Preventing site vehicle-pedestrian collisions

Detection system and impact on the organisation

Technological innovation and organisational changes : the potentiel impacts on prevention

March 2017

Our job:
making yours safer

www.inrs.fr

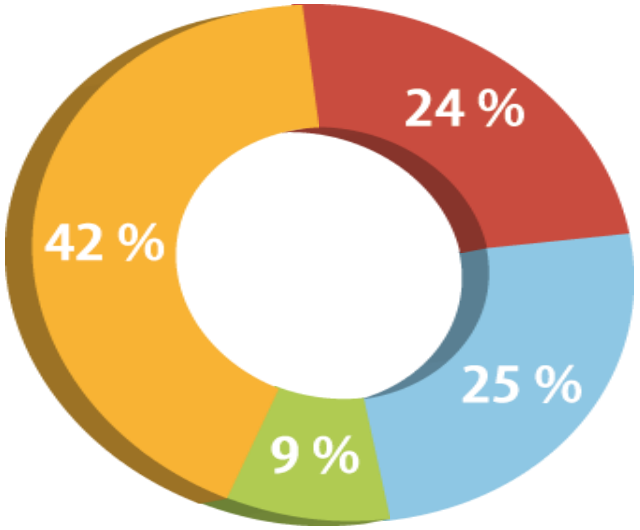
Content

- Context
- The technologies used for risk collision prevention
- Their place in the global measures of prevention
- Their impact on organisation

