worldsteel
ASSOCIATION

SAFETY AND HEALTH RECOGNITION PROGRAMME 2018

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worldsteel represents over 160 (including 9 of the world's 10 largest steel companies), national and regional steel industry associations, and steel research institutes. worldsteel members represent around 85% of world steel production. worldsteel acts as the focal point for the steel industry, providing global leadership on all major strategic issues affecting the industry, particularly focusing on economic, environmental and social sustainability.

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Safety and Health Recognition Programme 2018

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FOREWORD

"Nothing is more important than the safety and health of the people who work in the steel industry."

worldsteel Board of Directors

2017 was the safest year on record within the steel industry. It was also the first year that our industry's headline Lost Time Injury Frequency Rate fell below 1.0, a reduction of harm of around 80% since 2006. In this publication we celebrate this achievement and shine a light on six companies that the worldsteel community has chosen to recognise for excellence in their Occupational Safety, Occupational Health, and Process Safety practices.

While we celebrate this success and the contribution of all our members, this should be seen as a milestone on the way to a truly zero harm industry, rather than a destination in its own right. We may have crossed a symbolic line, but the drive to eliminate all workplace injuries must continue.

I wish to congratulate all of the member companies featured in this brochure and sincerely hope that by sharing these initiatives we can inspire other steelmakers to improve their own performance.

Andrew Purvis
Director, Safety,
Health and Environment
World Steel Association

Our focus areas:

Occupational Safety Management

Occupational safety management promotes the safety of employees, contractors and visitors by preventing personal injuries in the workplace, and has a strong focus on primary prevention of exposure to hazards.

Occupational Health Management

In its widest definition, occupational health management encompasses the physical, mental and social well-being of the people working in the company. The focus is placed on long-term effects on exposure to hazards. The health of workers has several determinants, including risk factors at the workplace leading to cancers, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress related disorders and others.

Process Safety Management

Process Safety management is focused on preventing catastrophic accidents and near misses, particularly explosions, fires, structural collapse and damaging releases of energy or dangerous substances. The focus of process safety management is not limited to protecting people but also the environment, our assets and the surrounding community.

Our safety and health principles:

- All injuries and work-related illness can and must be prevented.
- Managers are responsible and accountable for safety and health performance.
- Employee engagement and training is essential.
- Working safely is a condition of employment.
- Excellence in safety and health drives excellent business results.
- Safety and health must be integrated into all business management processes.

The six recognised programmes are judged on four key criteria:

1. How the organisation demonstrates the application of the six worldsteel safety and health principles.
2. Metrics used to test the project or system have a positive impact on the organisation's injury statistics.
3. Improvement in maturity level on the Bradley scale.
4. Relevance and applicability to other worldsteel members.

EZZ STEEL/EZDK - EGYPT

Newcomers' safety improvement programme

At Al Ezz Dekheila Steel Company (EZDK), the critical need to improve the safety of newcomers was raised following a series of accidents involving workers with less than one year's experience in 2013 and 2014. Once such incident left a newcomer with only three months' experience disabled.

Newcomers are most at risk to injuries in the industry due to peer pressure, their high enthusiasm and lack of experience. It was therefore crucial to set up a special programme to eliminate newcomers' vulnerability to injuries.

Management showed their commitment by supporting the initiative, which is based on three main pillars:

1. Identification of the newcomers

- Newcomers are provided with a different colour helmet, in this instance green, for the first six months to be worn on-site so that they can be easily recognised.
- The green helmet is substituted for the standard yellow company helmet when the training period in their assigned departments ends, after a six months period.

2. Training (classroom and on-the-job training)

- Introductory orientation classroom training carried out as standard procedure.
- Three months of technical training after being assigned to a specific department/site. This involves both theoretical and practical training on the day shift under close supervision.
- On-the-job technical training over the subsequent three months focusing on the assigned tasks, their hazards, and the safety precautions to take during the standard shift pattern.

