Safety and Asset Management in Smarter Process Industries: How Real-time Location and Identification can Change the Game in the Search for a Zero-Injury Workplace
Enhancing Safety and Asset Management with Real-time Location and Identification

Large industrial sites such as refineries, chemical or steel plants are increasingly under pressure to meet strict, effective and auditable worker safety practices. At the same time, they use a vast array of expensive equipment and assets, the management of which affects the bottom line of the organization.

Managers are confronted with the need to simultaneously improve safety, streamline operations, and optimize resources while being accountable for all this in near real-time. Traditional information and management systems are simply unable to cope with this challenge: they lack the fundamental capability of providing complete visibility into an industrial facility in real-time.

A new generation of location and identification technologies makes it feasible to attain the simultaneous goal of higher worker safety and more efficient asset management. Thanks to the ability of identifying and locating people and assets in real-time, and to derive business information from it, managers and workers are empowered to operate in smarter ways.

This white paper illustrates the role of location and identification technologies for personnel safety. It argues that the technology represents a game-changer in the practice of safety in the workplace. In addition, the technology is part of a broader approach for smarter industries that simultaneously enhance safety, visibility and asset management.

The Demand for Higher Levels of Safety

Government statistics and Industry Reports indicate that in the last decade significant safety improvements have taken place in the Oil and Gas and in the Process Industry as a whole. Safety policies and technologies, together with a rising awareness of safety by workers and management, have contributed to saving lives and avoiding financial costs. However, major incidents with serious injuries and fatalities are still a reality and remain as a permanent reminder that the industry is still far from reaching a zero-injuries work place.

Today, the Oil and Gas and Process industries are subject to increasing social and political pressures to radically improve incident prevention measures and achieve a significantly higher level of safety. As the recent events in the Gulf of Mexico demonstrate, and beyond the human toll, incidents cause financial damages and liability claims that can disrupt the operations of an entire company, if not bringing it to the brink of failure.
Accounting for People

There is widespread consensus in the industry that major safety advances require simultaneous improvements in leadership, awareness, accountability and management systems. This cannot be achieved without drastically improving the quality and relevance of real-time information to workers and managers, at all levels of the organization.

The basic need is to account for all personnel at all times, especially during emergencies where it is even more critical. Not only can the lack of proper accounting for personnel lead to avoidable exposure, ineffective risk prevention, and regulatory fines, but also to unnecessary rescue attempts after incidents. Most facilities currently rely on time consuming, error prone, manual processes. These manual processes are incapable of providing the necessary information required to support more efficient and effective safety policies.

A New Generation of Personnel Safety Systems

Automatic identification and sensor technologies have reached maturity and widespread adoption in many industrial sectors as well as in consumer electronics. They can be used to identify and locate assets and workers in any part of an industrial facility in real-time. Safety violations, unsafe practices or simply accounting for people in case of emergency can be automated, allowing companies to provide higher quality information that exceeds anything available in the market today.

A new generation of Personnel Safety Systems is emerging and is already being deployed in leading Oil and Gas companies. These systems leverage real-time information to assess risks, anticipate incidents and minimize the effects of incidents when they occur. Now, with this cutting edge technology, unsafe situations can be detected immediately and remedy actions can be swiftly applied. In case of evacuations, the system can ensure accountability of all workers in real-time and help to focus rescue operations. In addition, over time, they can detect patterns that serve to orient safety policies and best practice in the relentless pursuit of a zero-injury workplace.

The intersection between the growing demand for safety and the availability of mature location, identification and sensor technologies is where major safety innovations are emerging. They represent game-changers for safety in the Oil and Gas Industry, ultimately establishing a new level of safety for the entire Process Industry.

Changing the Game for Safety

Incidents like the explosion at a leading refinery, which killed 15 workers and injured more than 170 others, cost over $ 2 Billion in settlements plus an extra $ 1 Billion in repairs and lost profits.

As part of the incident review and safety recommendations, a panel chaired by Former US Secretary of State James A. Baker, indicated the automatic people accounting system used for access control and emergency headcount at another refinery was to be considered industry-leading best practice.

The validation of this technology illustrates the heightened awareness for improved safety within the industry as a whole. Adopting best practices for safety is no longer a “nice to have,” but rather a vital element needed to reach a new level of safety.
Traditional methods of information collection and analysis fall short of answering even basic questions such as: “How many people are in the process unit at the time of the incident?” Data is often collected on paper; inspections are visual or based on badges that operate only at selected gates; work permits are not verified in real-time and violations are hard to detect. This can be radically changed. Imagine you could answer these questions:

- How many workers are in a certain area now?
- Do they have the right work permit to work there?
- Are they aware of machinery or cranes operating around them?
- Are all contractors in their assigned areas?
- Are there unescorted visitors in the facility?
- Has everybody left the incident area?
- Has everybody reported at the mustering stations?
- Are all workers in the facility accounted for?
- Who’s missing and where were they seen last?

