilities includes detailed explanations for making the workplace safer. Agencies like the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA), companies like insurance carriers, and customers are often willing to provide cost-free and penalty-free help in identifying and rectifying hazards. Safety engineers can be hired and safety training is easy to find, often at low or no cost. There's no excuse for an unsafe workplace.

No Commitment to Safety

Even though our expectations have changed dramatically, some companies still show an astonishing lack of concern for worker safety. As an example, the Michigan Occupational Safety and Health Administration (MIOSHA) cited M&W Industries of Detroit with \$236,000 in proposed penalties in June 2007.

M&W Industries employs about 575 workers at four plants in the Detroit area, manufacturing metal weldments and other parts for the defense, automotive, and material handling industries. M&W Industries is the largest supplier of expend-

able steel racks in the automotive industry.

Within a year, six M&W employees lost parts of their hands while operating production machines. These included three employees who amputated fingers while operating hydraulic presses; one who lost his left ring finger while operating a squaring shear, one who nearly severed his left hand, and another who lost a finger while they operated horizontal band saws.

Management was well aware of dangerous conditions in the plant. In 2005, MIOSHA conducted a planned, wall-to-wall inspection that resulted in 20 "serious" violations, where there is a substantial probability that serious physical harm or death can result; one "willful" violation, committed with an intentional disregard of the MIOSHA regulations or indifference to employee safety and health; eight "repeat-serious" violations, and 13 "other-than-serious" violations, those that would probably not cause death or serious physical harm but would have a direct and immediate relationship to the safety and health of employees. Under these circumstances, follow-up inspections are conducted to ensure corrections are made and maintained.

Despite a settlement agreement from its 2005 inspection, the company failed to install needed guards on machines, provide required employee training on worksite chemicals, provide audiometric testing and training, train employees on the safe operation of overhead and gantry cranes, or enforce lockout procedures. In the 2007 inspection, at one of the company's locations, MIOSHA recommended that fail-to-abate and repeat-serious violations should result in fines of more than \$100,000. At another, an employee complaint resulted in the determination that the company should be fined \$132,000 for willful, serious, and repeat-serious violations, and another \$1600 for other-than-serious violations.

OSHA's Site-Specific Targeting Initiative finds the nation's most hazardous workplaces, those with histories of high numbers of injury and illness cases. "Iron foundries are potentially dangerous work-

Injury Cause Checklist

The following tips from the Liberty Mutual Safety Research Institute are a good starting point for evaluating and preventing the top five causes of serious workplace injuries.

Overexertion

- Evaluate production, storage and display methods to remove excessive reaching, bending, pushing, pulling, lifting, loading, and unloading.
- Use mechanical lifting aids, such as hoists or adjustable lift tables, to reduce the need to bend, reach, and twist. Use carts, tables, or other devices to move and position heavy objects.
- Design jobs to allow sufficient rest pauses.

Falls on same level

- Keep floors free of holes, water, grease, and other potential fall hazards.
- Provide footwear with the tread pattern and soling necessary to prevent slips.
- Provide adequate lighting for all interior and exterior walking surfaces.
- Highlight transitions in floor height.
- Remove snow and ice from parking lots and sidewalks.
- Use appropriate non-slip floor surfaces, cleaners, and waxes.

Falls to lower level

- Use appropriate ladders capable of easily reaching work or storage heights.
- Use mechanized material-handling devices to access higher levels.
- Regularly inspect and repair all ladders and lifting equipment.
- Provide railing protection for areas with abrupt floor level changes (such as a loading dock).
- Avoid storing heavy or awkward items out of reach of most workers.
- Provide handrails and slip-resistant treads for all stairs. Avoid storage of any kind on stair treads and walkways.
- Install nets when other types of fall protection cannot be used.

Struck by Object

- Aisles should be clearly marked and unobstructed, with adequate clearance.
- Train and supervise lift truck operators.
- Enforce speed controls and install mirrors at blind spots to enhance visibility.
- Stabilize overhead storage.
- Avoid storing or displaying products or equipment in areas where people travel.
- Restrict access underneath work areas.
- Use equipment and power tools only with the manufacturers' guards in place.
- Maintain all equipment and tools by following the manufacturers' guidelines.
- Train workers approaching mobile equipment to always make eye contact with the driver.

places," said Jule Hovi, director of OSHA's area office in Toledo, OH. "Employers must remain committed to keeping the workplace safe and healthful or face close scrutiny by OSHA."

One small Ohio company under OSHA's scrutiny, Quincy Castings Inc., demonstrated disregard for the health and safety of its 80 employees. In July 2007, OSHA proposed \$220,620 in fines for alleged multiple willful, serious, and repeat violations of federal workplace safety and

health standards. The three willful violations were failure to provide guarding around sand preparation machinery with rotating parts, improperly regulating compressed air used for cleaning, and failure to have adequate engineering controls for overexposures to crystalline silica.

