

## ABP & Rombit - Worker Safety Solutions

*real-time prevention of vehicle/pedestrian collision*

### *the challenge*

Associated British ports (ABP) is the UK's largest ports operator, handling around £150bn of trade across our network of 21 ports every year. Ports are busy places and safety is a core value for ABP, which is why we continue to invest in innovative ways to ensure the safety of our workforce. As ICHCA has pointed out repeatedly, moving equipment in warehouses and terminals is a significant threat to pedestrians, cargo, other equipment and infrastructure. Lift & crane accidents, collisions and struck-by incidents are on the rise (\*ILO/OSHA, 2022).

Drivers are focused on the task at hand, aiming for a maximum amount of moves per driven hour.

- The productivity pressure sometimes leads to driving and turning 'at the limit'. This results in improper vehicle control, overturning, dangerous accelerating and braking, in turn causing accidents and damages to cargo, vehicles and the drivers themselves. A forklift, reach stacker or straddle carrier on its side typically also results in significant injuries. People being trapped by collapsing or overturning machinery represent 12% of workplace fatalities in the UK. (\*H & S Executive UK, 2022)
- The routine tasks often lead to inattention blindness. While virtually all drivers are conscious of safety, it is an enduring challenge to stay aware of your surroundings. Driving backwards while loading requires a focus on cargo stability -- this is exactly the instant when things do go wrong. Vehicle collisions - or worse - pedestrian struck-by incidents are significant threats, representing 20% of workplace fatalities. (\*H&S Executive UK, 2022)

While training, protection and safety awareness initiatives are abundant, there is a strong need for **real-time alerts** allowing for last-second adjustments to avert an accident.

"The Occupational Safety & Health Administration (OSHA) estimates that about 70% of forklift accidents can be prevented with new digital tools."

- Slips, trips and falls are the most common safety risk. Although usually benign, sometimes people are in distress and in need of immediate help. As port terminals are big, responding in time is a considerable challenge. The biggest issue is knowing something actually is wrong and then finding and attending to this person.

There is a need for a real-time alert system indicating positions of individual accidents or individuals during a calamity or evacuation scenario.

### *the innovation*

ABP was the driving factor in the development of a new digital safety tool for connected workers, lifts & cranes. The association identified that telematics data was useful to track and monitor movements, but the real challenge is closing the loop: how do you translate these

insights into actionable information to the drivers; preferably exactly when they need it, while they are on the job, about to be exposed to a dangerous situation.

Together with safety technology experts Rombit and Rombit's UK partner NET4, ABP tested and implemented last-second warning technology, resulting in real-time prevention. ABP's extensive work to optimise safety across its ports resulted in the lowest number ever of Lost Time Accidents in 2021, and continuous improvement in workplace safety is a core value shared by ABP and Rombit.

During 2022 & 2023 the following 3 solutions have successfully scaled from a novel proof of value project in ABPs Garston port in Liverpool to a groupwide safety solution for ABPs 21 ports:



1. The Digital Drive Coach: This cockpit-mounted monitor prevents improper vehicle control leading to cargo damage, vehicle damage, building damage and physical injuries. The setup consists amongst others of IMU sensors: turning, acceleration, braking data is processed via self-learning algorithms (artificial intelligence). They evaluate whether movement is within tolerance standards or whether a driver needs to be alerted when no longer within the limits of safe driving.
2. Collision Avoidance: We use the exact same setup. This time the Rombit unit sends and receives UWB signals to accurately measure distance between vehicles and pedestrians. This data is evaluated within a tenth of a second.
  - a. When a vehicle fitted with the Rombit anchor and a port operative with a Rombit smart badge are too close to each other, the devices will vibrate and light up, alerting the pedestrian to avoid a potential collision.

- b. Meanwhile the cockpit monitor will alert the driver (visuals and sound)

The algorithms are dynamic, allowing for larger 'safety bubbles' when driving fast and smaller ones when vehicles move slow.

3. Lone Worker & Evacuation support: By adding smart badges to the safety solution, Associated British Ports (ABP) is the first ports group to invest in innovative wearable safety devices:
  - a. Building on the existing PPE (high visibility clothing, eye protection, safety helmets, protective boots, and gloves), this new technology provides connected workers with a new level of protection.
  - b. The new safety devices, which are worn on the wrist or arm and attached to machinery, have a wide range of uses. Not only do they provide collision avoidance alerts, but they also support lone worker support and evacuation tracking in case of emergency.
  - c. The speed of reaction to lone workers in an incident is critical to minimising the danger. In case of an emergency, a lone worker can use the device to request help. Similarly, the device can alert the system if the lone worker has a fall or shock, or if no motion is detected at all for a specified period of time. This enables a swift assessment and reaction to a situation to minimise risk.

