Leveraging IIoT for Worker Health & Safety

by Captain Daniel Alcantara

> "You have the required Safety and Sustainability Strategy in place. That is the WHY. It is thus vital that we redirect attention to achieve the Generative Culture in Safety to accelerate Core Values and Sustainability results within the organisation – which will bring us to the WHAT and HOW." - Captain Daniel Alcantara

In recent times, there has been an increase in worker health and safety awareness across industries. Many employees have lost their lives due to worksite incidents and occupational illnesses. These fatalities and serious injuries are devastating and can have a long-term effect on employees, their families, and colleagues. Therefore, it is the responsibility of everyone in an organisation to understand the potential factors associated with worksite accidents and take preventive measures.

The Global Sustainability Standards Board (GSSB) issued guidelines since 2018 to develop sustainability journeys and reporting for health and safety. GSSB is the independent standard-setting body of GRI and has developed best practices in occupational health and safety management and reporting. Despite these efforts, there is a very little change over the past decade. Worksite incidents and injuries continue to plague several sectors, resulting in a huge loss of resources.

While Mining, Chemicals, Maritime are the few sectors which are prone to such worksite accidents, the Oil and Gas industry, a vital part of the world economy, is one of the most affected sectors among all. A report by The International Association of Oil and Gas Producers (IOGP) revealed that workplace injuries were about 10% higher in 2021 as compared to 2020. The prospering industry is not immune to serious injuries or fatalities.

Cause of accident reoccurrence

No matter how safe a worksite is, accidents are inevitable. Unforeseen events and incidents can lead to an injury or casualty. Despite their efforts, companies have not been able to improve safety records involving its employees and contractors. In fact, worksite incidents have been on the rise for the past decade and their effects may be devastating and result in huge human and economic costs.

Human reliability is one of the primary factors of workplace safety. In general, human reliability means successful performance within specific timeframes and environmental conditions. Lack of Human Reliability information on process efficacy and work environment increases the likelihood of accident's reoccurring.

Experts believe that by improving general awareness and understanding of the risks involved in human reliability, the rate of accidents can be brought down significantly. This can be achieved by leveraging IIoT analytics to better inform the design of employee safety awareness programmes and conducting targeted, proactive training sessions.

Most companies are unable to uncover underlying cause of the accidents and tend to concentrate on direct causes. The main reason for accident recurrence is insufficient real time information towards underlying causes and pre-conditions. It is crucial to obtain real time human reliability data in order to assess the cause of an incident; and subsequently execute preventative measures effectively.

Leveraging IIoT and AI technology to improve visibility and situational awareness for workers involved in hazardous operations can help to improve accidents and incidents and reduce overall frequency. Through data and analytics, leading indicators can help management and HSSE (Health, Safety, Security, and Environment) teams identify early trends and take proactive action, resulting in positive behaviour change.

Unpredictable and unsafe behaviour

The unsafe behaviour of the workers is one of the underlying causes of worksite accidents. Employees tend to neglect safety protocols by taking shortcuts. Also, it is common for employees to not be always conscious of their surroundings. Such unsafe behaviour and hazardous working environment can exist concurrently and cause serious accidents.

Early detection of unsafe behaviour is important to execute interventions and targeted trainings. Technology plays a crucial role in detecting unsafe behaviour of workers at hazardous locations. Therefore, it is imperative that the management has safety solutions backed by digital frameworks in the worksite to minimise accidents.

Transforming safety with the digital framework using wearable technology

The digital framework for operationalising "Human, Work Environment and Organisational Factors"

Defined Safe Work Behaviour
Encourage crew behaviour change by empowering and improving accountability. Improve safety assurance and "Human Reliability" by focusing on Who? Where? When? and What?

Set Goals For Behaviour Change
Set expectations for behaviour change. Educate and provide the right tools to build crew accountability

Positive Safe Behaviour Reinforced
To build a relationship of trust and respect with the crew. Focus on opportunities to appreciate, praise and acknowledge good behaviour

Observe Behaviours
Observe worker behaviour and determine how safe practices can be turned to habitual behaviours

Real-Time Feedback
Using technology to provide real time feedback to crew on operations, observations and system based leading indicators

Analyse Data
Data analytics to identify elements for improving "Human Reliability"

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The Digital Framework

With Industrial Internet of Things (IIoT) and software, companies can improve workers' situational awareness. Wearable technologies help in optimising worker data and improving the work environment and processes. Utilising wearable technology as a tool to curb worksite accidents is becoming popular and is adopted by various industries to create a safer work environment. They can minimise such accidents at the worksite by helping the organisation with real-time alerts during an incident. Some wearables not only prevent accidents but also assist employees in their day-to-day work.

