Ensuring better workforce safety with improved lone worker safety solutions

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# Table of Contents

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Idea in brief</td>
</tr>
<tr>
<td>03</td>
<td>Industry Landscape</td>
</tr>
<tr>
<td>04</td>
<td>Way forward for industry players</td>
</tr>
<tr>
<td>06</td>
<td>About the Authors</td>
</tr>
<tr>
<td>06</td>
<td>About Wipro Ltd.</td>
</tr>
</tbody>
</table>
Idea in brief

Safety of a worker at the workplace is of growing importance across the globe. Organizations that provide services across utility maintenance, construction, health care, disaster recovery, late night hospitality and transportation have lone workers who are seldom connected to the base stations and are prone to higher levels of risks. Over the past two decades, many large Employee Health and Safety [EHS] solutions have evolved, matured and reached >$10M businesses. However, these solutions do not monitor the workforce in real time and hence are not suitable for taking actions in the event of a lone worker emergency. However, there is a separate set of solutions that is emerging to ensure safety of lone workers.

A quick glance at the recent developments and trends in lone worker safety shows opportunities for enhancing overall safety solutions in a two-fold approach. First it points to how gadget based smart lone worker safety solution ecosystems has further scope to improve with advanced technologies in electronic sensors, devices and form-factors. Secondly, it talks about how integrating the lone worker solutions into the enterprise level safety programs can create better value and meaning to the overall worker safety by creating better operability, visibility of risks, and developing prescriptive safety techniques. Impact of this enhanced safety solution opens up unprecedented opportunities and new business interests.

Industry Landscape

Industrial Safety can be broadly classified as safety of employees and safety of assets. In the past, for most organizations a damaged asset or machine caused a major loss and productivity downtime. Hence, many sensors, technologies and solutions were developed to ensure efficient maintenance and servicing thereby, making the assets more robust, automated and intelligent to ensure maximum productivity.

However, human loss did not pose a major threat to most industries till recently, where a number of organizations both internationally¹ and regionally²,³ are now working towards incident free work conditions, thereby creating awareness and stringent regulation for protecting workforce. Fines, sometimes as high as ASD $3M are imposed for certain categories of offense⁴. As per the International Labor Organization [ILO], 4% of global GDP was lost in 2012 due to work related accidents. It is estimated that for every $1 spent on direct costs, an organization loses approximately $4 in indirect costs like present-ism, training, sick pay to name a few.

¹ International Labor Organization [ILO]
As a result, over the past two decades, many solutions evolved and matured into robust solutions customized for various industries. Most solutions usually consist of the four major steps:

1. Identify hazards [like moving parts, electricity, gas leakage] in the workplace
2. Assess the risks associated with these hazards
3. Control the identified risks or reduce their impact using the appropriate trainings & awareness modules, personal protective equipment [PPE]
4. Review the control measure at regular intervals to measure effectiveness of the solution

These worker safety solutions have slowly but steadily progressed from being just descriptive solutions [trainings and guidelines] to moving towards safety measures targeting incident free working. However, these solutions usually address the basic workforce safety while, lone worker safety solutions need special ecosystem that can address emergency situations, reduce the impact of the hazard and ensure the workers connectivity to base stations.

Thus, several completely different ecosystems of lone worker safety solutions with wearable gadgets and real time connectivity have started to mushroom in silos and are currently dominated by a few niche point solutions. The general lone worker ecosystem consists of seamless connectivity of the worker to base stations, certified alarm response centers handling emergencies, tie-ups with First Responder Unit [FRU] and feature rich lone worker gadgets that need to be carried separately (like the connected identity cards, pendants or mobile phones).

In spite of all the safety trainings and precautions, construction and utility companies have the highest number of lone workers and most fatal accidents, while mining, healthcare and disaster recovery teams are at equally high levels of risks. Present day lone worker solutions only solve half of the problem by effectively communicating an occurrence of an unforeseen incident to the emergency response team.

Unfortunately situations like a pipeline asset inspection lone worker suffering from a major heart attack, a high rise construction worker having fatigue issues, a remote health worker being attacked by an angry patient, a mine worker or a disaster recovery volunteer is suffocated by poisonous environmental gasses can occur anytime, resulting in fatal injuries. With current safety solutions, a communication of the fatal accident along with their location is sent to the FRU. Given below are some opportunities identified to enhance the existing lone worker safety solutions.

