Preventing site vehicle-pedestrian collisions

Detection system and impact on the organisation

Technological innovation and organisational changes: the potential impacts on prevention

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Content

• Context

• The technologies used for risk collision prevention

• Their place in the global measures of prevention

• Their impact on organisation
The problem

Accident statistics

- 325 accidents (severe injury or fatality)

- 4 sectors of activity

- Trucks (reversing; parking on a quay)
- Civil engineering
- Forklift trucks (logistics, handling)
- Domestic waste collection
Existing or emergent detection systems

5 types of technology
- Laser
- RFID tag (Radio Frequency Identification)
- Ultrasound
- Radar
- Vision
Laser: principle

Detection area defined by user

Obstacle not detected

Obstacle detected

Scanner laser
Radar: principle

Radio Detection And Ranging

- Emitted wave
- Reflected wave
Ultrasound: principle

Ultrasound system

Emitted wave

Echo

Detected obstacle
RFID or magnetic badge

Badge solicitation by antenna
Response of badge
Digital vision (with image analysis)

Scene

Acquisition

image

Segmentation

Segmented zones

Identification

By appearance

Decision

yes/no?

Learning base

Pedestrian/non pedestrian

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Don’t be too quick to install a system

- Think carefully about what you want to buy
- Ensure that the chosen device will not be removed after only one week of use
- Experience shows that quick installation leads to very variable results. For better success, reposition the product within a global prevention strategy.
Prevention measures for collision risk and pedestrian detection: a global prevention strategy

Combine

- Organisational-type measures
  - Flows of site vehicles and pedestrians
  - Controlled access
  - Specific waiting areas
  - …

with

- Technical measures aimed at improving visibility (at conception or after)

If solutions are not adapted or if the risk has not been sufficiently reduced

→ consider using a detection system, if necessary in conjunction with additional visibility measures (e.g. mirror, camera-monitor system)
Detection systems and preventing collisions

• Where can they be used
  ■ To **inform the driver/the pedestrian** and contribute towards risk reduction
  ■ The operator should stop the vehicle immediately
  ■ Detection systems are not safety components
  ■ No automatic brake action
Prevention strategy with the use of detection system

• Analyse the activity, situation and environment
  ■ Identify the collision risk, describe the work situation
  ■ Is there visibility? « Full or partial »
  ■ Estimate the risk

• Requirements and potential technology?

• Choice, implementation and conclusion
  ■ Have the requirements been fully or partially fulfilled?
  ■ Complementary measures
Impact on organisation and human
Analyse the activity, observation of the situation

• To be undertaken in a group, with the company
  ■ One analysis per vehicle and company, each situation is different

• Take into account the ideas of the operational staff (driver, pedestrian, ...) and their know-how

• Take into account the specificities of the work situation
  ■ Environment (temperature, dust, ...), lightning/brightness, inside/outside
  ■ Task for the driver and the pedestrian
  ■ Presence of obstacle, technical element which can disturb the system
Implementation

• Inform the staff
  ■ Example of the destruction of a system on a domestic waste collection vehicle

• Define the rule in case of an alarm
  ■ Normally, stop the vehicle

• Train the staff for the use of the system
  ■ For the camera detection system: on a big/lenghty construction site (railway), difficulty to train each driver (number of drivers, turn-over, mobility of the driver along the site)

• RFID tag/transponder or magnetic badge
  ■ Procedure for the management of the badges, difficulty for the management of incoming or outcoming person
  ■ Battery test

• Collect first feedback (driver and pedestrian) and adapt/correct if necessary
  ■ Example of buzzer disconnected due to too many alarms
In use

- Cleaning procedure when system is sensitive to environmental aspect (optical system; ultrasound in case of binding environment/big dirt)

- Test procedure of the system, ideally at the beginning of each shift
Conclusion

• Use of a detection system requires a prevention strategy

• Each situation is different. Strategies should be adapted to the activity in question

• In this case, detection systems are not safety components, they are just an assistance for the driver, they inform him of the danger; human should be in the loop
Our job: making yours safer

Thanks for your attention