Today, wearables like smartwatches have the capability to detect anomalies and prevent accidents. Through wearables, organisations can track lone worker in remote or dangerous locations.

Benefits of the Safety SmartWatch:

Location Tracking

The Oil and Gas industry involves specialised equipment and employees working at oil rigs and plants. Processes like the extraction of natural gas from ocean beds involve hundreds of labourers and engineers. Tracking workers who are spread across the site on the ocean bed is a tedious task that calls for digital solutions to connect workers and their supervisors.

Location tracking technology in smartwatches enables supervisors to track employees' location in real-time at a worksite, no matter how remote it is or how hazardous the working conditions are. A human movement overview on the dashboard and the ability to pinpoint the indicative location of worker during an emergency will accelerate rescue operations and provide swift medical aid.

Virtual Geofencing

It is impossible for management to monitor individual employee's situational awareness with the current manual tools available and furthermore the topic of Situational Awareness has generally been misperceived as the injured person's shortcomings (for not being situationally aware of the tasks they have been engaged on).

So, with virtual geofencing technology, smartwatches can detect and alert the worker when approaching a hazardous area. Over and beyond notifying the worker of direct hazards, technology can provide the supervisors with additional insights to evaluate sufficient manpower on site, workers work and rest hours, heat exposures etc. We strongly believe Situational Awareness can be accelerated when human reliability insights become more visible or prominent.

Workforce Optimisation

Unsafe acts are difficult to predict at a worksite. It is natural for workers who are on 9 to 12-hour shifts on rigs to get tired or stressed. This increases the tendency for such workers to get injured due to fatigue and poor concentration. Also, the monotonous nature of certain jobs may result in such workers ignoring safety protocols or behaving recklessly, causing harm to themselves and others.

As such, it is important to recognise and correct such behaviours to prevent serious accidents. Smartwatches can assist in delivering insights into worker behaviour and providing the basis for guided intervention. With these insights, supervisors can make the necessary tweaks to the deployment of their workers to achieve both safety and resource optimisation.

Vitals Monitoring

It is common for oil and gas industry workers to lack real-time situational awareness on hazardous worksites. Workers are unaware of pre-conditioned environmental risk exposures, and they may not receive contextual alerts that inform them of surrounding risk.

External environmental factors and harsh working conditions may result in adverse physical and psychological effects.

Guided Intervention

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Unsafe acts are difficult to predict at a worksite. However, it is imperative to recognise and correct such behaviours to prevent serious accidents. Leveraging on IIoT with a digital safety framework can deliver workers behavioural insights and provide guided intervention.

Social Commitments in Workers Health and Safety - Environment, Social and Governance (ESG)

Expectations for organisational social commitments have started to shift to focus on outcomes and not just inputs or investments. Increasingly, safety and wellbeing are becoming more important for in an organisation's sustainability agenda.

Wearables is a game-changing technology when it comes to worker safety. Equipping employees with such cutting-edge solutions can assist companies in fulfilling their Environment, Social, and Governance (ESG) obligations in safety, through enhancing working conditions for the employees and reducing the occurrence of accidents and injuries.

Apart from ESG considerations, the quantum of accident claims, insurance premiums and regulatory fines for workplace injuries have increased over the years. Organisations that invest in safety technologies may well end up experiencing overall cost savings with reduced accident rates and associated costs. For organisations looking to enhance the safety and well-being of their employees, safety wearables could be the perfect tool.

Captain Daniel Alcantara is the Chief Solutions Delivery Officer at Magellan X. He will be presenting at The Connected Worker Summit, Houston on "Leveraging IIoT Enabled Connected Worker Platforms for Workforce Safety". As an expert speaker, he will highlight the importance of worker safety, and how digital frameworks using wearable technology can be deployed in the oil and gas and shipping industries.