

ISDIP056	People Plant Separation AI Pedestrian Detection System
Date	23 April 2024
Business Unit	Construction Division
Project & Region	Environment Health & Safety
ISC Themes	<ul style="list-style-type: none">• People and Place• Innovation

1 What Happened?

In March 2023, a small team participated in an innovation sprint to find an engineering solution for managing the critical risk of potentially being struck by mobile plant. We researched technology solutions because:

- There are too many high-potential incidents of people in close proximity of operational plant.
- Our work fronts are so dynamic that controls are not always effective.
- Much of our machinery have blind spots, making it difficult for operators to see people approaching.
- We rely heavily on low-level controls, like the 5m rule, for separation.

We identified several benefits of using innovative technology:

1. Allows zones to be set around operational plant.
2. Uses cameras to cover blind spots on heavy operational plant.
3. Uses Artificial Intelligence (AI) to distinguish between people and objects.
4. Notifies the operator (visually and audibly) when someone is at risk in the fatal zone.
5. Notifies people on the ground (visually and audibly) when they enter a fatal zone and are at risk.
6. Provides a "back stop" for both the operator and the person on the ground if the fatal zone is breached.

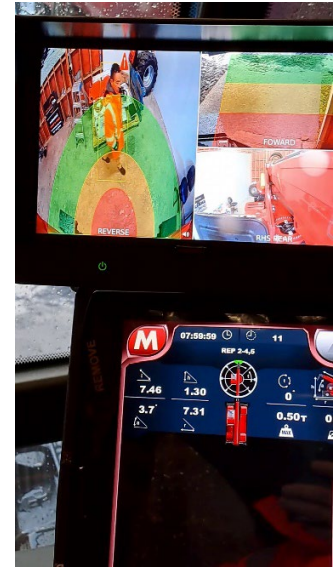
The team researched 17 different products and identified AI cameras as the preferred technology due to their ability to distinguish people from objects, reducing false readings and helping manage the risk of being struck by mobile plant.

We sourced and trialled three different products over two months on various plants, including a crane, a skid steer, and an excavator. Here are some outcomes from the trials:

- A 60% reduction in alert activity over time indicated people were changing their behaviour.
- Analytics identified the highest risk times: the beginning and end of shifts.
- Over 1500 zone breaches were detected, 431 of which were critical detections (<3m)

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A.I. cameras on the trial plant.

2 What Are We Doing Differently?



After the trial, we selected an AI Pedestrian Detection system, widely used in the trucking industry in China. These cameras can differentiate between pedestrians, vehicles, plant, and still objects. If pedestrians are detected in the calibrated zones, an alarm sounds for both the operator and the person on the ground. The alarm frequency increases as the pedestrian gets closer to the machine.

We proposed a business case to our executive team to purchase twenty initial units for further testing before investing in approximately 180 units for our highest-risk plant and activities.

The initial units have been received and are being installed on various machines and sites: 4 within Brian Perry Civil, 4 with Major Projects on Eastern Busway, and 12 within Higgins.

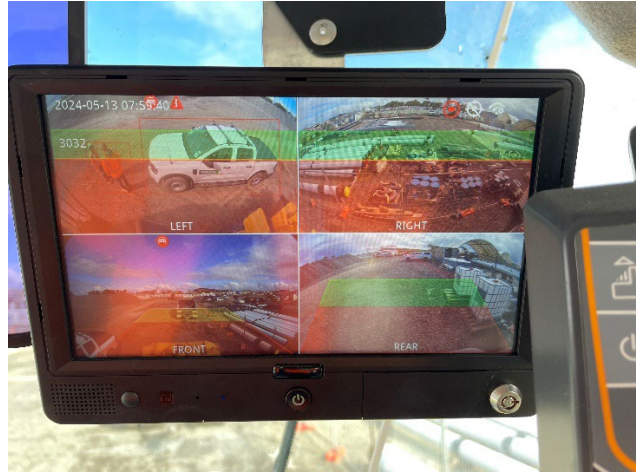
This technology will complement our current Safe Work System for People Interface Zones. Our primary control is to keep people at least 5 meters away from any operational plant, establishing Plant Only Zones (POZ) as part of our Vehicle Movement Plans. If maintaining a 5-meter distance is not possible, we will install AI cameras on plants where people must work within this range for operational or safety-critical

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reasons, such as spotters for underground and overhead services, drainage crews, chip runners, paving and milling operations, and piling activities.

This technology serves as a secondary control; it detects people in a zone but does not prevent them from entering an exclusion zone. Our other critical risk controls and safe work practices will still be necessary. We compare this system to a backstop in sports: if our primary controls are breached or fail, we have another system to detect and prevent someone from being struck and fatally injured.



AI Cameras installed on Higgins plant as part of the extended trial.

3 More Information