3. Proper supervision

- Newcomers are under close supervision during the six months period.
- During the on-the-job training period, newcomers are not to be assigned to any hazardous job without direct supervision.
- The system is applicable to all newcomers working in technical departments.

Benefits of the programme

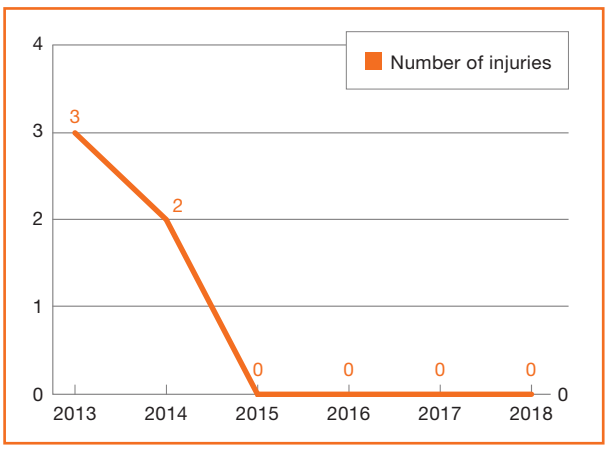
- Appropriate training to ensure newcomer competency
- Easy identification by colleagues and auditors who can provide help and guidance
- Better control of newcomers to avoid high-risk situations
- Increased confidence and morale of employees and hence safety performance

Outcome of the programme

- Significant improvements in safety; no injuries involving newcomers have been recorded since November 2014.
- Simple and easy to implement ideas were the key to the success of this programme.

Newcomer wearing recognisable green helmet.

Number of newcomer injuries, 2013 - 2018



LIBERTY ONESTEEL - AUSTRALIA

Overhead crane magnets

Overhead Crane Magnets form an integral part of Liberty OneSteel's MetalCentre business and are located on seven sites throughout Australia. They are used extensively by all site operators to provide logistical support for moving long steel products and plate, eliminating the need to 'touch' steel while attaching slings or grab hooks.

Overhead Crane Magnets constitute a significant safety risk following 68 steel drops over two and a half years, with an average of three per month. All drops have a potential for serious injury and direct effect on operators, as well as drivers, contractors, suppliers, and countless other site employees.

The Overhead Crane Magnet (OHCM) Headlight Team was formed in April 2016 following a spate of 16 magnet drops during a three-month period. The Headlight Team approached the issue with 'new eyes' and employed the methodology of specific, dedicated focus groups.

Throughout the investigation process the OHCM Headlight Team's significant discoveries were that 80% of all drops relate to behaviour.
The important findings were:

- Practice of avoiding a lift on partial power (by-passing the safety check)
- Lack of understanding of Magnetic Flux penetration and 'No-Go' lift products
- Inexperienced Buddy Trainers (poor training, complacency and non-compliance)
- Shed Layouts for two Head Bar Magnets (exacerbates drop potential).

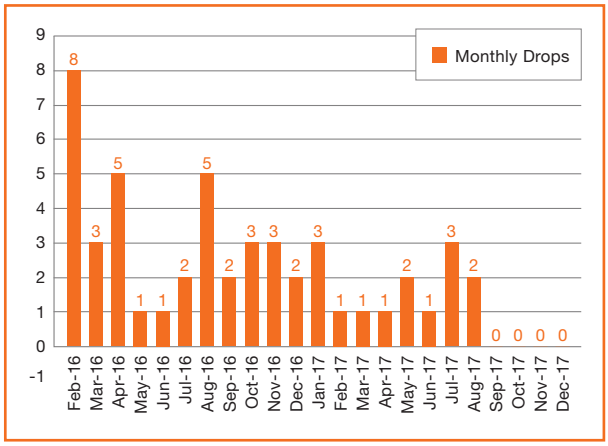
After an extensive review, investigation and engagement by the focus groups, an Action Plan was created based on the belief that ALL crane magnet drops are preventable. The Action Plan contained the following:

- Development of standardised Standard Operating Procedures (SOPs)
- Appointment of Magnet Champions and Buddy Trainers
- Engagement of External Subject Matter Experts to visit sites and conduct training
- Re-Training and Re-Certification of Magnet Champions and All Operators
- Clarity, standardisation and revised "No Go" list for two head magnets
- CAPEX upgrade of two head to four head cranes in high risk areas and re-layout of Shed Bays
- Change of behaviour.

