Attitudes Towards Technologies for Increasing Seat Belt Use

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David G. Kidd
MAP-21 opens up new opportunities to use in-vehicle technology to increase belt use

- Can allow automakers to use interlocks to comply with a safety regulation
- Can require reminder chime for more than 8 seconds
- Rulemaking for rear seat belt reminders
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Percent belt use observed in 1972-74 model vehicles with belt reminders or interlocks

Robertson, 1975
Belt interlocks are unpopular

• Focus groups of part-time belt users
  – Too invasive
  – Concerns about emergency situations
  – Believe belt use is a personal choice

• 2003 telephone survey of part-time users indicated radio/entertainment interlock was most effective and least acceptable

• Situations to consider:
  – Warming up the car
  – Emergency situations
  – Moving at low speeds in parking lot or driveway
  – Only effective if people want to use that particular function
Can we take advantage of MAP-21 changes?

IIHS Survey, 2012

• National survey of 1,218 drivers and passengers on self-reported belt use
• Respondents classified as full-time, part-time or nonusers
• Part-time and nonusers asked
  – Reasons for not buckling up
  – Opinions about effectiveness and acceptance of technologies
Types of belt users
Drivers and adult passengers

- Full-time users: 90%
- Part-time users: 5%
- Nonusers: 5%
# Top 3 reasons for not using seat belt

By belt user type

<table>
<thead>
<tr>
<th>part-time users</th>
<th>nonusers</th>
</tr>
</thead>
<tbody>
<tr>
<td>short trip</td>
<td>comfort</td>
</tr>
<tr>
<td>67%</td>
<td>77%</td>
</tr>
<tr>
<td>forget</td>
<td>don’t need belt</td>
</tr>
<tr>
<td>60%</td>
<td>54%</td>
</tr>
<tr>
<td>comfort</td>
<td>don’t like being told what to do</td>
</tr>
<tr>
<td>47%</td>
<td>50%</td>
</tr>
</tbody>
</table>
Part-time users’ opinions about belt use interlocks and reminders

Percent that agree

- Prevents vehicle from starting
- Limits speed to 15 mph
- Basic safety belt reminder
- Accelerator pedal resistance
- Prevents use of entertainment and communication systems

More likely to buckle up
Acceptable

0% 20% 40% 60% 80% 100%
Percent of belt users that would support different belt interlocks

By belt use group

- Prevents vehicle from starting
- Prevents vehicle from being put in gear
- Limits speed to 15 mph
- Prevents use of entertainment and communication systems

(full-time users) (part-time users) (nonusers)
Interlocks and buckling routines

Percentage who have buckled up at each step during trip start

- before car starts
- after car starts, before placing in gear
- after placing in gear, before car moving
- after car moving
- it varies

Types of interlocks:
- ignition interlock
- gearshift interlock
- entertainment interlock
- speed limiter
- pedal resistance

- full-time users
- part-time users
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Percent belt use observed in 1972-74 model vehicles with belt reminders or interlocks

Robertson, 1975
Percent driver belt use in vehicles with and without enhanced reminders

- Ford dealers 2002
- Honda dealers 2007
- Observed traffic NHTSA, 2007
Enhanced seat belt reminders are common in U.S. fleet

• Many manufacturers voluntarily fit 2012 models with enhanced reminders
  – 91 percent driver
  – 77 percent front passenger

• Euro NCAP gives credit to driver and front passenger reminders that meet certain criteria
  – “Loud and clear” audiovisual signal lasting at least 90 seconds
  – Intermittent or continuous signal
  – Criteria for when the signal must start
Real-world belt-reminder effectiveness

- U.S. driver belt use 3-6 percentage points higher in vehicles with enhanced reminders vs. vehicles without enhanced reminders
- Driver belt use in Europe 93-99% when fitted with enhanced belt reminders meeting EuroNCAP rating criteria
  - 12 percentage points higher than in cars without reminders
- U.S. driver fatality risk 2 percent lower for vehicles with enhanced reminders vs. vehicles without enhanced reminders
Part-time users’ opinions about effectiveness and acceptability of different reminder features

Percent who agree

<table>
<thead>
<tr>
<th>Feature</th>
<th>More likely to buckle up</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>buzzer or chime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>physical cue like vibration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>voice message</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lit or flashing warning light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>text display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>illuminated seat belt buckle</td>
<td>20%</td>
<td>60%</td>
</tr>
</tbody>
</table>
Part-time users’ opinions about effectiveness and acceptability of different intensities of reminders

Percent who agree

- More intense over time
- Repeats every 15 seconds
- Repeats every 60 seconds
- More intense as car speeds up
- Ends after few seconds

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<tr>
<td>More intense over time</td>
<td>70%</td>
<td>30%</td>
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<td>80%</td>
<td>20%</td>
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<td>20%</td>
</tr>
<tr>
<td>Ends after few seconds</td>
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<td>80%</td>
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Increasing benefit of front passenger belt reminders

• Reminders meeting Euro NCAP’s design requirements increase driver and front passenger belt use

• System designs can vary widely
  – Intermittent or continuous 90-second audiovisual signal
  – Allow for gaps in signal up to 25 seconds
  – Proportion of time chime sound can vary
  – Overall duration of chime can vary

What features of enhanced belt reminders are most effective?
Sample reminder
Ratings of effectiveness and annoyance by belt reminder type

- Basic:
  - 20% likelihood of buckling up: 6 sec on, 24 sec off
  - 50% likelihood of buckling up: 15 sec on, 15 sec off
  - 100% likelihood of buckling up: 30 sec on, 0 sec off

- Enhanced:
  - 20% likelihood of buckling up: 6 sec on, 24 sec off
  - 50% likelihood of buckling up: 15 sec on, 15 sec off
  - 100% likelihood of buckling up: 30 sec on, 0 sec off
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Encouraging fitment of rear reminders

- Euro NCAP gives credit for rear reminders
  - Visual display lasting at least 30 seconds after start of trip
  - Audible tone when a rear belt is unbuckled
- 2007 petition to NHTSA to mandate rear reminders
- 3 percent of 2012 U.S. vehicle models have rear seat belt reminder systems
IIHS 2012 national survey of 254 drivers with 8-15 year-olds riding in back seat

- Only 3 percent said their child does not always buckle up in back seat
- Reasons why child does not buckle up
  - 84 percent do not like belt
  - 77 percent never fasten belt
  - 55 percent take belt off during trip
Reminder features parents want

• 82 percent of parents want to know when child is unbuckled

• Desired reminder information
  – Diagram of seating positions and belt use (87%)
  – Flashing or illuminated light or text display (85%)
  – Chime or buzzer (79%)

• Desired reminder duration
  – Until children buckle up (63%)
  – Several miles into trip (17%)
  – Brief, ending shortly after vehicle starts (19%)
Conclusions

• MAP-21 offers new opportunities to increase front and rear occupant belt use

• Survey suggests belt reminders would be most acceptable technology to encourage belt use and are reasonably effective
  – Audible reminders and reminders that are persistent are most effective

• Strengthening reminder requirements similar to Euro NCAP is a promising way to increase belt use
  – Estimate about one-third of the enhanced seat belt reminders in the U.S. currently meet Euro NCAP requirements

• Reducing duty cycle is one way to reduce annoyance of European-style enhanced reminders

• Most parents want rear seat reminders with information on belt use status
Dedicated to reducing deaths, injuries, and property damage on the highway