These needs are common across all business areas, from exploration and production, to processing, distribution and retail. They can be answered thanks to systems that locate in real-time workers or assets in complex industrial environments in a reliable way, while ensuring privacy and data protection.

Zebra’s Personnel Safety System

Zebra Technologies has developed a Personnel Safety System (PSS) to address the growing needs of safety and accountability in the industry. Based on real-time location and identification, Zebra’s new Personnel Safety Solution brings safety to a new level of security for every individual at your company. Only Zebra’s PSS allows companies to automatically account for thousands of workers and visitors by providing real-time visibility into the exact location and identification of every individual both in and outdoors. Zebra’s PSS is based on the ATEX-certified portfolio of Zebra, a proven set of location and identification technologies that can be deployed in harsh, dense metals environments, and in the presence of explosive gases. Designed to help companies move closer to a zero-incident workplace, Zebra’s PSS radically improves safety practices and incident prevention.

The system is based on intelligent tags, which complement the regular access control badges, and on industrial-grade sensors located at various places across facilities such as refineries, rigs, or yards.

While sensors locate and identify tags, the underlying software interprets this information to detect safety violations or unsafe behaviors. During emergencies it can guide the mustering and evacuation process accounting for all people in real-time while the operation unfolds.

Under the strictest privacy prescriptions, the system can detect anomalies and anticipate risks. It can also be used for prevention and enhancing safety practices, as well as for supporting mustering and evacuation. Combined with asset and vehicle management, it can detect and avoid potentially unsafe situations and prevent potentially catastrophic events.
The Need | The Personnel Safety System Answer
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Access control and mustering during emergencies | ● Real-time counts of all workers, visitors and contractors anywhere
● Detect who enters/leaves facility
● Counts presence at mustering points, refuge buildings or safe areas
● Detects missing people and their location

Evacuation management | ● Detect those located in an incident area
● Consolidate counts to verify safety of all personnel
● Guide rescue teams to the known location of those in need
● Store incident information for rapid audit and investigation

Location of personnel, permit verification and hazard detection | ● Virtual fences to detect unauthorized entry in restricted areas
● Real-time verification of work permits and detection of violations
● Enhanced safety for visitors and detection of unescorted visitors or contractors

Prevent incidents with vehicles | ● Detect presence of vehicles (forklifts, cranes) in proximity of people
● Alert operators and workers of pending hazard

Assess safety violations and reconstruct incidents | ● Monitor safety violations over time, rate of improvement or deterioration
● Identify areas of attention
● Playback events and incidents for learning and awareness

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**Increasing Safety while Improving the Bottom-line**

It is a normal business practice to assess the benefits of adopting new safety systems against their costs. It is also recognized that trading off safety costs has led some organizations to accept risks that have been among the root causes of major incidents in the past.

This trade off is not necessary. Safety and asset management practices can be improved by leveraging the same underlying location and identification infrastructure, therefore, the same investment that increases safety can also provide cost savings and more efficient operations, all of which improve the bottom-line.

Zebra has developed an entire portfolio of solutions that leverage the same infrastructure to enhance safety, improve asset management and deliver site visibility. Zebra has developed an entire portfolio of solutions that leverage the same infrastructure to enhance safety, improve asset management and deliver site visibility - all of which provide the ability to address questions such as:

- What is the inventory status for the facility at this point in time?
- How can we increase asset utilization and minimize asset losses?
- How can we streamline maintenance and inspections?
- How can we ensure operations integrity with less equipment?
- How can we improve supply chain visibility?

Answering these questions means saving money, inventory reduction, decreased operational interruptions and a streamlined supply chain. All of which ultimately improves safety and the bottom-line.
To discuss these industries implications further we encourage you to email the following contact:

**Zebra Enterprise Solutions:** Euro Beinat: ebeinat@zebra.com

Or visit [www.zebra.com/zes/og](http://www.zebra.com/zes/og) for additional information

Zebra Enterprise Solutions, a division of Zebra Technologies Corporation, extends Zebra’s reach beyond passive RFID by employing state-of-the-art software and hardware solutions to locate, track, manage, and optimize high-value assets, equipment and people across the world’s largest supply chains. Whether tracking containers through a port, optimizing parts for manufacturing, or managing ground support equipment at an airport, the real-time asset management solutions from the combination of Navis, WhereNet, proveo, and Multispectral Solutions provide improved visibility and velocity to gain measurable business improvements. Utilizing products that are based on ISO/IEC 24730-2, Cisco CCX Wi-Fi, precision GPS, and UWB technologies, Zebra Enterprise Solutions offers a wide range of location solutions that are “application matched,” enabling its customers to put the right asset in the right place at the right time.

For more information about Zebra Enterprise Solutions visit [http://www.zebra.com/zes](http://www.zebra.com/zes)