BUILDING THE WORLD'S FIRST INDUSTRIAL SAFETYTECH REGULATORY SANDBOX

CASE STUDIES

THE CASE STUDIES

Five technology companies , from an initial field of over 200 were chosen via the Sandbox selection criteria to participate in investigative studies exploring challenge areas identified in collaboration with companies from the UK construction sector.

Safetytech Accelerator

TowerSure by PASMA

Heathrow

The EAVE system consists of smart ear defenders which continuously collect data on environmental noise and the wearer's exposure to noise. Beacons around the site work with the ear defenders to map worksite noise, using an online platform to present the data and gather insights. The system is used to protect over-exposed workers, adjust working methods and remove noise hazards at source.

How continuous monitoring of noise on site changes the game for countering Noise Induced Hearing Loss (NIHL)

INVESTIGATIVE STUDY FOCUS

How can technology help earlier identification of NIHL and contribute to its prevention? Is it reasonably practicable to implement as a control measure in place of traditional hearing protection? How should guidance on what is 'reasonably practicable' be updated to account for technological advancements in hearing protection?

KEY LEARNINGS

Over-exposure to noise is widespread in the construction sector and is not reflected in the official reported figures (RIDDOR), highlighting the need to address under-reporting. Continuous monitoring of noise at a granular level on construction sites enables contractors to understand where and how to fix over-exposure.

SUMMARY OF RECOMMENDATIONS

HSE should consider integrating data from smart hearing protection platforms into their guidelines for noise exposure and explore whether smart hearing protection data could be used to replace traditional methods of noise exposure assessment.

Industry should address NIHL under-reporting, including how insights from smart hearing protection data can inform the development and implementation of more effective and targeted noise control measures.

DRIVING INDUSTRY ADOPTION

The findings have profound implications for the construction industry as they highlight the necessity of addressing the myriad of factors that lead to under-reporting of NIHL. Raising awareness of NIHL, improving noise exposure assessments, addressing stigma and fears, and simplifying the reporting process are all vital steps to rectifying under-reporting. These actions should be accompanied by efforts to improve compliance with noise exposure regulations and improve access to healthcare services.

It has been demonstrated that the use of smart hearing protection can help reduce the risk of NIHL. Thus, the insights from smart hearing protection data should also inform the development and implementation of more effective and targeted noise control measures.

NEXT STEPS

EAVE has received an Innovate UK grant for the development of an Occupational Health and Safety platform that utilises a novel approach to risk assessment and control. An Industry Steering Group has been established and HSE has been asked to present a regulatory perspective.

FYLD

FYLD is an award-winning digital platform that automatically transforms video and audio footage into real-time workflows, visual risk assessments and analytics dashboards. By harnessing the power of machine learning, it eliminates paperwork, saves time and creates safer work sites.

How can we drive the adoption of Artificial Intelligence (AI) technologies across the construction industry to improve safety outcomes?

INVESTIGATIVE STUDY FOCUS

Exploration of barriers to adoption of point-of-works dynamic risk assessment technologies using AI to support health and safety management by contractors working on UK construction projects.

KEY LEARNINGS

Verified models of return on investment (ROI) are crucial to driving investment, and these must factor in wider benefits than just safety. There is a gap between the position of the regulator and the perspective of industry leaders who are making decisions regarding technology.

SUMMARY OF RECOMMENDATIONS

HSE should convene an industry and tech sector focus group to continue exploring the utilisation of technology through use cases to demonstrate how compliance can be achieved and to close the gap between regulator and industry understanding.

Industry should work with FYLD to co-develop an AI Digital Training Programme and seek to share content at scale in order to break down barriers to the use of AI in industry.

The HSE focus group felt predictive safety would be beneficial for the industry by delivering safety improvements

NEXT STEPS

FYLD are continuing the on-site work with Colas to demonstrate further proof points for ROI wider than safety improvements. This will be published as a case study for construction projects. FYLD have also identified a product improvement as a direct result of their work with Colas. A digital signing solution is being built and deployed into the current product, to suit the nature of the construction industry.

HAL Robotics

HAL Robotics is an extensible and modular software system that facilitates inter-device communication, adaptive programming of robot tasks and motion planning for one or many robots working together.

How should increasingly flexible and collaborative robots be regulated?