The 24 serious safety citations came about because the company failed to provide and have employees use flame-retardant clothing and protective gear while pouring molten metal, did not have

capacity markings on pouring ladles and spreader bars, lacked safety latches on hoist hooks, did not have machine lockout procedures to prevent accidental start-ups of equipment, had failed to remove a defective forklift from service, lacked daily inspections of a bridge crane that had no working brakes, and blocked fire exits.

Employees were not protected from exposure to crystalline silica. There was no medical surveillance or effective respiratory protection and evaluation program; the company had poor respirator training, and respirators that did not properly fit employees who used them. Quincy Castings also had adequate notice of its unsafe practices, having had 13 inspections since 1979, yielding a total of 80 citations.

Commitment to Compliance or Risk Management

Companies such as M&W and Quincy Castings make others that simply comply with the laws look progressive. The knowledge that OSHA inspections could happen at any time, and that a visitor, customer, or employee could file a complaint, may keep management careful about posting material safety data sheets, providing fire extinguishers, having lockout/tagout procedures in place, and providing some safety training to employees. A reactionary "OSHA wouldn't allow that" stance gives employees protection but lacks consistency and conviction. Employees don't always believe that safety is important. And when "ship it out" has a higher priority than "do it safely," accidents happen.

Other companies have adopted the view that safety is important, if only for financial reasons. Looking at safety as something that can be quantified and managed, the risk management orientation is proactive in looking for ways to remove hazards. The financial assessment of risk gives safety officials, human resources directors, and managers a common language for approaching safety issues. When managers accept the business case for safety, they are ready to go beyond compliance.

Accidents are Expensive

California's Cal/OSHA Consultation Service points out the costs associated with occupational injuries and illnesses, and helps managers think of opportunities to reduce them.

Costs to employers include:

- Increased compensation insurance premiums
- Medical expenses
- Legal expenses
- Wages paid to injured employees who are not producing
- Wages paid to non-injured employees who stop production to assist after the accident or stop to watch/talk about it, or who need the output normally provided by the injured worker
- Damaged or spoiled materials
- Replacement of damaged tools or equipment
- Overtime work necessary to make up for lost production
- Time required of administrative and clerical personnel while investigating the accident, processing forms, and settling claims
- Reduced productivity of new or substitute employees
- Reduced production of the injured employee when first returning to work
- Effect on employee morale, or the need to increase wage rates to retain workers for the particular operation.

Costs to employees include

- Permanent effects of the accident on the health or well-being of the injured worker
- Reduction of earnings while recuperating from an accident
- Reduction of earnings if the injury or illness affects the worker's ability to perform at the pre-accident level
- Reduction of worker's productive work years
- Destruction of morale if the accident results in a long term handicap
- Hardship to the worker's family.

To avoid such costs, the first step in risk management is risk assessment. The company's workplaces are inspected to

Toyota's STOP 6 Accidents

1. Being caught in a machine,
2. Collision with a heavy object,
3. Collision with a vehicle,
4. Falls,
5. Electric shocks, and
6. Contact with a heated object.

find hazards that could result in injury or illness, by safety engineers on its staff or outside experts. Small companies in particular are likely to have to look for outside help.

Once the most significant causes of loss due to adverse events and conditions are identified, the team involved in containing risk can begin to deploy a plan to correct problems. Working the plan to remediate and maintain a safe workplace will require resources and discipline. Training for safety teams, supervisors, and employees is a must, both in new employee orientation and in regularly scheduled events on a continuing basis.

Management Commitment to a Safety Management System

Some companies are looking at employee safety and health as a fundamental principle of doing business. Toyota's Taiichi Ohno said that safety comes before everything else. "Every method available for man-hour reduction to reduce cost must, of course, be pursued vigorously," he said, according to Jeffrey Liker's book, *The Toyota Way*, "but we must never forget that safety is the foundation of all our activities. There are times when improvement activities do not proceed in the name of safety. In such instances, return to the starting point and take another look at the purpose of that operation."

Toyota today places safety and health for customers and employees firmly in its sustainability strategy. (Toyota Sustainability Report, 2006) "Safety is management itself," says one maxim, and everyone from senior executives to factory

floor employees is expected to take responsibility for placing safety first.

Toyota's fifth five-year safety and health policy covers the period from FY2005 to FY2009. Among its goals are zero designated occupational diseases, those that result from dust and noise, or musculoskeletal disorders, and zero STOP6 accidents, those that result in death or disability.

Other important goals of the five-year policy are to raise the level of workplace safety skills and to continue implementing and improving proactive prevention activities. In FY2005, Toyota addressed basic steps to raise workplace safety levels and to increase the visual representation (*mieruka*) of all accidents, including minor ones. It implemented new ergonomic measures to prevent musculoskeletal disorders, and promoted stronger measures against noise and dust. To pull all its actions together, it introduced a comprehensive occupational safety and health management system (OSHMS).