The OHCM Headlight Team's forensic focus on practices, behaviour and implemented changes, coupled with commitment from management and employees to the action plan, has achieved a significant downward trend of magnet drops over the past 12 months.

The methodology and action plan employed by the OHCM Headlight Team can be adapted by any site or location to help eliminate the incidence of Magnet Crane drops.

Overhead Crane Magnets, monthly drops, 2016-2017



TERNIUM - MEXICO

Advanced technology application for safe operation in yards

Advanced technology application for safe operation in yards

Ternium's *Safe Operation in Yards Programme* has two main objectives:

- To reduce personnel risks by eliminating interactions between people, mobile equipment and products.
- To standardise the best and safest practices and control mechanisms.

The project addresses five key issues:

1. Layout of the yards:

- The layout should be designed with the fewest number of pedestrian walkways. Pedestrian walkways should be independent of mobile equipment flows. Areas must be designed with sufficient space to make logistic activities, such as forklift manoeuvres, as safe as possible.
- The layout must include aisles, storage areas, mobile equipment roads, parking areas and pedestrian walkways.
- The layout must be clearly marked and highlight critical risks.

2. Standard racks:
   Racks are physical structures. They must be manufactured according to advanced engineering design processes, which are always accessible. Routine maintenance inspections must be implemented.

3. Mobile equipment:
   Inspection checklists must be established for all mobile equipment. Routine maintenance must be implemented and kept on record. Only certified operators can use the equipment. The maximum load capacity must be visible on all equipment and they must be equipped with the following safety devices or features: reverse alarm, three points seat belts, anti-collision sensor, horn, audible siren, emergency stop button, communication facilities, controlled speed, nightlights and rear-view cameras.

4. High technology practices:

- RFID technology: This technology automatically identifies the location of a coil through a tag attached to the product or coil racks.
- Warehouse Management System (WMS): This system can identify the best storage space for a coil and can track the coil's location thanks to positioning lasers on the crane.
- Proximity Warning & Alert System: This system prevents collisions between vehicles and personnel.
- Safety with video analytics: An alert is triggered when an incident that brakes the rules is detected. This technology can also analyse videos in real time.

5. Practices and controls:
   All warehouses must be fenced and have a controlled access system involving the supervisor. When a necessary task needs to be performed all mobile equipment must stop.

The implementation of this programme has resulted in the following improvements:

- Safety was improved by eliminating the need for a staff member to physically locate a steel coil in the warehouse.
- Inventory time was reduced by 88%.
- Product location time was reduced from 10 minutes to no time at all.
- The overall risk factor was reduced by 71%.

USIMINAS - BRAZIL

Projeto superar

"Projeto Superar" (Surpass Yourself Project) started in 2014, using as a basis the mapping out of the number of work leave days related to musculoskeletal causes and injuries caused by motorcycle accidents among Usiminas employees, which accounted for 30% of the total work absences. The project was initially made available to employees working in Ipatinga. In 2016, it was extended to employees working in Cubatão.

The main goal of the project is to guide employees to the appropriate care to prevent injuries related to the musculoskeletal system caused by sports and traffic accidents, as well as offering a multidisciplinary educational and therapeutic approach for employees with axial skeletal disorders, disorders and shoulder and knee issues. The aim is to reduce the risk of complications and, consequently, reduce the need for hospitalisation and surgery.