### Way forward for industry players

#### Opportunity for enhanced safety: With improved lone worker solutions

- **Improved Form-factors:** Today’s lone worker gadgets need to be carried separately. Research all over the world is ensuring that the sensors are woven into the day to day work routine. If the industries tie up with such research programs in embedding sensors woven into Personal Protective Equipment [PPE] like helmets, suits, shoes, better solutions can be productized at much faster pace. Such, on the field intelligent devices shall ensure better control and protection to workers in real time and now is the time to invest into such solutions as most of the technologies have evolved from pure research stages to demonstrable stages.

- **Intelligent Devices:**
  - Advent of new sensor technology: New low power, ultra-small sensors that can detect both environmental parameters and unobtrusive sensors that can detect vital health information are

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5 Safe Work Australia, “HOW TO MANAGE WORK HEALTH AND SAFETY RISKS, code of practice
6 2013 Workplace Safety Index, USA,
7 Eight NHS workers are ‘attacked every hour’: Number up by 9% in a year with most assaults coming as staff try to treat patients (http://www.dailymail.co.uk/news/article-2846935/Eight-NHS-workers-attacked-hour-Number-9-year-assaults-coming-staff-try-treat-patients.html)
11 http://www.openshoe.org/
available. Companies with a knowhow of how to integrate these sensors, should work with industry to design the customized solutions that can pass on the right information at the right time to the FRUs. In case of a mining accident, the sensors should not only relay details of environmental gases like methane concentration but also relay the body vital information of workers, so that the first responder units are well equipped by the time they reach the spot.

- Advances in computing algorithms and nano-electronics, has reduced the size of the devices and increased the computing capacity. This is acting as catalysts to create smart and intelligent devices that communicate between each other and to the base station. For example, sensors embedded into shoes and scaffolds shall automatically monitor the load a construction worker is carrying and sends an alarm if the threshold is exceeded. Intelligent PPEs can alert not only the worker but also, communicate to the nearby machines or devices to avoid obstacles hitting the workers, slips, falls and trips which are observed to be main causes of accidents. For example, if the intensity of sparks reaching the head gear has exceeded the threshold, the helmet should alert the welding machine to stop till the worker adjusts the distance.

  » **Smart Systems:** From the various inbuilt sensors data, algorithms can derive many valuable insights like fatigue, personnel authentication or geo fencing to name a few and with ubiquitous connectivity of the workers to their base stations, significantly prescriptive safety solutions can be designed to enhance the safety of enterprises and their workforce.

  » **Screening at the base-stations:** Monitoring the general health of the worker before proceeding with the lone worker job would eliminate the slightest level of risk due to fatigue or other stress related activities.

A health kiosk at the front desk of a utility company or at the personal protective equipment (PPE) dispenser should be used to quickly screen the basic vitals before proceeding for the a lone worker job.

**Opportunities for new business enablement:** With integrated lone worker safety solution

Tightly integrating the robust lone worker safety solutions to enterprise EHS systems, would ensure right data for further analysis resulting in enhancing the safety solutions. In the process, new ecosystem and new business has great potential to grow

- PPE manufacturers and research institutes can partner with each other to create intelligent PPEs that have ubiquitous connectivity to base stations.

- Software system integrators have a great opportunity in bringing up a device agnostic platform that can integrate lone worker gadgets to existing EHS systems.

- Data Analytics: With improved lone worker safety gadgets, more insights on the environment, health and situational data can be obtained. This shall pave way for data modelling and business analytics opportunities that would can aid in designing robust predictive safety modules thereby increasing productivity.

- Improves worker engagement levels: Many workers who currently skeptical of working alone might feel assured of their safety increasing the worker engagement levels.

To sum it up, improving the scope of the lone worker safety shall in the process not only improve the lone worker safety but also help EHS solutions to become more robust and concrete by opening up new opportunities and businesses across the ecosystem.
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Santhosh Kumar Madathil is a General Manager with the Chief Technology Office of Wipro Limited. He holds an MS in Micro Electronics and has over 23+ years of experience in Embedded product design covering various industry domains. He has been involved in the incubation, development of the Wipro’s wearable ECG Device, Wipro’s Remote Health monitoring platform called Assure Health™ covering Cardiac monitoring, Fetal monitoring and Diabetes monitoring solutions. In his current role, he leads a team of researchers and technologists in Next generation technology areas covering Smart Devices, IOT and its applications across industry verticals.

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