The problem

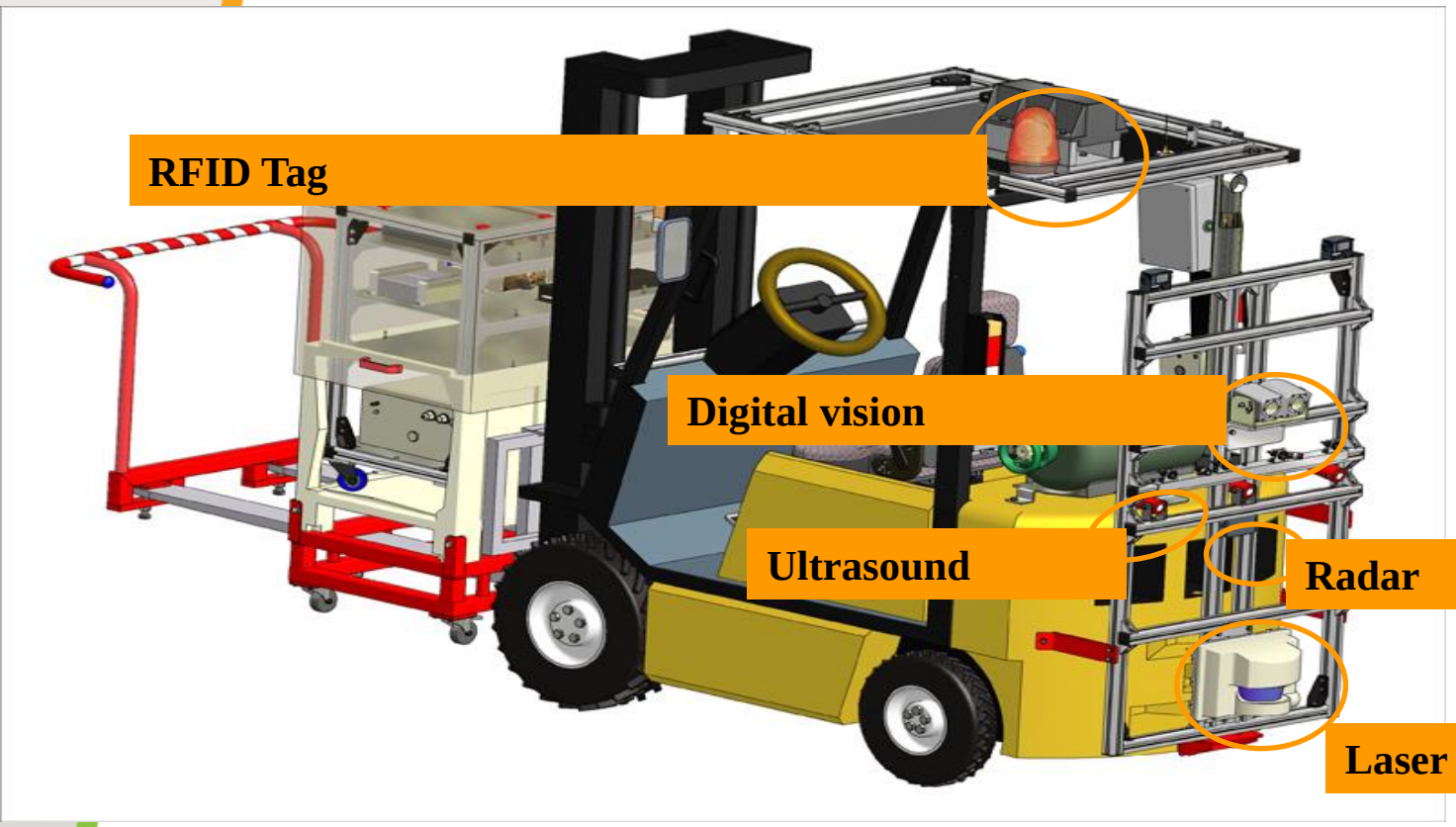
Accident statistics

- 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

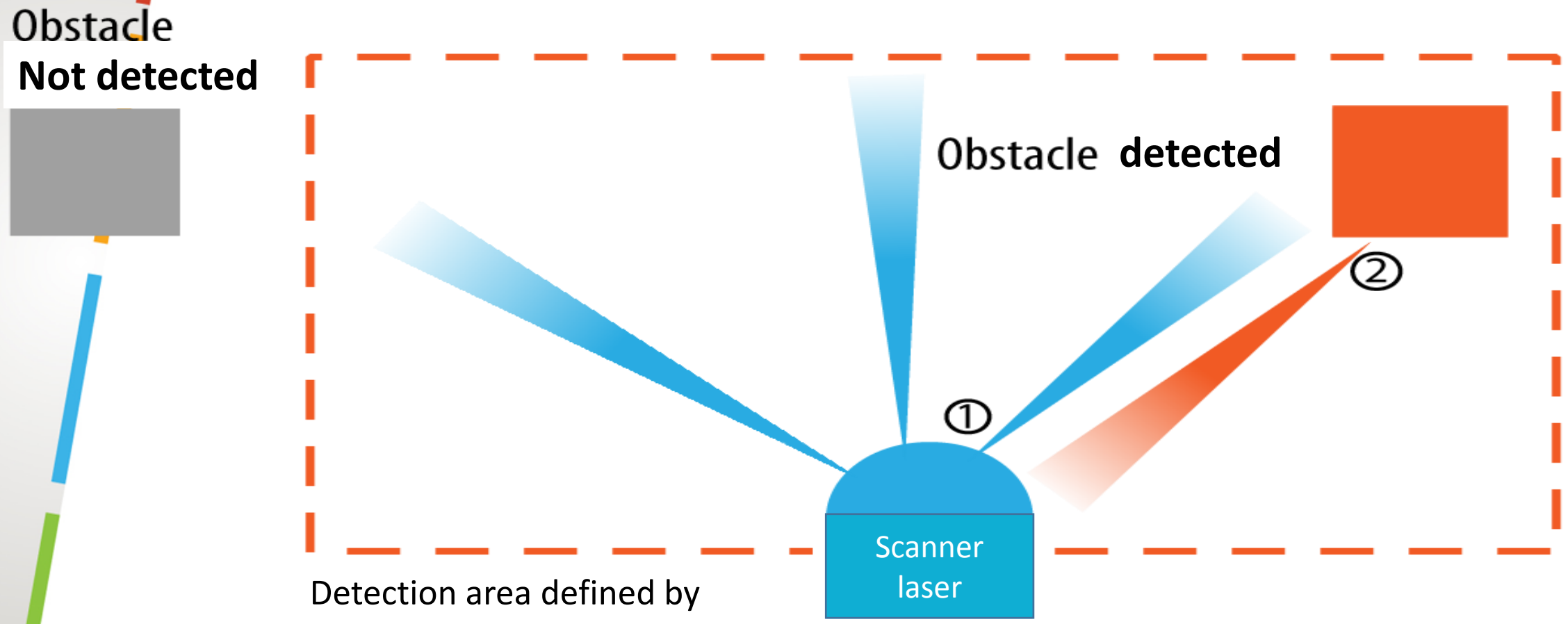
