

Safety Maturity: Three Crucial Elements of Best-in-Class Safety

Hazards are ever-present in the steel plant environment, and a heightened awareness and emphasis on safety is a necessary priority for our industry. This monthly column, coordinated by members of the AIST Safety & Health Technology Committee, focuses on procedures and practices to promote a safe working environment for everyone.



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Comments are welcome.

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Please include your full name, company name, mailing address and email in all correspondence.

The human cost of occupational accidents is vast. Worker safety is a fundamental human need and requirement in industrial settings. It protects workers, prevents unnecessary downtime and satisfies standards compliance.

However, plant floor safety has long been viewed as a costly obligation that adds little value to operations. Today, best-in-class manufacturers realize that combining employee behavior, procedures and technology enables them to go far beyond simple compliance to deliver improved productivity and dramatically lower injury rates.

Every manufacturer's approach to safety is unique and dependent on factors ranging from vertical market, company size and operations, potential hazards, and regional safety standards. But looking beyond the makeup of a company's safety programs and examining the larger trends of the best performers can provide valuable insights into what can be accomplished when safety is implemented holistically, with consideration to a manufacturer's larger operations.

The Aberdeen Group, in three separate surveys, showed that manufacturing executives used four key performance indicators to measure safety performance:

1. Overall equipment effectiveness (OEE).
2. Repeat accident rate.
3. Injury frequency rate.
4. Unscheduled asset downtime.

The survey found that best-in-class manufacturers, defined as the top 20% of aggregate performance scorers, achieve 5–7% higher OEE, 2–4 % less unscheduled downtime and less than half the injury rate of

average performers. These higher-performing companies also experienced far fewer workplace accidents compared to average performers — 1 in 2,000 employees versus 1 in 111 employees.

Best-in-class manufacturers share a common set of best practices that can be grouped into three core elements of any safety program:

1. Culture (behavioral).
2. Compliance (procedural).
3. Capital (technical).

Each of these safety pillars is equally critical and dependent on the others. A company that builds a strong safety culture, for example, can only go so far without complying with standards and investing in safeguarding technologies. Likewise, manufacturers can make significant investments in safety technologies and procedures, but those investments will not fully pay off if management doesn't embed safety into the cultural DNA of the company.

As an additional challenge, the knowledge necessary to improve each of the pillars often resides in disparate functional areas. For example, while environmental, health and safety management (EHS) departments likely implement policies and procedures, they may not include documentation around safeguarding on new machinery. Engineers are focused on designing machinery systems, but they may not consider involving EHS, and sometimes are unable to secure funding for compliant safeguarding systems and controls. Communicating and collaborating across functional groups is essential for a comprehensive approach to safety.

1. Culture

A safety culture is generally indicative of the broader company culture. Safety culture represents worker and company behavior.

A major food manufacturer recently worked with Bright Side Inc., an Ohio-based behavioral strategy firm that works with organizations on building safety into the culture. One of the manufacturer's plants had received a corporate certification for superior discipline and best work processes and practices. However, after a safety assessment, it was revealed that workers weren't actually reporting all safety incidents because they were concerned it could jeopardize the plant's hard-earned certification. While the safety work processes were strong, there were major variations among workers in how they performed those processes.

To remedy this, Bright Side and the manufacturer addressed three strategic employee behaviors:

- **Transparency** — Establishing a climate of trust in which employees could speak the truth without hesitation and understand safety is more important than productivity.
- **Shared leadership and accountability** — Engaging employees to be responsible and accountable, not only for their own personal safety but also for others.
- **Business, self-rationalization** — Changing employees' approach to safety from robotically following processes to engaging their brains when making safety-related decisions.

"Employees who aren't honest about safety won't likely feel obligated to be honest about other things, which can lead to a culture of mistrust and dishonesty," said Donna Rae Smith, founder and chief executive officer of Bright Side. "Likewise, if workers feel encouraged to disregard 'official' safety policies and procedures to reduce maintenance time or increase throughput, they'll likely feel just as flexible about other company policies and procedures. They may also believe that the company is more interested in profits than employee wellbeing."

On the other hand, employees who are transparent, accountable and seeking to continually improve with respect to safety will carry those traits into the rest of their work, to the company's benefit. Moreover, employees internalize safe behavior, taking responsibility for not only their own safety, but also that of their co-workers. Committed employees will accept and appreciate feedback from colleagues who they know will help improve their safety.

One of the biggest hurdles to overcome in achieving a strong safety culture is creating a shared and common appreciation for safety among all parties — from top floor to shop floor. Most manufacturers will

say safety is a priority, but attitudes and behaviors on the plant floor too often prove such statements to be little more than superficial lip service because priorities change often.