The project was developed in partnership with Fundação São Francisco Xavier, using a preventive and therapeutic approach, as well as modern sensitisation techniques, management of clinical conditions and control of results.

In the preventive approach, the appropriate prescription of physical exercises and motor conditioning, rehabilitation based on the principles of sport medicine, the principles of defensive driving and speed control awareness are provided. In the therapeutic approach, the main techniques employed are the Backbone School and Mackenzie Technique.

Since its implementation, "Projeto Superar" has contributed to an increase in health maturity throughout the company. In the initial phase of the project, employees did not see the need for treating musculoskeletal disorders. As employees began to participate, they became increasingly aware of its importance and realised how health education and self-care could contribute not only to improved work health but also to overall improved health. Thus, adherence to the project activities became a natural process and employees adhered spontaneously.

Currently the project is at the stage where the prevention and promotion culture is disseminated among employees, who then pass their knowledge on to their colleagues.

The outcomes of the "Projeto Superar" are periodically assessed by means of a survey of the number of work days lost by participants during the 12 months prior to enrollment, and the 12 months after hospital discharge. In the case of the 274 employees working in Ipatinga, who took sick leave for axial skeleton (CIDs M50 to M54), there was a reduction of 75.1% in the number of days lost on sick leave of up to 15 days, and 70.8% of the number of days lost on sick leave exceeding 15 days.

TATA STEEL LIMITED - INDIA

Process safety journey through its Centre of Excellence (CoE)

Excellence in Process Safety Management is one of Tata Steel's key safety strategies to achieve its corporate objective, 'Committed to Zero'.

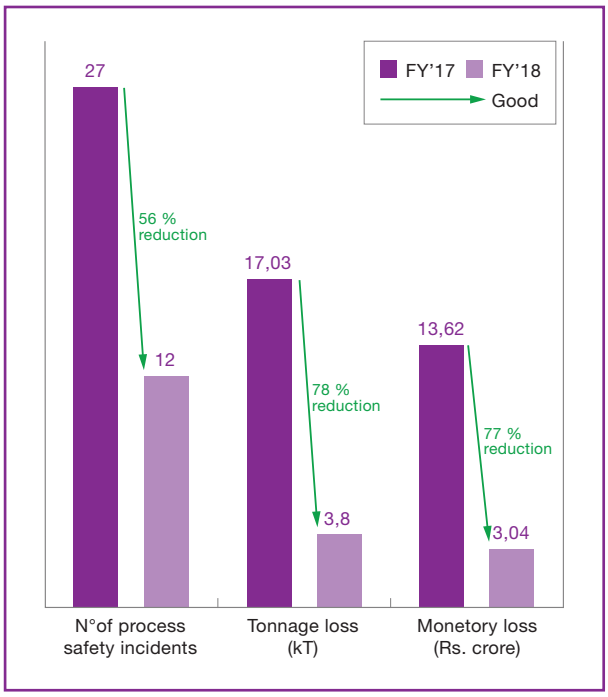
Tata Steel adopted process safety management in 2006 to address process-related risks. While frameworks and procedures were established, their deployment remained an issue.

With the aim of making process safety a 'way of life', a Centre of Excellence (CoE) concept was introduced in two of the high-hazard manufacturing units in 2016 and was extended to three more in 2018. Tata Steel will roll out this concept to the rest of the company progressively as it develops more and more in-house competency.

The programme aims to answer the following three questions:

1. Do we know what can go wrong?
2. Do we know what barriers we have to ensure that it doesn't go wrong?
3. Do we know that our barriers are effective and working properly?

Business impact : Steelmaking Shop LD-1 (CoE Department)



The CoE concept focuses on four elements of Process Safety and Risk Management (PSRM), namely Process Safety Information (PSI), Process Hazard Analysis (PHA), Management of Change (MoC) and Operating Procedure (OP). It sets three objectives:

1. System and documentation

- Review and upgrade of existing procedures and tools for PSI, PHA, MOC and OP.
- Incorporate industry leaders' best practices through benchmarking activities.

