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Vehicular Safety Technologies

Vehicular incidents is one of the incident types with higher risk of fatality (Type A).[1] In 2022, vehicular accidents contributed to the highest number of workplace fatalities (15 out of 46) and 4th highest number of workplace major injuries (41 out of 614). Some of the cases were:

Location of the traffic controller just before he was run over

Truck involved in the accident

16 Aug 2022 - A 72-year-old traffic controller died after he was hit by a truck that he was guiding.

Image source: The Straits Times

7 May 2022 - A 49-year-old worker died after being pinned under a large metal cylindrical pipe when a lorry crane toppled on its side.

Image source: The Straits Times

Vehicular accidents typically happen due to one or more of the following:

- driver / operator negligence

- inadequate or non-compliance to traffic management plan

- lack of control measures (e.g. no proper control of keys to vehicles)

- poor situational awareness

Vehicular safety technologies (VSTs) can be implemented to reduce human errors and enhance vehicular operation safety. Such technologies can also reduce downtime due to accidents by facilitating swifter analysis of causes using the video footages and data collected.
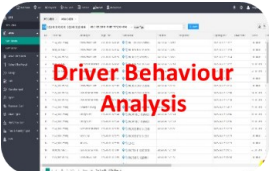
A wide range of VSTs is available in the market. Below are some examples of VSTs that are suitable for on-road and on-site implementation to detect and potentially prevent vehicular accidents.

On-road solutions

Advanced Driver Assistance System (ADAS)

Driver Monitoring System (DBMS)

Driver Status Monitoring Systems (DSMS)

Blind Spot Detection (BSD)

Image source: landtransportguru

Image source: Grid Plus

Image source: SmartComm
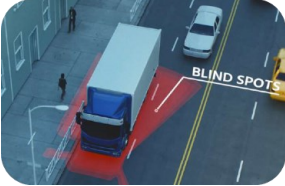
Image source: Mobileye

On-site solutions

360 Degrees Camera

Access Control

Proximity Alert System

Stability Control System

Video Analytics

Image source: Linde

Image source: NewGene Technologies

Image source: Automation Support Services

Image source: Wong Fong

Image source: TRIOMOBIL

On-road solutions

ADAS: Provides forward collision warning, lane departure warning, headway monitoring, and pedestrian and cyclist detection to the driver

DBMS: Provides drivers with telematics-based feedback on unsafe driving behaviours such as speeding, harsh acceleration, harsh cornering, or excessive braking

DSMS: Notifies driver of fatigue, distraction, smoking or phone usage

BSD: Detects vehicles and pedestrians in blind spots when turning or changing lanes

On-site solutions

360 Degrees Camera: Provides real-time view of area surrounding vehicle

Access Control: Requires authentication before operating machinery to prevent unauthorised access

Proximity Alert System: Alerts driver when vehicle is too close to a person or an object

Stability Control System (SCS): Monitors the position of stabilisers and ensures loads lifted are within stability limits

Video Analytics (VA): Provides real-time safety alerts for a variety of use cases, such as collision detection, workers' behaviour violations, illegal parking, geofencing for exclusion zones or traffic management

Robotics and Artificial Intelligence (AI)

The rapid development of robotics and AI has opened up the possibility of eliminating human errors in vehicular operations. The first autonomous vehicle approved for public road testing in Singapore was developed by A*STAR and trialed at One-North in July 2015. Since then, the National University of Singapore (NUS) and the Singapore-MIT Alliance for Research and Technology (SMART), Nanyang Technological University (NTU), ST Engineering and many others have designed other self-driving vehicles and conducted public trials.[2]

Apart from driverless vehicles on the road, robotics such as autonomous material handling systems can also prevent accidents in workplaces, by reducing reliance on the need for human operators.

Image source: Konica

Support Schemes for Adoption of VSTs

Lorry Crane Stability Control System Grant (SCSG)

Stability control system is a proven technology that can prevent overloading and toppling of lorry cranes by limiting its lifting capacity if the outriggers are not fully extended. Six government agencies, including HDB, JTC, LTA, MOHH, NParks, and PUB, signed a Declaration of Commitment in 2020 to put in place tender requirements for new and existing lorry cranes to be equipped with stability control system.[3]

To further encourage the installation of stability control system on lorry cranes, lorry crane owners can now apply for a grant to install stability control system on their lorry cranes. This is on a first come first served basis.[4]

Find out more at www.go.gov.sg/scsgrant

Productivity Solutions Grant (PSG) - Fleet Safety Management System (FSMS)[5]

The solution covers one or more of the following aspects – collision alert, driver fatigue/distraction warning, driver behavior and blind spot monitoring. Companies can more effectively manage driver deployment based on driving behavior, monitor and improve their drivers' safety performance, and reduce accident risks. Furthermore, video recordings can facilitate post-accident investigations. Small and medium-sized enterprises from all industries are eligible to apply for the grant.

Find out more at GoBusiness Singapore

Productivity Solutions Grant (PSG) - Autonomous Material Transportation Robot[6]

The solution covers an autonomous or semi-autonomous material transportation robot that transports cargo and pallets independently and reliably within a warehouse or manufacturing environment.

Find out more at GoBusiness Singapore

References

[1] **Ministry of Manpower (MOM). Workplace Safety and Health National Statistics Report 2022**

https://www.mom.gov.sg/workplace-safety-and-health/wsh-reports-and-statistics

[2] **Autonomous Vehicles**

https://www.smartnation.gov.sg/initiatives/transport/autonomous-vehicles/

[3] **Cross-agency collaboration - Lorry crane stability control system**

https://www.mom.gov.sg/newsroom/speeches/2020/0115-speech-by-minister-of-state-for-manpower-mr-zaqy-mohamad-at-the-wsh-symposium-on-cranes-2020

[4] **Lorry crane stability control system grant SCSG**
www.go.gov.sg/scsgrant

[5] **Productivity Solutions Grant (PSG) - Fleet Safety Management System (FSMS)**

https://www.gobusiness.gov.sg/browse-all-solutions-fleet-safety-and-fleet-management-system/fleet-safety-management-system

[6] **Productivity Solutions Grant (PSG) - Autonomous Material Transportation Robot**

https://www.gobusiness.gov.sg/productivity-solutions-grant/solutionrepo/solution1118