Existing or emergent detection systems



5 types of technology

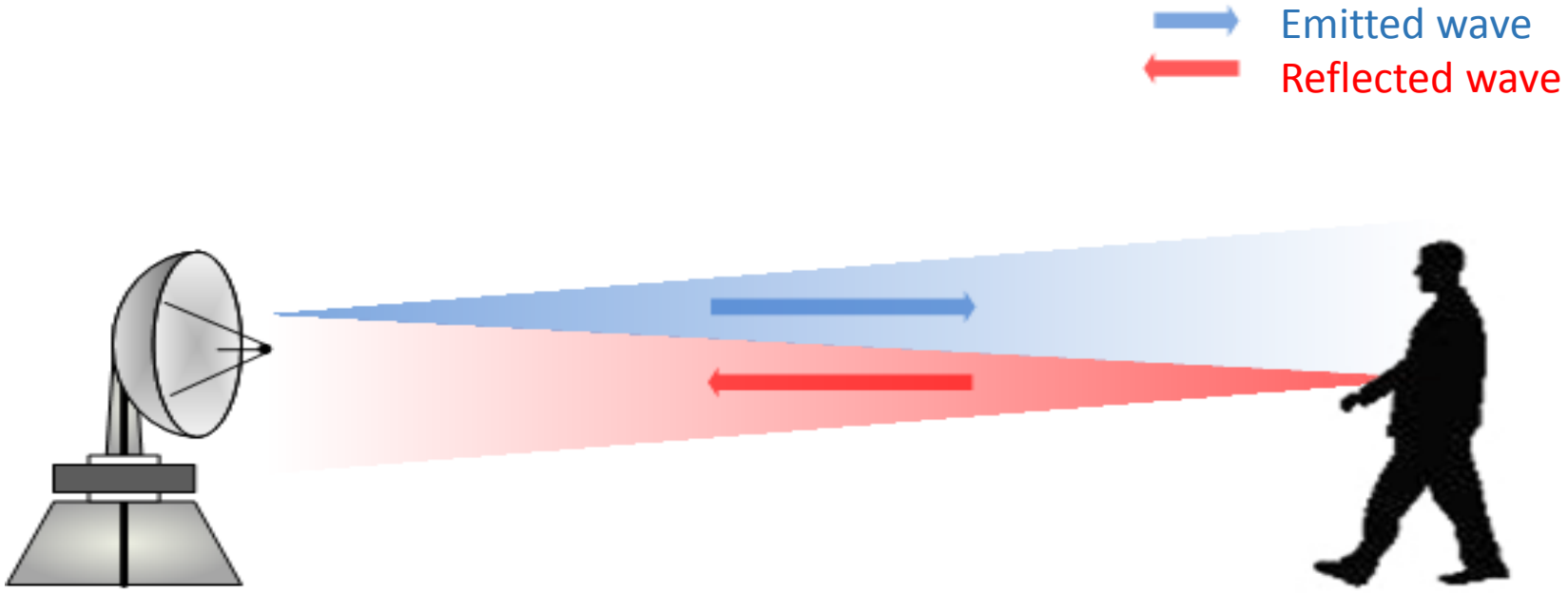
- Laser
- RFID tag (Radio Frequency Identification)
- Ultrasound
- Radar
- Vision

