

## A Case Study in Safety Ownership and Leadership

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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Beginning in spring of 2016, a maintenance department at a steel mill incurred several high-potential near misses within the previous two months. Management leadership within the department reviewed current safety programs and proceeded to build a new foundation around existing programs for a positive outcome regarding safety and health of the department using a safety work order process, behavior-based observation cards and a pre-task analysis card program. The department reduced overall incidents, including injuries, near misses and property damage, working more than 1.4 million hours without a recordable incident in the past 61 months.

In 2016, the maintenance department at Commercial Metals Company's location in Seguin, Texas, USA, had a dramatic increase of near miss and property damage incidents. These incidents occurred over the course of two months and included a total of 19 events; nine of which qualified as high potential events under the definitions within the facility. At a monthly meeting, all the near miss, property damage and first aid incidents were reviewed. During the detailed review, it was identified that many of the near misses were significant enough that immediate intervention was required. Although the department had just finished celebrating one year without a recordable injury, many within the department felt that complacency was creeping into daily functions. The department manager and other management team leaders identified that the department needed to make a meaningful change focused on awareness and accountability for safety.

### Determining Action

A leadership meeting was held within the CMC Steel Texas maintenance department to determine processes and programs that would create a renewed value system to the safety program. Immediately, many of the supervisors and managers began discussing programs that competitors

and other outside businesses were doing to help encourage safer work practices. During the discussion, the department manager reminded everyone that there were tools in place to help drive awareness and identify unsafe acts and conditions within the existing programs. What the maintenance and construction manager said during this discussion rang true then and still does now: "It doesn't matter what safety program we have. We just need to find one that you and your team can believe in".<sup>2</sup> This thought process derived from the world of professional sports and sport psychology, in which psychological knowledge and skills are used to address optimal performance. This would also include addressing social aspects of participating in such a program.<sup>1</sup>

The department manager again reinforced that if the department believed in the processes in place, pushed people to be their best and held people accountable, it would bring value and positive change to the department and added to this idea: "The beginning of every great challenge that is faced begins with the belief that you will win and be successful. If you don't believe in that, then why do it, why try?".<sup>2</sup> It was then agreed that the current programs in place just needed to be enhanced and optimized to impart a safety belief system for the employees. The management team reviewed three different programs

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that the facility was using for measuring unsafe acts and conditions:

1. Behavioral Observation Cards.
2. Take-2 Pre-Task Analysis (PTA).
3. Writing Safety Work Orders (SWO).

Manuele discusses attributes of being a change agent for safety when a manager can leverage knowledge and experience in developing strategies for positive influence.<sup>9</sup> When core competencies are identified, they should be exploited and reinforced within the company culture. Determining how progress will be made and success measured will eliminate confusion of goals.

### Brainstorming on Current Programs

Once the management team agreed that the existing tools and programs in place were value-added, a brainstorming session was held to determine what attributes each program had to benefit the safety of the employees (Table 1).

This list was then cross-referenced with the incidents and near misses that the department experienced. It became clear that all three of these programs had the potential to either prevent or minimize incidents. The management team agreed that the existing programs would work when used properly. It was now time to focus on developing a belief system to create change. These programs had been in place the past five years at the facility and had produced positive results. The question became how to reinvent these programs to be more impactful.

That day during the brainstorming session, the management team decided to start training maintenance employees in different aspects of these specific safety programs through a model with a 100% actionable level. The management team believed that being action-based would concentrate and drive employees

to understand what it means to be a safety champion, safety owner and safety leader. The theory of action-based research is not a new concept, but it was exactly what was needed to bring impact to these programs. Per Conklin, “We study the product, not the process; we look at what happened, not what is happening. One of our biggest issues as safety and reliability professionals is that we manage to our organization’s outcomes instead of managing and understanding the processes that we used to create those results”.<sup>5</sup>