During the first year of the policy, there were no fatal accidents, and the number of STOP6-type accidents and designated occupational diseases remained flat or increased only slightly. Measures against asbestos in facilities and buildings were begun, scheduled for completion in 2006 for facilities and the end of FY2007 for buildings.

Along with the OSHMS, the Toyota Safety and Health Global Vision 21 has been adopted. This program is designed to standardize the creation of safe and healthy workplaces through a PDCA (Plan, Do, Check, Act) cycle. It started in Japan in 2006 and will be rolled out internationally.

The overall Plan phase of the system with its interlocking PDCA cycles begins with the Toyota Safety and Health Promotion Division. It will clarify health and safety policies, gathering information from Toyota and external organizations.

The Do phase will take place as overseas affiliates, holding companies, and plants adopt and implement safety and health plans, with support and audits from the corporate level.

■ Toyota Safety and Health Global Vision 21

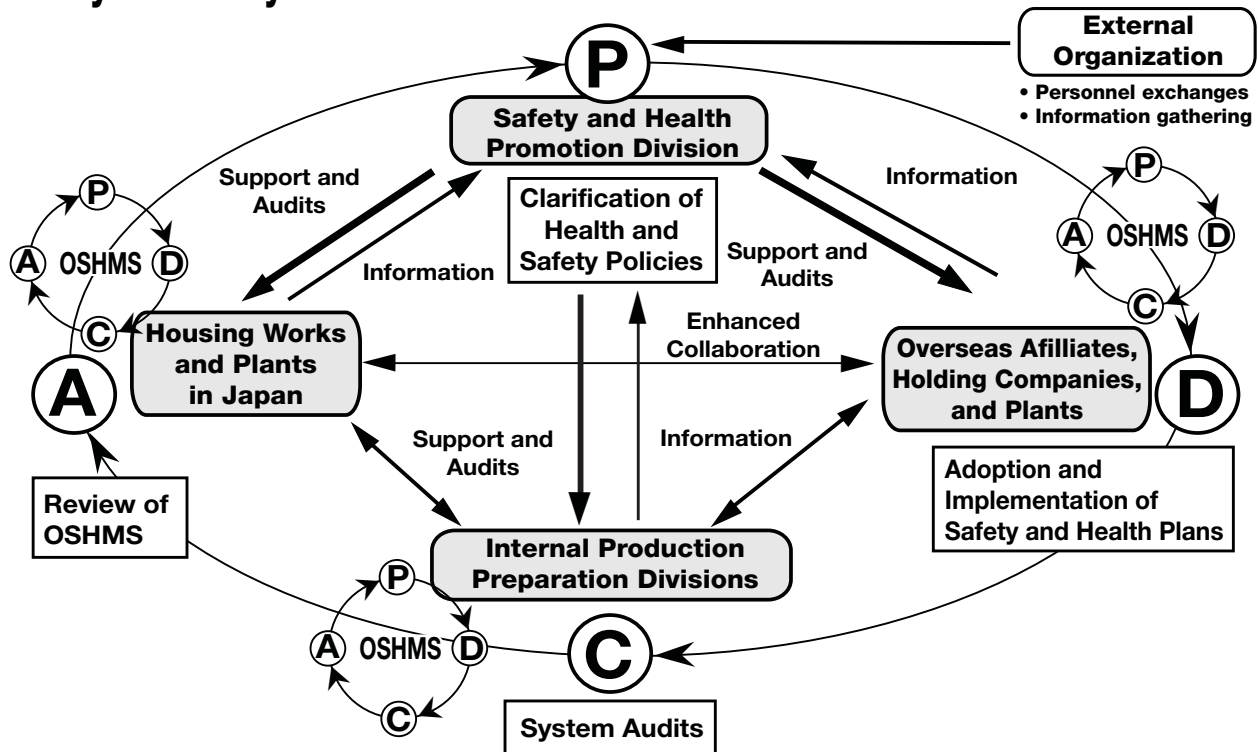


Figure 1.

Internal production preparation divisions will perform the Check phase by conducting system audits. There will be a feedback loop between the internal production preparation divisions and the corporate level to continue policy clarification.

The Act phase will be carried out, initially in Japan, as it receives a review of OSHMS from the internal production preparation divisions' system audits. Information from the plants will go to the corporate safety and health promotion organization, which will also provide support and audits.

Between each of the four entities in the system, information will be exchanged, with support and audits coming from the corporate entity to each of the other three. PDCA cycles will also be carried out between each point of the overall cycle.

