CAN FATIGUE DETECTION TECHNOLOGY IMPROVE SAFETY?

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WHAT IS FATIGUE DETECTION TECHNOLOGY?

WHAT EVIDENCE IS AVAILABLE TO SUPPORT THE USE OF DIFFERENT TYPES OF FATIGUE DETECTION TECHNOLOGY?

- Developer validation
- Availability of validation information (report and/or data)
- Independent validation
- Laboratory studies
- Field studies
- Validation against gold standard measures
- Validated against driving performance
- Sensitivity / specificity
- End user acceptability

FUNCTIONALITY AND END USER ACCEPTANCE

FATIGUE/DISTRACTION DETECTION TECHNOLOGY USE IN THE AUSTRALIAN ROAD FREIGHT TRANSPORT SECTOR

- Project aimed to identify how the industry is facilitating improved safety outcomes through the adoption of fatigue and distraction detection technology.

- Understand how organisations currently implement and use fatigue and distraction technologies – what has worked, and what hasn't worked

- How fatigue detection technology could be regulated

- Today I'll be focusing on:

  - Organisational factors

  - Driver factors

- Interviews with key stakeholders

Research Report: Phase 2

FATIGUE/DISTRACTION DETECTION TECHNOLOGY USE IN THE AUSTRALIAN ROAD FREIGHT TRANSPORT SECTOR

NHVR
National Heavy Vehicle Regulator

Andrew Higginson, Professor Drew Dawson, and Dr Madeline Sprajcer
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FATIGUE/DISTRACTION DETECTION TECHNOLOGY USE IN THE AUSTRALIAN ROAD FREIGHT TRANSPORT SECTOR

- 12 road freight and passenger transport operators

  - Where possible, four drivers, one safety manager, one IT/technology specialist, and one operations manager were interviewed from each operator

  - 2 union representatives

- 9 representatives from technology providers

- Total of 79 individuals were interviewed

FATIGUE/DISTRACTION DETECTION TECHNOLOGY USE IN THE AUSTRALIAN ROAD FREIGHT TRANSPORT SECTOR

- Interview areas included:

- 1. The organisational decision to invest in fatigue/distraction technology

- 2. Implementation issues

- 3. Operation and maintenance of the equipment

- 4. Governance, policy and recommendations

- 5. Data utilisation

FINDINGS

WHY ARE COMPANIES BUYING FATIGUE DETECTION TECHNOLOGY?

- To respond to a 'fatigue problem'
    - E.g., after a fatigue-related incident or near miss
    - Awareness of fatigue-related risk
- Because it was required as part of a contractual relationship
- To keep up with industry trends
- Potential insurance benefits

"It wasn't a case of if, but a case of when - sooner or later you're going to have one" (a fatigue-related incident)

"We want to be able to show that we're proactive in our thinking...we have our driver's safety and the public's safety as a top priority"

"We have seen a reduction in our premiums when we took our insurance to market - based on our equipment, technology and how we use it".

"[We have] an obligation to follow industry trends"

"I looked after the company line haul component and we were having incidents that were attributed to fatigue"

"The customers wanted it"

HOW IS FATIGUE DETECTION TECHNOLOGY BEING USED?

- **Significant investment is already occurring** and there is already significant support for the use of fatigue and distraction technology in the road freight and passenger transport industry in Australia.

- Current investment to date is typically dominated by larger operators (greater than 30 vehicles) with a publicly stated commitment to 'demonstrable safety'

  - i.e., safety which can clearly be demonstrated based on systems, safety records, etc.

- Many companies using the tech as part of a **trial** prior to full roll out.

- More recent work our team has done suggests that **smaller operators are now more commonly using fatigue detection technology:**

  - Declining purchase / running costs

  - Increased awareness that the technology exists

PERCEIVED SAFETY

- Enthusiastic support at the executive / supervisor level because of perceived safety benefits

- Strong belief that the effective use of fatigue and distraction detection technology will reduce the frequency of fatigue and distraction events while driving.

- Company representatives all reported that distraction events are far more prevalent and outnumber fatigue events by a factor of four to one.

- Perception by some that detecting fatigue events comes too late
  - Reactive rather than proactive

- Perception by some that they knew their own fatigue better than a device

"I've been driving a truck for 10 years, and no one knows my fatigue better than me"

"We've had drivers who will absolutely deny that they've had a fatigue event and when we show the footage and they say, 'oh my God'".

DO USERS BELIEVE THE TECHNOLOGY WORKS?

- Awareness of false positives and false negatives

- Imperfect detection was not seen as a barrier to use by most participants

- Some technological teething issues
  - E.g., availability of trained maintenance personnel in rural areas

- Greater likelihood of inaccurate detection under certain conditions
  - E.g., inner city driving with GPS interference
  - Rural / remote driving with limited connectivity
  - Dirt roads

"I've asked people in our industry of how much this technology could reduce incidents if it was across the board? The lowest response I've had is 25% and the highest is 50%. We have strong evidence which shows that we've seen a reduction in incidents. our claims history and premiums have reduced in the last 5 years"

DRIVER PERFORMANCE

- Unexpectedly, drivers reported using fatigue detection technology as a 'biofeedback device'

- Improved driver behaviour

  - E.g., reduced distraction events such as phone use

"You can let it go until, you know, it'll tell you, or you can get in early".