The review of current safety programs by management was an obvious first attempt to remedy and reverse the increase in incidents. What made this review different was the management team’s ability to retain what was known (Observation Cards, SWO and Take-2 PTA Process) and apply it to the complex problem of the increase in incidents. These actions can be considered the beginning foundation of problem-based learning (PBL). The management team developed a structured process around what was known to increase accountability, while systematically obtaining new knowledge and skill. PBL facilitates collaboration to pursue solutions and knowledge related to a problem to determine viable solutions.<sup>12</sup>

### New Concepts: Crew Safety Leader Training Program

The maintenance department created and developed the crew safety leader (CSL) training program. A safety stand-down meeting was held on 31 May 2016 by the management team to explain the current state of the departmental safety performance. The expectations of the future state of safety were identified, and the department was moving forward with the CSL program to improve performance. Unlike any other safety program attempted in the facility, this program would be 100% action based, pulling three employees from the different work crews for one month at a time to focus on safety by applying the three existing programs.

**Table 1**

<i>Review of Benefits Each Program Delivered to Department</i>		
Behavioral observation cards	Take-2 pre-task analysis (PTA)	Writing safety work orders (SWO)
Stopping unsafe acts	Prevent complacency	Identifying safety issues so they can be fixed
Looking out for one another	Assess all potential hazards	Provide a safe place to work
“Brother’s keeper” mentality	Mind focused on task	Ownership of the problem
Preventing unsafe conditions	Think before acting	Not someone else’s job to report
Keeping people from taking shortcuts	Verify employee has skill set for job task	Tool used to address any concerning areas in the plant
Understanding that safe behavior is part of the job	Provide the time to think about a job and do it safely	SWO allows opportunity to fix before something happens

On the first Monday of each month, a kickoff meeting is held with the three selected employees, the maintenance department manager and the safety coordinator from the safety department. This meeting would be a process check to determine expectations for the month and the cadence that the CSL would follow each week. This group met each Monday throughout the month to discuss the previous week and plan for the next. The CSL has deliverables each week that are reported back to the department to provide accountability in the program. The purpose of the CSL is to serve as an extension of the supervisor or foreman, promoting safe work practices with coworkers while deploying the department's safety coordinator guidance within the Maintenance Department. This in turn would provide ideas for enhanced coworker safety. The scope of the CSL program had three missions:

1. Gauge the safety mindset of group members.
2. Exercise authority and responsibility to pause/stop unsafe work activities.
3. Give fact-driven, constructive feedback based on experiences and observations.

Conklin points out, "Don't defend the process over the opinion of the workers. They are your frontline experts. It is no secret: if you want to know how work actually gets done, ask a worker what is truly going on there".<sup>4</sup> Managers cannot be afraid to hear the truth when it comes to daily operational safety. Gaps in awareness, training and risk assessment will become known, as will opportunities for improvement. Developing a culture around the CSL program was paramount. Culture on its own can be defined as a set of shared attitudes, goals or practices for a defined population. In moving forward to define and develop a safety culture, values, attitudes, perceptions, competencies and patterns of behavior of the health and safety management system must be considered.<sup>11</sup>