2. Field implementation

- Strengthen the inspection and maintenance systems relating to critical process safety equipment.
- Monitor and manage process parameters deviations within Standard Operating Condition (SOC) and Safe Operating Limits (SOL).

3. Cultural changes

- Capability building of shop floor employees through a 70:20:10 approach on PSRM.
- Management of change implementation in day-to-day operations.

Advanced tools, such as hazard and operability studies (HAZOPs), consequence modelling through process hazard analysis software (PHAST), bow-tie analysis and layer of protection analysis (LOPA) are also used to improve the quality of hazard identification and risk assessment.

Today, benefits are clearly visible in the reduction of high severity process incidents and the increase in reporting of low severity near misses.

The key success factor of this journey can be attributed to leadership commitment, human resource investment (four officers being released full-time for one and half years), as well as exposure to benchmarking practices and subject matter experts.

ESSAR STEEL - INDIA

Revisiting process safety elements

Essar Steel, Hazira believes in *Building a Sustainable Safety Culture through Process Safety Management (PSM)*. Their journey started in December 2010 with a baseline external audit performed by a third party, which was reconducted in September 2012, November 2014, February 2015, March 2017 and February 2018.

Process Safety Management initiatives

After completing a series of initiatives relating to process safety including setting up an online PSM portal, an online MOC (Management of Change) system, launching company-wide PSM campaigns, screening of PSM films, and a mandatory 15-day on the job safety training for both contractors and employees, process related incidents were brought down to zero.

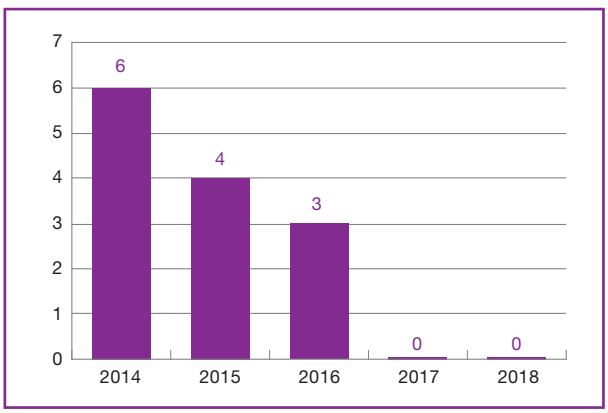
Post-Process Safety Management audit and review

In 2017, as part of a continual improvement plan, Essar Steel revisited the selected process safety elements at the **micro level**. Subsequently, a series of systems and procedures were reviewed to prevent high-potential (HIPO) catastrophes, such as fire, explosions and release of toxic and hazardous gases during various steel processing or maintenance activities.

Plant audited

1. **Steelmaking zone** – Plant 1 and 2; sinter plant
2. **Rolling zone** – Cold rolling, hot strip, crude steel production, plate and pipe mills
3. **Service zone** – Central refractory repair shop

Trend of process incidents from 2014 to 2018



Scope of review

- Entire gas network and burner management system.
- Equipment drawings, process flow, process, instrument and logic diagrammes, alarms, trips and interlocks with process operator.
- Start-up and emergency shut-down procedures with plant operator.
- Hazards and Operability Study (HAZOP), Safety Integrity Levels (SIL).

In the remaining plants (DRI modules, blast furnace, utilities, material handling, central stores), the PSM audit and review process is ongoing.

The audit recommendations were distributed to all specific team members (operational, mechanical, electrical and instrumentation) with the support of senior management. The recommendations are reviewed at each monthly operation meeting, which is chaired by the CEO and the Managing Director. All critical recommendations are tracked via an online Health, Safety and Environment portal as part of the annual goal setting and improvement plan.

International Process Safety Workshop

An International Process Safety Workshop was organised at Essar Steel's Hazira facility on 29 and 30 November 2017 in collaboration with worldsteel and the Indian Steel Association. More than 57 steel industry professionals from nine countries participated and an action plan was drawn up for horizontal deployment across the steel industry to prevent catastrophes, such as fire, explosion and gas releases.