"I'm not sure that we've coached drivers to become more self-aware or trialed the system long enough. When it came it had some level of influence on everybody that was exposed to it (e.g., I didn't realise that I took 10 second looking at my left-hand mirror to change lanes)".

IMPLEMENTATION

"Initiatives such as this fall into the category of major change. So, you need constant and consistent communication, respond to issues and concerns promptly and have management oversight and ownership to overcome initial and any ongoing resistance".

- Importance of adopting a collaborative (as opposed to mandated) approach between company management and drivers.

- A very sensitive approach was necessary to 'get drivers on side'

The way I sell it is 'this is your wife in the passenger seat, looking over, giving you a nudge'".

- Training and education

  - Companies that had more training prior to implementation tended to have greater driver acceptance

"I sat down and watched the footage, I didn't realise how you reacted at times, it opened my eyes (literally) to what had happened"

"We trod very lightly in the beginning; we introduced the system by implementing a voting process at the end of the 12 months to vote the technology in or out. Of course, this never happened as once the drivers saw the videos, their support was immediate".

WHAT CONCERNS DID DRIVERS HAVE?

- Continuous surveillance and 'big brother'

- Data privacy

- Health concerns (infra-red / electroencephalography)

- Difficulty with or unwillingness to adapt to using new technology

- Resistance to wearables

- GPS / video data available to law enforcement in the event of a crash

"[I had] arguments with drivers threatening to leave. You install it in the truck, and I say to them, you might be a perfect driver, then that sits on the dash and its obsolete."

"The camera [needs to be] outside of curtains (bunk area) in the cabin of the truck"

"One of the big things about the technology about the footage that we get is privacy...the way we destroy the trust of our drivers is if one of these shows up on YouTube".

WHAT DID DRIVERS LIKE ABOUT THE TECHNOLOGY?

- Increased feelings of safety

- Evidence if an incident occurred

"I've changed my tune a bit...I actually think it's a good thing...last Thursday an old 2-up partner of mine would have been killed in a double fatality. He was in the bunk asleep, and the driver fell asleep, and if it wasn't for the [technology], there would have been a funeral this week".

"They're good to know...that if you do fall asleep, which is quite possible for anyone to do, that that thing [the technology] will wake you up".

"I'm going to go to [work at] a company that has safety features...they're worried about you".

"I totally agree with it...I like it. I've been driving for quite a few years...when you start getting doughy and that machine is set up with the vibration, it'll bring you back to life pretty quick".

"it should be compulsory"

POLICIES AND PROCEDURES

- Some organisations implemented the technology with limited or no associated policies and procedures
  - E.g., what to do if a driver gets an alert
  - How the data is managed

- Particularly a problem for smaller operators who do not have a high level of safety infrastructure

- Supervisor oversight

- Typically, limited support from vendors regarding what to do in the event of an alert

- Risk mitigation if an alert occurs
  - Short breaks
  - Stopping the drive for the day
  - Caffeine

- Critical that the tech not be used punitively

"Ops person has authority as to whether driver stops or keeps going depending on questions on checklist. Checklist questions must be answered in a certain way or driver will be made to have mandatory break... if a second fatigue event occurs in a shift you have a non-negotiable break".

"If a driver has a rest and then alerts again, we don't have a system - we're making it up as we go along".

KEY TAKEAWAY MESSAGES

- Look for reputable technology options, ideally with available validation data

- Organisations may choose to implement fatigue detection technology for a range of reasons, but managing fatigue-related risk is seen as key by most operators

- Fatigue detection technology is currently in use across a range of organisations in the transport sector

- Organisations have seen significant safety benefits, though all devices appear to have non-zero false positive / false negative rates

- Drivers generally have a number of concerns about the technology prior to implementation
  - Surveillance
  - Data privacy
  - Punitive use

KEY TAKEAWAY MESSAGES

- Consultation and training are a key part of the implementation process

- Typically, a high level of driver support was seen where the benefits of the technology were clearly explained and drivers were involved in the implementation process

- Drivers generally reported that the technology made them feel safer on the road

- It is critical to establish policies and procedures for technology use

- Potential to undertake trend analysis across organisations / industries

SO, CAN FATIGUE DETECTION TECHNOLOGY IMPROVE SAFETY?

- Yes, but…..
    - If the technology selected has the capacity to sufficiently detect fatigue (and potentially distraction)
    - If the technology is handled appropriately by the organization
    - If users are made part of the implementation process
    - If users know what to do if fatigue is identified