### CSL Responsibilities, Roles and Work Expression

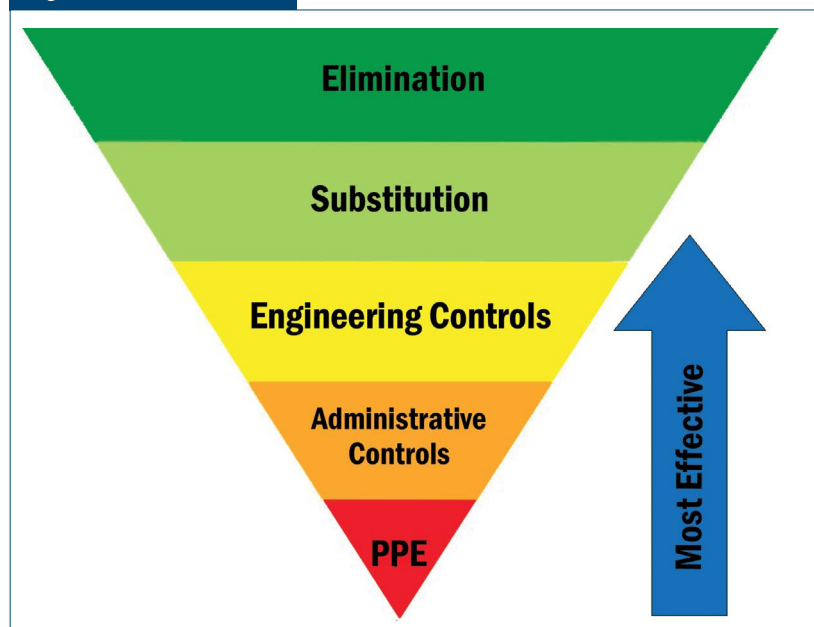
The role the CSL takes while rotating through this program has five key work expressions that were considered value-added to drive a cultural change in safety:

- Execute work tasks in a safe, ethical and honest way.
- Positive, team-oriented contributor with professional conduct.
- Assist in the development of safe work habits.
- Provide perspective on prevention (hazard control hierarchy, as shown in Fig. 1).
- Present and conduct themselves as a role model to coworkers.

The responsibilities of the CSL can be broken down into a simple chart for a holistic view (Table 2). Specific, measurable, achievable, realistic and timely (SMART) goals were created to ensure CSL participants had a clear understanding of expectations. CSLs were set up to cover specific events, projects and processes within the facility. If a department went "down" for preventive maintenance, a "down day" was called for a specific time (Table 3).

A recent research study from the Campbell Institute highlighted several different leading indicators that the CSL program captured. These leading indicators included: communication of safety, environment, health and safety (EHS) management system components, risk profiling and risk assessment. Although some of these indicators are considered reactive in the maturity level of the organization, the complexity to obtain and maintain this data is low.<sup>8</sup>

Figure 1



National Institute of Occupational Safety and Health (NIOSH) defines five rungs on the Hierarchy of Controls: elimination, substitution, engineering controls, administrative controls and personal protective equipment (PPE). The hierarchy is arranged from the most effective controls (elimination) to least effective (PPE).<sup>6</sup>

## Crew Safety Leader (CSL) Results

The results of the CSL program have exceeded all expectations thus far. Over a 4-year period, the quantitative results speak for themselves. Property damage incidents were reduced by 53%, near miss events were reduced by 67% and first aid cases were reduced by 40%. Since the inception of this program, the maintenance department has worked more than 1.2 million man-hours over the past 53 months without a recordable injury. In addition to the reduction in overall incidents, the SWOs backlog increased by more

than 200% as compliancy for unsafe conditions was removed by due diligence of the CSL program. CSLs were encouraged to write SWOs when unsafe conditions were observed to engineer and correct the hazards identified. Per Blair, "Well-designed measures help employees focus on the important safety interventions that are being measured. This is important for safety performance because employees have many things competing for their time and attention. In the absence of good measurement, it is human nature to pay attention to the unusual or the annoying. The time for employees to be focused on safety is before

### Table 2

<i>Crew Safety Leader (CSL) Responsibilities and Expectations</i>	
Definition	Responsibilities/Expectations
Purpose	Serve as an extension of the supervisor/foreman promoting safe work with coworkers
	Deploy safety coordinator guidance within the team
	Provide ideas for enhanced coworker safety
Scope	Gauge the safety mindset of team members
	Exercise authority and responsibility to pause/stop work activities
	Give constructive feedback based upon experiences and observations: fact driven
Deliverables	Support supervisor and team leader with safety meeting summary
	Record observations (positive and negative) on daily log
	Summarize daily log into weekly summary sheet
	Create safety work orders with proper classification for improvements and drive to resolution
	Review/debrief day's plan with supervisor/foreman as needed

