RoSPA
The Royal Society for the Prevention of Accidents

New Vehicle Technology and MORR

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THE ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS

Presentation Outline

- **An Overview of Vehicle Technology**
  - Where the previous emphasis on vehicle technology has been
  - Where focus is shifting in future
  - How and when new technology can prevent accidents
  - Depends on proper use of the systems
  - Examples of what I mean in each case, and an idea of what organisations should do.

Vehicles Are Changing!!

- **Historically, vehicle safety has focussed on crashworthiness – known as "passive safety"**
- **Key role in reducing the number of injuries on our roads**
  - Between 2000 and 2005, improved crashworthiness of vehicles is estimated to have reduced the number of car occupant KSI by 5.8%
- **Caused an increased consumer interest in safety**
  - 94% say that safety is an important aspect when buying a car
- **Looking for new ways that the vehicle can help prevent accidents, focus in recent years has shifted onto "active safety"**

What Vehicles Can Do

- **Help the driver in many ways**
  - **Warnings**, alert the driver to different circumstances
  - **Intervention**, augment the actions of the driver
  - **Control**, takes responsibility for the control and removes the driver from the system

When Can Technology Prevent Accidents and Injuries?

Normal Driving

- 1. Warning Phase
- 2. Assistant Phase
- 3. Pre Crash Phase

Accident

- 4. Petty Collision
- 5. Minor Accident
- 6. Severe Accident

After the Accident

- 7. Post Crash/Rescue Phase

Accident becomes increasingly unavoidable

Severity of injury increases

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Potential Benefits and Risks

- **Benefits**
  - Driver receives more information to help them plan
  - Results in more predictable actions
  - The likelihood of human error causing an injury is reduced or eliminated

- **Risks - unknown or unpredicted behavioural changes in response to the technology**
  - Lack of driver experience
  - Lack of standardisation between technologies
  - Driver distraction and workload
  - Automation changing the role of the driver

Driver Experience: Learning the System

- **Drivers will go through a 'learning phase'**
  - Driver explores the uses of the system
  - Identify the limits of the system
  - Discover the advantages of the system
- **Use of the system integrated into the driving task**
  - Changes the way the car is driven

Driver Experience: Learning the System

- **Drivers will go through a 'learning phase'**
  - Shorten the learning phase
  - Help drivers find appropriate responses to the system
  - Help drivers understand when using the system is a danger
- **Use of the system integrated into the driving task**
  - Ensures that negative effects of the system are reduced or removed
- **In future, greater emphasis on In-Vehicle Technology during the driving test and further training**

Driver Experience: Learning the System

- **Example – Reverse Parking Aid**
  - **Danger**

    A driver who is left to learn the system may start to rely solely on the audio alerts, reducing the number and quality of the observations that the driver makes.
  - **Solution**

    Ensuring the use of the aid is included when the driver is familiarised or trained in the vehicle. Driver is given feedback. Assessment and monitoring where appropriate.

Different Standards of Systems

- **Currently the interaction between vehicle and driver is relatively standardised**
  - Layout and nature of the control systems
  - Way that the vehicle interacts with the driver
  - Similar or identical systems across all vehicles
- **Several new types of system being introduced**
  - Not all systems are the same, experience not necessarily transferable
  - Different specifications and standards
  - Feedback information in new ways

Different Standards of Systems

- **Engineering Solution**
  - Standards set where necessary
  - Guidelines on good and bad practice for system manufacturers
- **Education and Training**
  - Ensure that drivers know what the standards are
  - Familiarity with the technology

Different Standards of Systems

- **Example – Tyre Pressure Monitoring System**
  - Danger

    A driver is moving between two vehicles with TPMS, both have different audio alerts, and will inform the driver when tyres reach different inflation pressures.
  - Solution