If safety is considered simply a priority within a company, it has some competition — other company priorities. For best-in-class manufacturers, safety is more than a priority — it's a core value. When safety is ingrained as a value within a company's culture, neither management nor employees on the plant floor will make exceptions to safety, no matter how big the customer or how urgent an order.

Some preliminary questions to help gauge a manufacturer's safety culture include:

- Are leaders, teams and employees objective observers?
- Can employees see what's happening on the plant floor and understand the real or potential impacts on safety?
- Are safety problems met with excuses or finger-pointing?
- In meetings or on the plant floor, does everyone speak up or is it frequently the same people?
- Are safety issues treated honestly and transparently?

A strong safety culture is communicated and demonstrated from the top down. Every employee should know that management is fully on board with a world-class safety culture, and safety should even be integrated into a company's brand and business plans.

PepsiCo provides a strong example of a safety culture in action with the implementation of its Global Environmental, Health and Safety Management System (GEHSMS). The system conforms to ISO 14001 standards but also sets "global standards for risk areas" across the company. The PepsiCo EHS policy, implemented under the GEHSMS, includes a proactive "ownership culture" across individual, managerial and organizational levels. The policy, distributed from the chief executive officer and sent across the company's brands, states, "We believe that environmental incidents and occupational injuries and illnesses are preventable, and we aspire to be an incident-free workplace."

Striving for continuous improvement is an integral characteristic for best-in-class performers. After all, manufacturers can't become the best if they're not continually seeking to become better.

2. Compliance

A significant challenge for manufacturers is determining how to bridge the disconnect between engineering

and EHS. Oftentimes, the larger the company, the larger the gulf is between these two groups.

Communication is the key to closing the gap between engineering and EHS. Both groups need to collaborate and work toward a common goal, but may not have a solid understanding of the other's job or function. Communicating, holding meetings and understanding how each person's job affects the other's will allow these teams to work toward a shared goal rather than the personal outcomes of each group. In some organizations, engineering and EHS are organized as part of the same department, and EHS is an established career path for engineers.

Cross-functional communication is also critical when ordering new machinery. At a minimum, a company should have functional safety standards in place that have been agreed upon by engineering, EHS, operations and maintenance. This will help ensure consistency among the plant's machinery and also help incorporate the needs of workers who will be involved with the equipment.

For example, a bolt-on safeguard may be fixed over a hazardous spinning blade on a new machine, but if an operator needs to clean the blade on a daily basis, he or she may find a workaround — such as permanently removing the guard or reducing guard fasteners. Now, workers are exposed to the hazard and the investment made in safety has been wasted.

Performing a proper task-based risk assessment and considering all human elements that will be involved with the machine is critical. Studies show that about 90% of machinery safety incidents occur outside of normal operation.

Manufacturers should apply the same standards to equipment upgrades as they do new purchases. This is particularly important for those with in-house engineering capabilities. Design and remanufacturing projects originating from in-house departments too often are not held to the same standards as original equipment manufacturer (OEM)-delivered new machinery. If anything, however, in-house engineers should be extremely familiar with their own company's standards and be held to an even higher standard than OEMs.

In addition, manufacturers need to consider the impact of compliance (or lack thereof) beyond their own walls. The companies that turn a blind eye to vendors with lower standards face major financial and reputational risks if their operations are interrupted by, or even associated with, supplier negligence in a multitude of areas. Supply chain safety is one such area gaining attention, as safety violations, preventable industrial accidents, and mistreated laborers can result in costly fines, company downtime and negative news coverage that can impact profitability.

Best-in-class manufacturers understand this risk and put the same requirements on third parties as

they put on themselves. And, more often than not, the larger the company, the more influence they can have on their suppliers.

3. Capital

It's important for manufacturers to have a solid understanding of their safety technologies and techniques. Companies can do this by determining into which of the following categories they fit best:

- **Incomplete or improper** — Safety is an afterthought, if it is considered at all. Workers are expected to keep themselves safe. If safety technologies are used, they are likely misused, defeated, or non-safety technologies are used in place of safety technologies.
- **Basic** — Efforts are made to ensure the plant is compliant with safety regulations. In place of standard control devices, basic safety technologies and techniques are used, including safety relays and lockout/tagout procedures.
- **Optimized** — Supplemental safety technologies and techniques are used to optimize safety. In particular, manufacturers use alternatives to lockout/tagout tasks when they are deemed to be cumbersome, costly or time-consuming.