### Table 3

<i>CSL Department "Down Day" Schedule</i>				
Area	Meltshop: Down day	Rolling mill: Down day	Shredder: Down day	Non-down day
1	<ul style="list-style-type: none"> <li>Furnace upper/lower levels</li> <li>#42, 5 and 6 cranes</li> <li>Carbon, lime and hydrogen areas</li> </ul>	<ul style="list-style-type: none"> <li>Reheat furnace to PR1</li> <li>Auxiliary areas</li> <li>Crane crew</li> <li>Rebuild shop</li> <li>Shift crew</li> </ul>	<ul style="list-style-type: none"> <li>Infeed through ferrous system</li> </ul>	<ul style="list-style-type: none"> <li>Crane crew</li> <li>Mechanical contractors</li> </ul>
2	<ul style="list-style-type: none"> <li>LMS upper/lower levels</li> <li>Pre-heaters</li> <li>Cooling towers</li> <li>#7 crane</li> <li>Baghouses</li> <li>Rebuild shop</li> <li>Shift crew</li> </ul>	<ul style="list-style-type: none"> <li>Mill proper = PR1 through S-4</li> </ul>	<ul style="list-style-type: none"> <li>Complete non-ferrous system</li> </ul>	<ul style="list-style-type: none"> <li>Project shop</li> <li>Machine shop</li> <li>Hydraulic shop/utility shop</li> <li>Shift crew</li> </ul>
3	<ul style="list-style-type: none"> <li>Caster all levels</li> <li>#1 and 37 cranes</li> <li>Turn over cooling bed (TOCB)</li> </ul>	<ul style="list-style-type: none"> <li>RRI through back shear</li> </ul>	<ul style="list-style-type: none"> <li>Auxiliary areas</li> <li>Crane crew</li> <li>Rebuild shop</li> <li>Shift crew</li> </ul>	<ul style="list-style-type: none"> <li>Electric shop</li> <li>Electrical contractors</li> </ul>

Table 4

## CSL Deliverables Broken Down Into Cascading Daily and Weekly Items

Daily	Weekly
Review daily safety topic in morning meeting	Proactive safety measures (PSM) <ul style="list-style-type: none"> <li>• Total Take-2s completed</li> <li>• Total observations completed</li> <li>• Percent sufficient vs. insufficient observations on Take-2s</li> <li>• Total cards written based on crew size vs. crew average</li> <li>• Categorize cards by hazard/safety initiative:               <ul style="list-style-type: none"> <li>– PPE</li> <li>– Lockout/tagout (LOTO)</li> <li>– Hand and finger</li> <li>– Overhead load</li> <li>– Lifting technique</li> <li>– Proper tools</li> <li>– Best practices</li> <li>– Other</li> </ul> </li> <li>• Identify cards that need follow-up with SWOs</li> </ul>
Review incidents from previous day/shift/week	
Review work orders for the day	
Identify, review and validate safety work orders (SWOs) completed	
Review SWOs created and help drive to completion	
Review Take-2s completed for quality: <ul style="list-style-type: none"> <li>• Employee name</li> <li>• Details of Take-2/work completed</li> <li>• Hazards sufficiently identified for work completed</li> </ul>	Identify and review key safety item for the week
	Highlight and review best observation card/Take-2 (including name and details)
	Incident review
	SWOs created/completed

injuries occur; serious injuries are an undesirable way for employees to become more aware of safety”.<sup>3</sup>