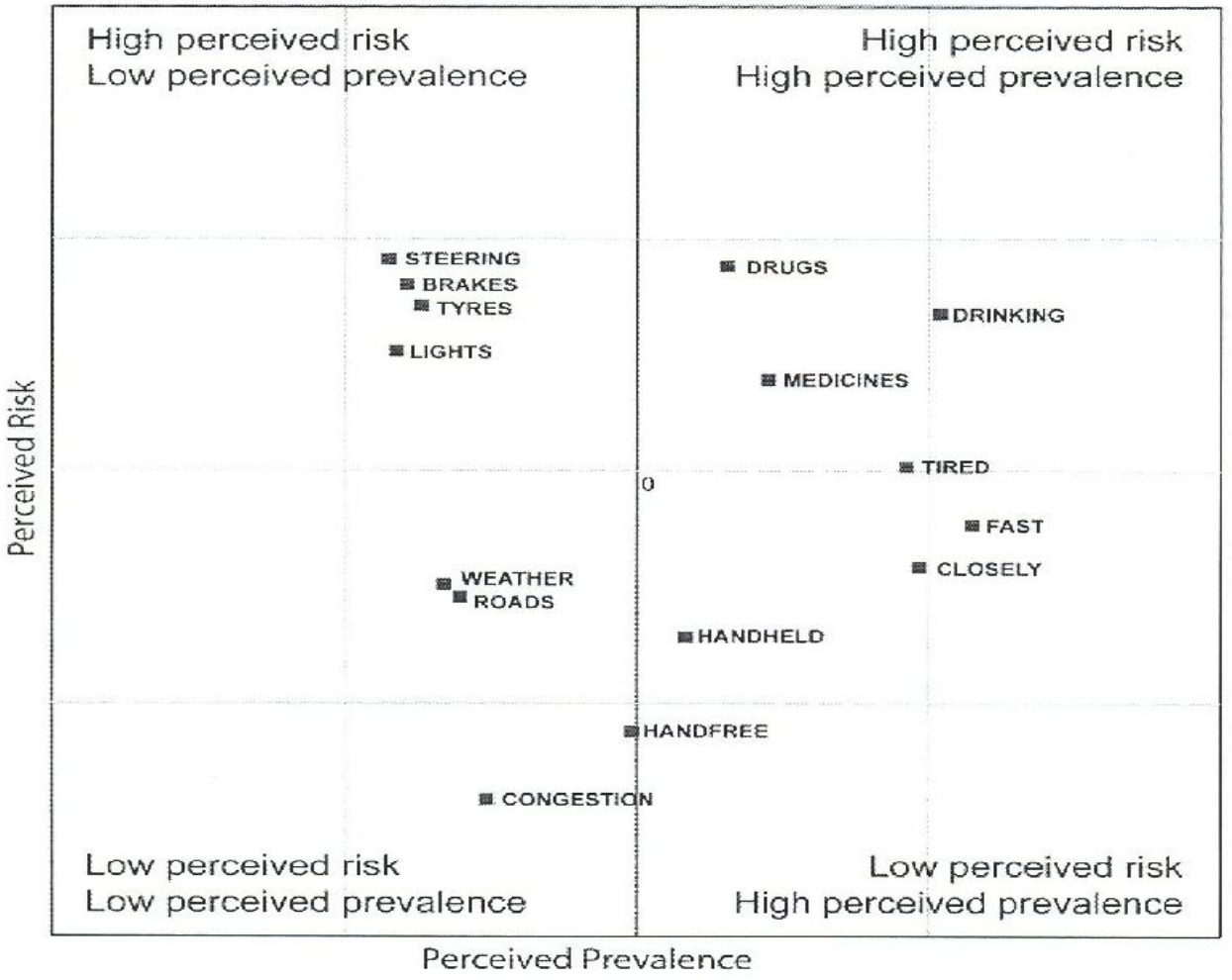
    Ensure the driver is educated about the new system and its standards.

Driver Distraction

- **Distraction and workload effects of technology can be categorised[1]**
  - General withdrawal of attention
  - Selective withdrawal of attention
  - Biomechanical interference
- **Can be caused by in vehicle technology**
  - Systems operating in a distracting manner
  - Inappropriate timing of system feedback
  - Poorly positioned systems
- **Do drivers perceive it to be a problem?**

[1] State-of-the-art of the SNRA/JARI/BAST Joint Research on Driver Workload Measurement, Christhard et al, 18th ESV Conference

Driver Distraction



Results of Social Attitudes to Road Traffic Risk of Car Drivers In Europe
http://sartre.inrets.fr/documents-pdf/repS3V2E.pdf

Driver Distraction Training Countermeasures

- Dangers of driver distraction publicised
- Training to ensure drivers know appropriate response

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Driver Distraction Engineering Countermeasures

- **Engineering**
  - Designed so that they do not unnecessarily distract the driver
  - Don’t require the driver’s attention for long periods of time
  - Greater degree of interaction between the systems
  - Systems switch off and cannot be operated by the driver in dangerous circumstances
  - Improved Human/Machine Interface
  - Ratings systems to provide drivers with information about the “ease of use”.