Integrated — Machinery has tight integration between safety and control functions. While these manufacturers understand that safety and control functions must be separate, they also know that the two can work with each other to improve operating efficiency and productivity.

In a recent Aberdeen Group study, 74% of best-in-class manufacturers said they used integrated safety technologies to improve diagnostics and reduce unscheduled downtime. Such technologies include integrated safety controllers, which combine safety and standard control in one chassis. These controllers can be connected to plantwide information systems, giving operators visibility into metrics such as downtime reports and machinery and line efficiency.

The Safety Maturity Index Assessment Tool

Tools like the Safety Maturity Index™ (SMI) self-guided assessment can help an organization measure and evaluate its safety program against the three key pillars — culture, compliance and capital — on a scale of one to four.

- **SMI 1: Minimizing investment** — For manufacturers who fall into this category, production throughput and cost reduction are the top

priorities. Safety incidents are frequently hidden. There may be high incident rates, high insurance costs, fines and/or employee complaints to government agencies. Incomplete or improper use of safety technologies exacerbates the problem.

- **SMI 2: Attaining compliance** — For these manufacturers, safety is important, but minimal compliance is the most important part of the safety program. They often use safety technologies such as relays, which separate safety from core or standard machinery operation.
- **SMI 3: Cost avoidance** — Companies in SMI 3 consider safety a high priority but not necessarily a true value. Most safety incidents are reported properly, but some may be discovered after the fact. Compliance processes are established but may be applied inconsistently. Safeguarding technologies are used as a supplement to the standard control system. Safety is the goal, rather than operational excellence.
- **SMI 4: Operational excellence** — For SMI 4 manufacturers, safety is considered vital to

the health of the business and its employees. Safety is an inherent value, and everyone is held accountable and willingly accepts responsibility for themselves and the safety of their co-workers. Compliance processes are clearly defined, and even suppliers must live up to required safety standards. The company conducts thorough risk assessments and uses advanced safety technologies to improve worker safety and OEE.

The benefits of optimizing safety extend far beyond fewer injuries or fines. Companies that approach safety holistically across culture, compliance and capital can improve productivity, gain efficiencies and experience improved employee morale — while also protecting their brand reputation.

Reference

1. International Labour Organization, <http://www.ilo.org/global/topics/safety-and-health-at-work/lang--en/index.htm>. ◆

Did You Know?

ArcelorMittal Steel Chosen for Earthquake-Resistant High-Rise in Manila

An earthquake-resistant luxury apartment complex in the Philippines will feature 700 metric tons of ArcelorMittal steel.

Known as the “Imperium Tower,” the 63-story residential high-rise in Metro Manila is being built using HISTAR® 460 sections produced by ArcelorMittal Europe Long Products’ mill in Differdange, Luxembourg.

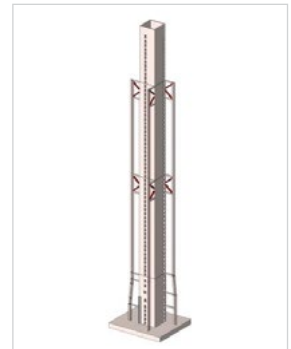
Jean-Claude Gerardy, senior project sales manager, said, “Steel is a popular choice for construction projects in areas prone to earthquakes. HISTAR steel provides structural resilience and ductility, satisfying the needs of designers for light and economical structures which also meet safety and sustainability criteria.”

Located in one of the world’s most severe seismic zones, the tower — designed by architects CallisonRTKL — is not only earthquake-resistant, but boasts a pool and fitness facilities, recreational space and mini-theatre. The Imperium is expected to be completed in 2018.

American structural engineering firm Magnusson Klemencic Associates (MKA) are the masterminds behind the tower’s earthquake-resistant structure, which uses a methodology called “performance-based seismic design” (PBSD); as president Don Davies explains, “By using PBSD and non-linear modeling techniques it’s possible to better simulate the behavior of a structure under strong seismic ground motions, or strong winds. This allows us to better predict how a building will perform, and propose solutions that put materials where they are more efficient for their intended purpose.”

The building’s stability and strength is enhanced by connecting the building’s central concrete core with perimeter columns featuring HISTAR steel rolled shapes, which provide increased column strength while allowing column size to be reduced by as much as 50% compared to all-concrete columns. Reducing column size enables a greater ratio of usable floor space per unit, helping to offset other costs.

MKA engineers also specified the use of buckling-restrained braces to absorb energy from an earthquake in a ductile and predictable way.



HISTAR® composite sections used as outriggers.
Image courtesy of CallisonRTKL.