In FY2006, Toyota defined basic actions that should be taken in the workplace, held study groups to promote them, and conducted audits to confirm that

implementation was proceeding. (Toyota Sustainability Report, 2007.) The action items and audit methods were reviewed based on the results, with higher-level activities planned for FY2007.

Extending the OSHMS into the Supply Chain

Toyota is serious about management commitment throughout the extended enterprise supply chain. The aim is to create zero-risk workplaces in suppliers' companies. Toyota uses the employee-centered phrase "creating a worry-free and safe work environment," and asks suppliers to reinforce occupational safety and health action. Recommendations include checking by means of genchi gembutsu, going to see places where work is going on, and training of what Toyota calls safety guardians.

In 2006, top executives from member companies of Toyota's suppliers associ-

■ Structure of the Occupational Safety and Health Management System

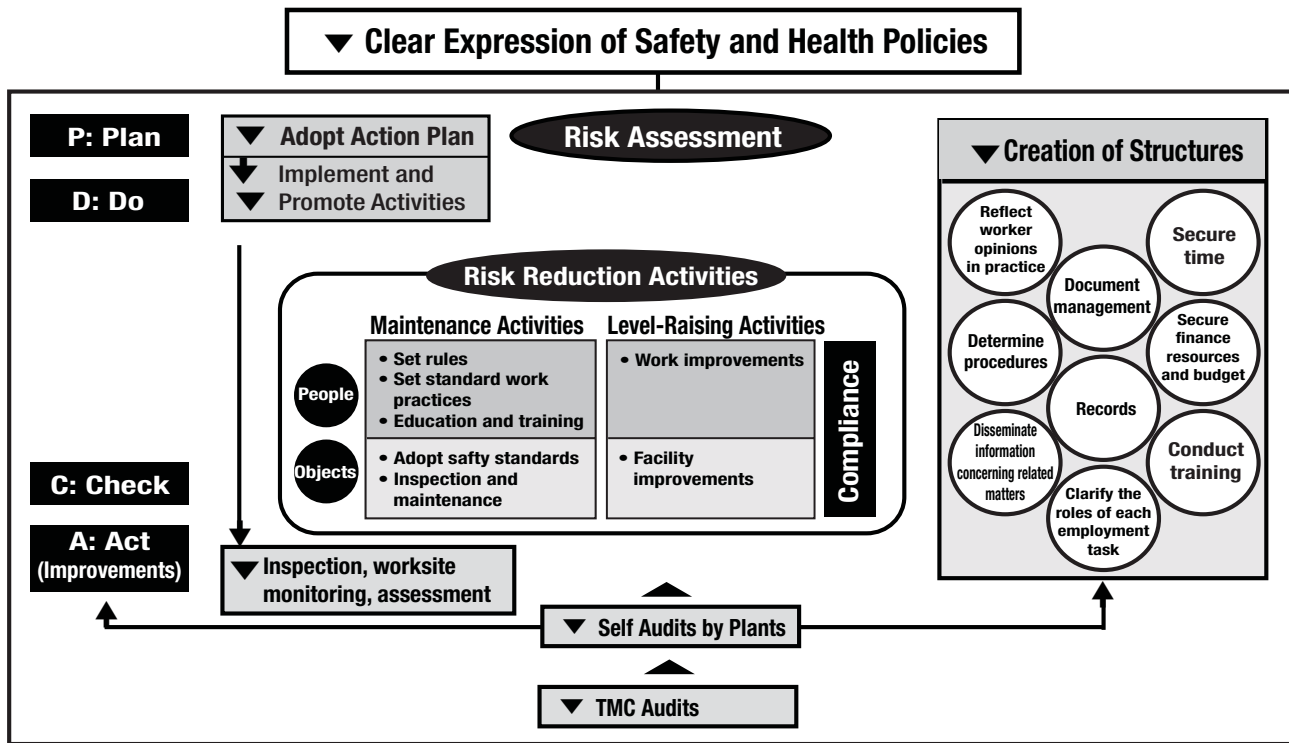


Figure 2.

ation, the Kyohokai, participated in a study meeting at the Tsutsumi Plant's Toyota Global Safety and Health Education Center. They attended presentations on specific training of employees on simulated production lines, dealing with the sorts of irregularities they might find at their companies. The course participants learned how important it is for executive management to personally check safety on-site and to present a strong management commitment to safety. The message was taken to suppliers' middle management ranks when 670 people from 431 companies from around the world attended the Toyota Global Suppliers Convention in February 2007.

From 1890 when lads dashed into forging presses to sweep anvils between strokes to 2008, when Toyota is leading other companies to zero injuries, expectations about safety have risen. The bar is constantly being raised. Improving safety must be part of every kaizen, and making

things safer for employees and customers must be part of policy deployment. If safety is management itself, think about your commitment to safety and how you can make that a standard operating procedure. Why not grab your safety shoes and hit the plant floor for a safety walk today?

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