Driver Distraction Enforcement Countermeasures

- **Enforcement**
  - General legislation already in place to make distracted driving illegal
  - Specific legislation to ban dangerous in-car equipment
  - Health and Safety when equipment is being used at work
  - General Product Safety Regulations 2005
- **Laws on careless and dangerous driving can be enforced.**

Driver Distraction

- **Example – Satellite Navigation**
  - Danger

    A driver may use a SatNav poorly, relying heavily on the visual instructions and interacting with it at dangerous times.
  - Solution

    Ensure that the driver is assessed in the use of the SatNav, if the driver is using it poorly then look at further training or whether the driver finds a different SatNav easier to use.

Driver Underloading Due to Automation

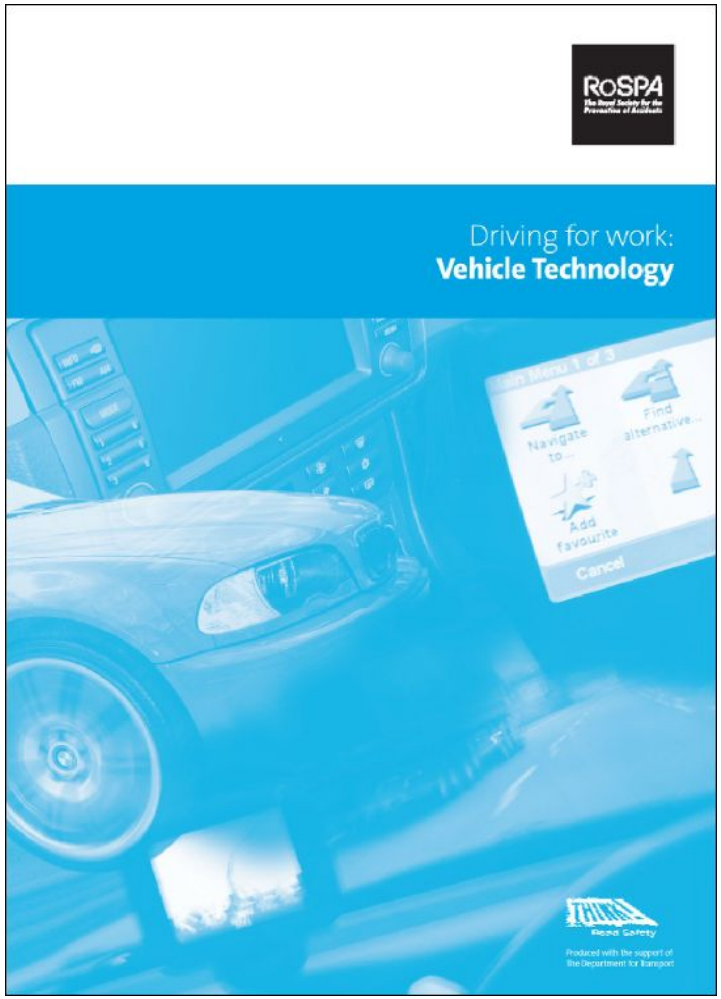
- **Potential dangers due to increasing automation**
- **Driver takes the back up role of monitoring the system**
  - Tendency to use the extremes of the automation range
  - Disproportionate over reliance on the system
  - Difficulties in detecting system failure
  - Loss of basic skills
  - Complacency

Behavioural Adaptation to New Technologies

- **All of the areas of risk previously covered are to do with Behavioural Adaptation.**
  - Drivers can react in a positive way as well as a negative way, depending on how they perceive the benefits and risks.
  - Drivers will not always utilise all of a systems safety benefits, yet may still depend on them.
  - The reliability of a vehicle safety system is not just dependent on the engineering reliability of the device, but the way in which it is used.
- **Drivers can be trained and encouraged to get the best use out of a vehicles safety systems.**

Driving for Work: Vehicle Technology

- Designed to help employers identify and manage risks from vehicle technology.
- Guidance about the risks which will apply to future technology as well as current technology.
- Sample policy which can be integrated with the companies wider ‘Safer Driving for Work’ policy or used stand alone.



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Conclusion and Further Information

- Cars are changing.
- Great opportunities to reduce the risk to drivers and number of accidents.
- Potential for risk, which must be managed.
- This can be done through MORR.

Conclusion and Further Information

- **Crash Testing**
  - EuroNCAP, Thatcham Whiplash & ESC Ratings
  - http://www.euroncap.com/
  - http://www.thatcham.org/
- **RoSPA Website**
  - Numerous factsheets, compendium of acronyms, comprehensive policy paper entitled "Cars In The Future"
  - http://www.rospa.com
- **TRL Website**
  - Freely available reports on In-Vehicle Technology & Driver Distraction
  - http://www.trl.co.uk/
- **e-Safety Support Website**
  - Keep an eye on future technology
  - http://www.esafetysupport.org/

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Thank you

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