INVESTIGATIVE STUDY FOCUS

Exploration of opportunities for use of reprogrammable robotic automation technology to support works on construction projects. Exploration of barriers to adoption linked to how use of such software is regulated and certified for use in UK construction.

KEY LEARNINGS

The current standards are generally fit for purpose, but the processes, information and guidance to develop the certification documents could be greatly improved.

SUMMARY OF RECOMMENDATIONS

HSE should explore options for providing simpler access to information to guide the certification of a robotic cell.

Industry and the tech sector should consider building a tool to simplify access to the regulatory information required for certification when designing and building robotics systems.

Building a tool to access regulatory information when designing and building robotics systems

HAL Robotics' findings provide a unique insight into the different attitudes across the industry and highlight the knowledge gaps between different stakeholders. As such, the key action would be to provide simplified access to information and a tool to guide the certification of robotic cells. Even if that only covered relatively simple installations, it would allow many more companies to use automation.

Such a tool could take inspiration from established systems and approaches that a number of robot manufacturers are taking; these ensure that full documentation is provided with a piece of equipment as well as certificates of incorporation. It should draw information from a library of existing equipment and processes, complete with templates and documentation, but remain fully editable so that no processes or equipment are excluded.

NEXT STEPS

HSE is working with Safetytech Accelerator (STA) and the Regulators' Pioneer Fund (delivered by the Department for Science, Innovation and Technology) to explore funding opportunities for the development of tools to improve compliance in the area of flexible robots.

Machine Eye

Machine Eye employs the latest deep learning Artificial Intelligence (AI) techniques to identify humans on-site in real-time and understand their likely interaction with a machine to assist, inform and support decision-making, leading to safer workplaces.

Identifying and countering the key blockers to the uptake of computer vision within construction

INVESTIGATIVE STUDY FOCUS

Exploration of barriers to adoption of computer vision technology to support safe operation of heavy vehicles, plant and machinery on UK construction sites.

KEY LEARNINGS

A set of 15 key blockers to the adoption of computer vision within the construction and civil engineering space were identified and grouped into financial and technical risks. Mitigations to these blockers were identified.

SUMMARY OF RECOMMENDATIONS

Government should provide financial incentives to promote and accelerate AI adoption in the construction sector, particularly on Government infrastructure projects.

HSE should support SME tech companies through Sandboxes and Knowledge Exchange opportunities as well as being more proactive in issuing clarification with respect to new technologies.

Industry should explore collaborative approaches to highlight best practice and work collectively through innovation zones and Sandboxes.

Impact for Machine Eye

"The project has significantly increased the profile of both our and similar technologies. We are already seeing good engagement from operators in the sector who want to begin a journey of improving standards through the addition of technology. The presence of this project has encouraged them that they are making a worthwhile investment".

NEXT STEPS

Machine Eye has built new relationships within the construction sector and is now working with partners from the project to identify and deliver pilots on-site.

PLINX

PLINX is a safety system using wireless sensor technology designed to make construction sites safer. The system protects construction workers and employers by restricting access to areas of hazardous activity, based on role and purpose.

Using zonal working standards to establish a stronger connection between the design and construction phases of projects and empower data-driven decision-making

INVESTIGATIVE STUDY FOCUS

Exploration of the use of wireless sensor technology to support active monitoring of zonal working procedures on construction projects, with the potential to create a technology-supported cross-industry zonal working standard for use by the UK construction industry.

KEY LEARNINGS

The greatest value of this type of technology applied to zonal working is likely to be the ability to deliver 'live' risk information, enabling immediate mitigation actions to be taken.

SUMMARY OF RECOMMENDATIONS

HSE should work with Industry to develop industry-wide standards for zonal working.

Industry and the tech sector should develop a digital tool to simplify and standardise the zonal working process.

Developing a digital tool

An 'easy to use' digital tool should be developed that represents the standards set in this Sandbox project. Such a tool would simplify the zonal working process for designers and construction teams, facilitating the identification and mitigation of associated risks.

The tool should dynamically assess risks based on information provided by the designer and construction teams. It would help identify risks directly associated with the task at hand as well as the compounding effects of adjacent works. Integration with a 4D model and leveraging of machine learning capabilities could optimize site design and enhance site safety. The tool's output could be a digital representation of the zone or a document outlining the zone requirements and any pre-work conditions.

NEXT STEPS

HSE and PLINX are coordinating an industry working group to further progress the standards and tool development work, known as the ProACT initiative.

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