Every maintenance employee that has gone through the CSL program has made their own contribution to this program and culture, by reviewing the operational risk from their point of view. CSLs have the freedom to upgrade and change parts of the existing programs to help foster change in the workplace. Some of these changes included adding no-touch tools to the PTA. CSLs provided critical feedback to employees without negativity when checking on how and when their Take-2 Observations were being completed. The number of PTA cards turned in was only matched by the quality of the cards. Variable data regarding unsafe conditions and acts are instrumental in identifying safety culture issues. The maintenance and construction manager for the facility said, “We let them know that we are 100% vested in their success and that the door is always open; they do not need to wait for the weekly meeting to discuss any concerns”.<sup>2</sup>

The CSL program followed, and demonstrated, what can be accomplished through management leadership. The Occupational Safety and Health Administration (OSHA) identifies management leadership as a core value in their Recommended Practices for Safety and Health Programs. This core value identifies four different action items that the CSL program addressed, including:

1. Communication of commitment to the program.
2. Defining program goals.
3. Allocating resources to achieve the goal.

4. Expecting performance by setting roles and responsibilities.<sup>10</sup>

First, the CSL program enabled participants to learn new information regarding occupational safety at the operations level. This program created three distinct informal learning events for employees. Smith points out adult learners do not want to be taught, they want to play a part in their learning experience.<sup>13</sup> Reviewing near-miss incidents and observation cards gives the participant a chance to identify and process the daily issues that maintenance employees face to perform work efficiently and safe.

Second, the program design forced interaction between the CSL and the remaining members of the department. This encouraged peer-to-peer conversations and growth around working safely. It pulled safety into the casual conversation, instead of pushing it into the process: Geller and Geller describe part of this process: “People acknowledge and support the safe behavior of a coworker and strategically point out opportunities for improvement. This is the critical corrective feedback component of coaching for safety”.<sup>7</sup>

The third informal learning event created process improvement around work instructions and job safety analyses found within the department. Organizations will pre-plan work that is needed to be completed as imagined or known. Meaning that preventive maintenance is redundant in most cases, but is the work done as imagined and intended, or is there deviation? Conklin refers to this as, “The Gap: Operational

Safety Learning”.<sup>4</sup> The deviation between “work as imagined” and “work as done” can be drastically different. Participants in the CSL program learned what was written in the pre-plan and modified the work to improve documents and knowledge.

## Conclusion

The CSL program has been successful in changing the safety culture within the maintenance department due to management leadership and employee participation. Employees engaged in the CSL process have the freedom and ability to suggest and make changes to the existing processes to add value to the safety function. Management leadership should look at existing processes and programs that are in place that can lift organizational safety performance, instead of implementing a “flavor of the month” program to instill change. Organizational drift can occur within a department, even when a company maintains its course. Identification of key attributes in safety processes will help employees and managers return value and a belief system to reinforce safety programs.

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## Did You Know?

### RWE and thyssenkrupp Come Together to Decrease CO<sub>2</sub> Emissions in Steel Production

RWE Generation and thyssenkrupp Steel Europe have planned a partnership to decrease emissions from steelmaking by utilizing a RWE electrolyzer. It could help reduce CO<sub>2</sub> emissions in steel production by using green hydrogen.

A 100-MW electrolyzer could produce 1.7 metric tons of gaseous hydrogen per hour, corresponding to around 70% of the quantity required by thyssenkrupp’s blast furnace. From this, around 50,000 metric tons of climate-neutral steel could be produced.

“The planned cooperation with RWE is an important step on our path to climate neutrality,” said Bernhard Osburg, chairman of thyssenkrupp Steel Europe. “The aimed-for supply quantity would be largely sufficient to supply a blast furnace with green hydrogen and allow the production of climate-neutral steel for around 50,000 cars per year. This shows that climate-neutral steel is possible and we are pressing ahead with the conversion of our production. Nowhere else than in the steel industry can hydrogen be used with a comparable climate protection effect.”

The blast furnace is expected to be converted by 2022. thyssenkrupp’s goal is to have their entire steelmaking process climate-neutral by 2050.

Read more at [www.thyssenkrupp.com](http://www.thyssenkrupp.com).