#### *how it was implemented*

The project consisted of three parts:

- Needs analysis, vendor selection and first proofs of concept (2022)
- Pilot evaluation and feature selection: ABP worked closely together with the supplier to finetune the application for (port) terminal use. (H1 2023)
- Continuation of the Garston pilot and rollout of the first operational system at Newport (H2 2023)

We formed a small steerco with key stakeholders: innovation manager, SHEQ, operations, business project team and local site/service managers. Given the plug & play factor of the solution, implementation was easy and IT support not necessary.

Apart from technology performance there were three main topics that were considered:

- Change management: One of the toughest parts in implementing new technology is convincing large numbers of (blue-collar) employees to adopt the technology. A phased approach and expert coaching upon activation of the tool proved very helpful.
- Privacy: The dataflow is designed in such a way that no PRI-sensitive data is required. The solution is fully GDPR (EU) compliant. In addition: the vendor does not own the data, the data stays in the ABP 'tenant' for a fixed amount of days before being deleted — what is remembered are general insights and metadata

Maintenance and improvements: The vehicle units and smart badges have a sim card with continuous LTE connection for safe and secure updates to improve solution quality.

### *result*

The Digital Drive Coach, Collision Avoidance and Lone Worker solutions are

- easy to implement: installation and calibration take a few hours. Typically a project is fully up and running within a day after delivery of the units.
- self learning (AI): to minimise false positives due to normal events like smaller shocks while driving on uneven floors, the vendor deployed a self-learning algorithm. The solution keeps improving. This is an unpretentious but lifesaving application of AI (machine learning).
- easy to use: alert = danger = stop and look around. That is the only thing people need to understand. The tools also do not use 'language' only pictograms depicting the type of danger. This allows for universal deployments. General feedback about the solution is positive.

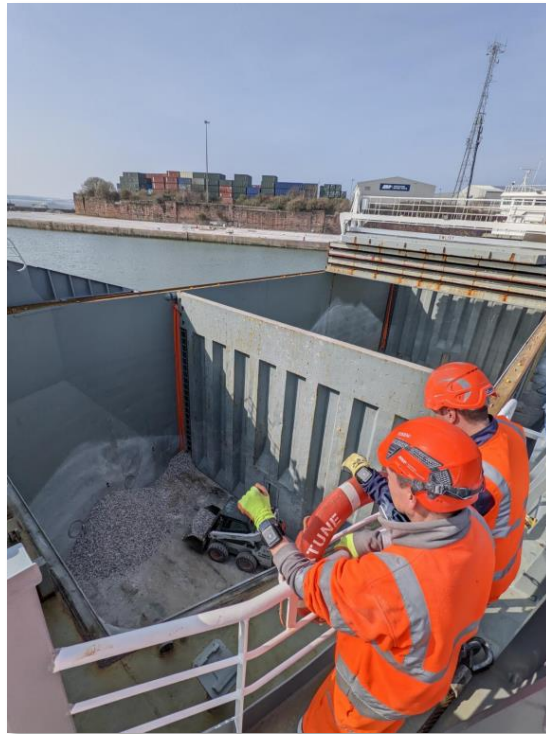
### Safety effects:

1. An expected 25% reduction of unsafe events after installation and up to 70% in the long term:
  - a. Harsh turning, accelerating, braking
  - b. People entering warning zones / danger zones around moving equipment
2. ABP minimised response time to a calamity or individual incident thanks to the lone worker features. Realising someone is not accounted for and then finding this person usually takes hours. The wearable solution reduces alert, response and rescue time to mere minutes.
3. Next step is to translate these reductions in actual reductions in incidents and losses.
4. ABP and the vendor will involve the insurance provider to discuss how they can also benefit from these insights.

### Other effects:

1. Opex reduction: driving safely results in a decrease in (unscheduled) maintenance costs, and a decrease in energy costs.
2. Productivity: there was no observed effect on the amount of moves, indicating that increased safety does not affect productivity.
3. Damaged cargo: results are evaluated to look for decrease spend (insurance and direct costs)

4. Damaged assets: results are evaluated to look for decrease spend (insurance and direct costs)



*conclusion*

ABP is proud of the pioneering role it plays in reducing two dominant safety challenges in our sector. We have identified a technology solution and a way to implement it that can easily be copied to other terminals. The TT Club is the ideal forum to discuss this technology-assisted approach to driver training. Truck/Lorry telematics and insurance providers have partnered for two decades in an effort to reduce road accidents. We believe the TT Club and its members can do the same for internal logistics operations involving moving equipment on the terminals.

LINK: <https://www.abports.co.uk/news-and-media/latest-news/2022/abp-is-first-in-the-uk-to-trial-rombit-s-safety-wearables/>