Laser : principle



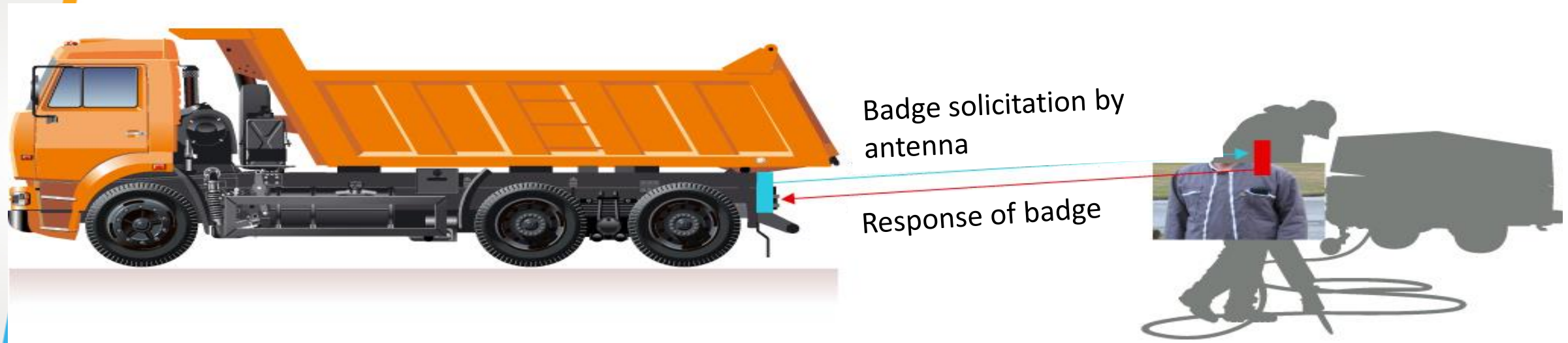
Radar : principle

RAdio **D**etection **A**nd **R**anging

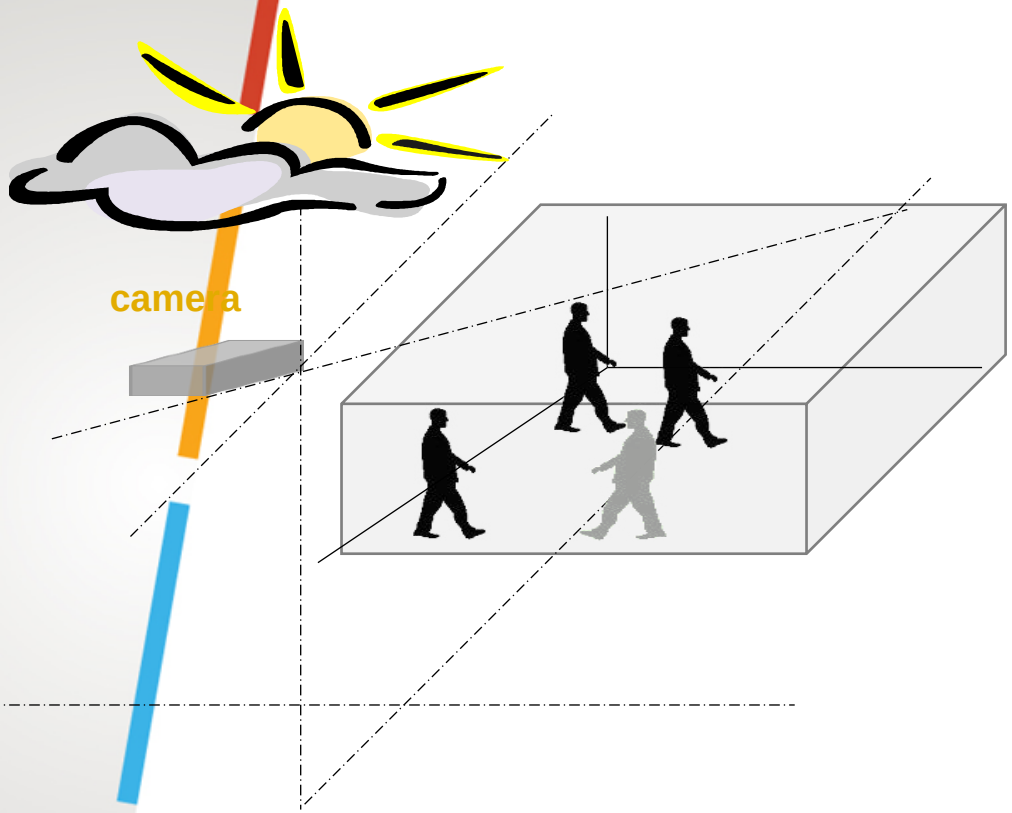


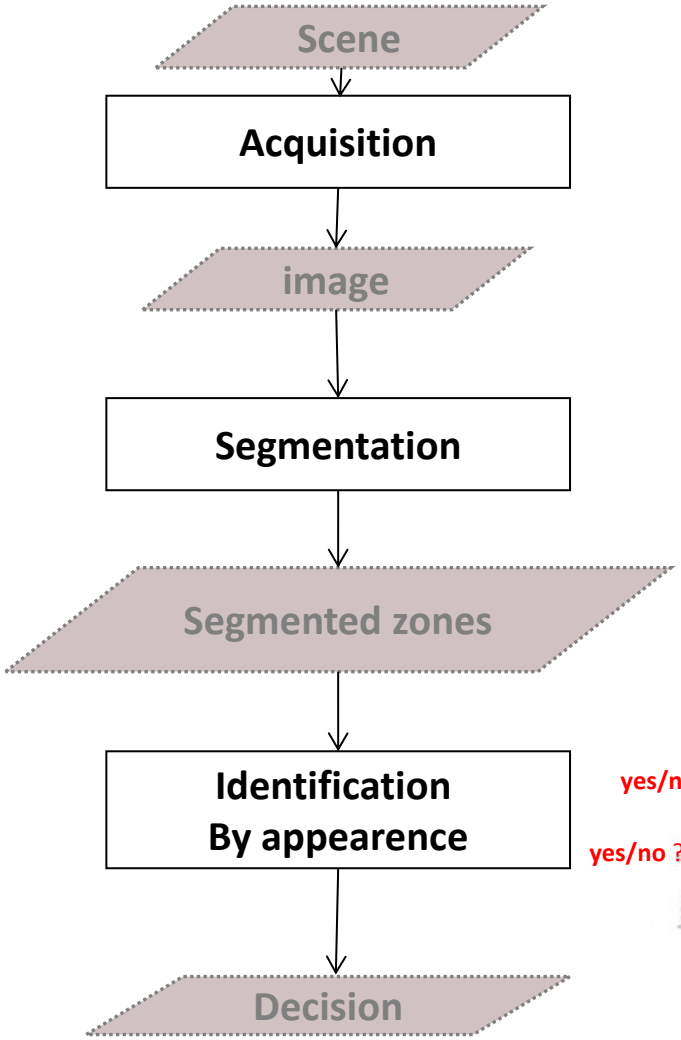
Ultrasound : principle

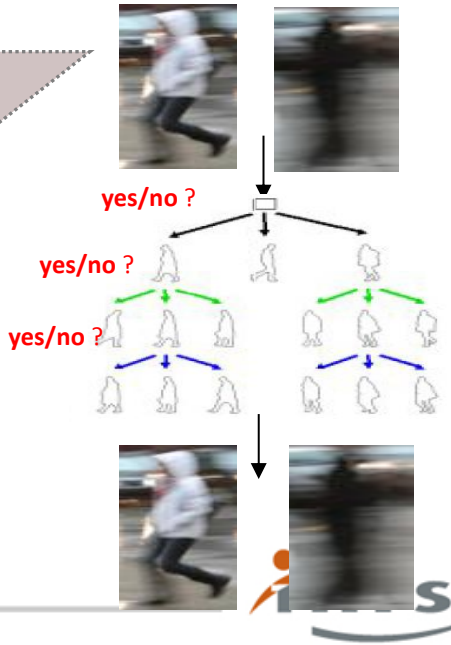
RFID or magnetic badge



Digital vision (with image analysis)







Learning base

Pedestrian/non pedestrian

Don’t be to 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

Institut National de Recherche et de Sécurité

Our job: making yours safer

Thanks for your attention

www.inrs.fr