

## Machine Eye Technology - Machine Eye platform

*centralised, 24/7 means of monitoring and controlling pedestrian-plant interface compliance across the terminal/ port site*

### *the challenge*

One of the most important tasks in keeping terminals, quaysides and operational areas safe, is the segregation of people and plant. Given the 24/7 nature of port operations, and the heavy use of mobile plant: employees, contractors and visitors are exposed to a high level of risk associated with collision or crush. These injuries are often severe or fatal.

### *the innovation*

The project was a joint proof of concept between Belfast Harbour Commissioners (Port of Belfast) and an innovative SME, Machine Eye Technology with input from BT. In a unique arrangement, BHC provided the innovation challenge as well as access to the port and it's teams for the SME to develop the solution within the port. This is an innovative framework, which has fostered an agile development environment and a very close working relationship between developers and end users.

The Machine Eye platform provides a centralised, 24/7 means of monitoring and controlling pedestrian-plant interface compliance across the terminal/ port site. The technology uses Computer Vision AI to optically identify persons within the port, whether staff, visitor or otherwise and assess the level of risk they are exposed to by the plant or machine in question. Onboard the machine, operators are provided with improved visibility, and AI assisted interpretation of their surroundings. Should a pedestrian be at risk from the machine, the AI will generate alarms and warnings, allowing a pre-emptive action to be taken to remove risk to the pedestrian.

Outside the machine, where pedestrians are observed by the AI, the data is transmitted on the Harbour 5G network to allow further cloud analysis into compliance, trends and behaviours. This is analysed in the cloud and presented visibility to authorised personnel to assess trends and growing risks. Key to this is a heatmap, allowing graphical assessment of risk throughout the harbour.

### *how it was implemented*

The Harbour provided a sandbox environment, and full access to its staff, resources and partner companies for the delivery of the proof of concept. The delivery was undertaken by the startup. A working group of key stakeholders from the harbour – it's management, operations staff, stevedoor companies and machinery suppliers was brought together. Through this, each aspect of the implementation of AI was considered: practical problems, legislative frameworks and human concerns.

The startup led engagement with all stakeholders, and assured significant buy in from all partners in the project. This was first delivered throughout the covid-19 lockdown, requiring new and innovative means of engagement to be adopted.

Following a period of design-thinking led engagement, technical and policy development was delivered in parallel to engagement. The technology was implemented on a designated machine within a high traffic area of the harbour. Regular engagement was then held with the users, supervisors and management to assess the impact and performance of the system, alongside development, in an interactive, data and feedback led process.

The outcomes from this project were (and continue) to be shared with industry to ensure best practice from the project can be adopted by others, with the value and safety benefits being open to others.

### *result*

The project was deemed to be highly successful in meeting the stated aims, and the collaborative innovation model employed was also a success. This is a model which can be used in a wider context to foster agile innovation in this environment.

During the period in which the system has been fitted to a specific high risk machine within Belfast Harbour, there have been no recorded incidents. Pedestrian interactions with the machine red zone have decreased 70% within 4 weeks of deployment, and there is a groundswell of awareness of these incidents amongst workforce, leading to positive behavioural change.

Feedback from operators is positive, with them enjoying the additional visibility and assistance it provides in day to day use. Management have increased visibility, and with this high resolution data, previously unavailable, trends have been identified in port operations. These trends have highlighted higher risk activities which have previously gone unnoticed. The result has been interventions being made at an early stage in the design and conduct of these operations, which have maintained productivity, but increased safety within the port.



*conclusion*

This project has been a highly successful example of a large stakeholder (Belfast Harbour Commissioners) and a co-located SME (Machine Eye Technology) working together in an agile manner to implement innovative new technology. Both teams working together closely has yielded impressive results, significant workforce buy-in, and a clear pathway to safer port operations, as a result of a dynamic and unique innovation project. Since the launch of the project, there has been an increased awareness of transport safety within the port, and with the deployment of the perception systems, a notable increase in compliance and reduction in incidents raised/ reported. This has ultimately demonstrated the innovation outcomes of making the port a safer place to work.

LINK: <https://www.machine-eye.com/>