International Process Safety Workshop, Essar Steel Hazira, November 2017

2018 STEEL SAFETY DAY

On-site traffic

steelSafetyDay

Established in 2014, the Steel Safety Day was set up to reinforce awareness of the five most common causes of safety incidents and to create a safer working environment across the entire global steel industry.

By focusing on the five causes - moving machinery, working at heights, falling objects, on-site traffic, and process safety incidents, worldsteel intends to set up a continuous improvement process.

An extensive membership audit took place in advance of the Safety Day on 28 April 2018.

The focus this year was on-site traffic.

IN 2018...

439,528 employees and contractors from 51 companies actively took part in the audit.

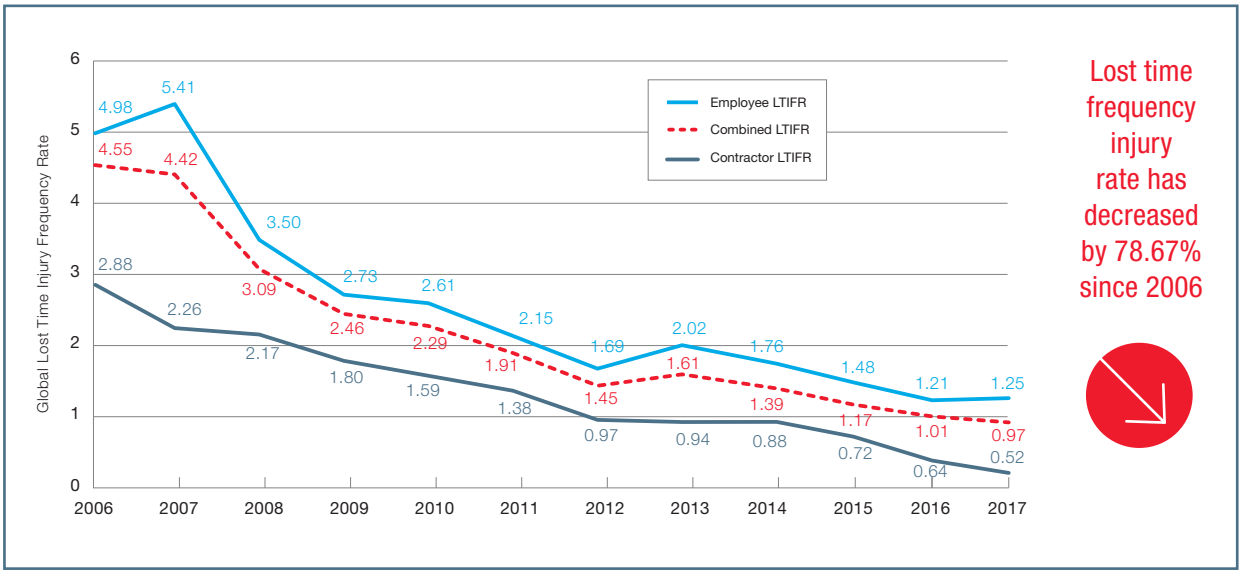
885,975 employees and contractors working on those sites were directly or indirectly involved in the audit.

OUTCOME

The Steel Safety Day audits have had a major positive effect in identifying hazards in the workplace. Participating worldsteel members are now developing mitigation plans for 100% hazards identified to ensure serious injuries no longer occur.

For more **information**, go to the safety and health section of **worldsteel.org**, under steel by topic.

Steel industry Lost Time Injury Frequency Rate (LTIFR)*



**A Lost Time Injury (LTI) is an incident that causes an injury that prevents a person from returning to his next scheduled shift or work period. The Lost Time Injury Frequency Rate (LTIFR) is the number of Lost Time Injuries per million man-hours. LTIFR includes fatalities.*

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