Heavy vehicle stability safety systems are currently available from a number of manufacturers of heavy road transport equipment.

Advisory systems to warn the driver of impending rollover developed over a decade ago have been superseded by technology development. Advisory systems were not considered in this project, nor were systems in the experimental stages such as those that pump up air bags.

The technologies that were analysed in the investigation were:

- Electronic Stability Control (ESC)/Electronic Stability Program (ESP) for rigid trucks and prime movers
- Roll Stability Support (RSS)/Roll Stability Control (RSC) for trailers and semi-trailers.

These technologies can be highly effective in potentially dangerous situations like:

- overestimating the safe curve speed (e.g. narrowing curves, highway exits)
• obstacle avoidance manoeuvres with sudden steering input (e.g. steering from the shoulder back onto the road and skidding)
• laden semi-trailer in narrow curves on slippery surface (jackknifing on turns).

Analysis of crashes
In total, 440 stability related crashes were examined in detail, half from Queensland and half from Victoria. The table below outlines the configurations that were involved in the crashes.

<table>
<thead>
<tr>
<th>Configurations in assessed crashes</th>
<th>Qld</th>
<th>Vic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid truck &gt; 4.5 tonnes GVM</td>
<td>36.4%</td>
<td>44.5%</td>
<td>40.5%</td>
</tr>
<tr>
<td>Articulated vehicle</td>
<td>42.7%</td>
<td>49.1%</td>
<td>45.9%</td>
</tr>
<tr>
<td>B-double</td>
<td>15.9%</td>
<td>6.4%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Type 1 road train</td>
<td>5.0%</td>
<td>0.0%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 1: Configurations involved in crashes that were assessed

The average benefit (per crash) resulted from an assessment as to what proportion of the crash might have been reduced in severity while the overall benefit is the assessed reduction in crashes for the group of stability related crashes. These benefits are outlined in Table 2.

<table>
<thead>
<tr>
<th>Safety benefits in assessed crashes</th>
<th>Qld</th>
<th>Vic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crashes considered to benefit</td>
<td>41.8%</td>
<td>50.0%</td>
<td>45.9%</td>
</tr>
<tr>
<td>Average benefit</td>
<td>54.6%</td>
<td>68.7%</td>
<td>62.4%</td>
</tr>
<tr>
<td>Overall benefit</td>
<td>22.8%</td>
<td>34.4%</td>
<td>28.6%</td>
</tr>
</tbody>
</table>

Table 2: Results of crash analysis

An economic analysis was made and the results are outlined in Table 3.

<table>
<thead>
<tr>
<th>Articulated vehicles</th>
<th>Rigid vehicles</th>
<th>Trailers only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>$328.3m</td>
<td>$205.2m</td>
</tr>
<tr>
<td>Costs</td>
<td>$229.9m</td>
<td>$534.0m</td>
</tr>
<tr>
<td>Benefit cost ratio</td>
<td>1.43</td>
<td>0.38</td>
</tr>
</tbody>
</table>

Table 3: Results of economic analysis (7% discount rate over 15 years)

Conclusions
The research showed that HVSST would be valuable for articulated vehicles but less so for heavy rigid vehicles. However, the analysis was not sufficiently detailed to determine if a sub-set of heavy rigid vehicles might benefit more than the whole group. The highest benefit cost arose from use of RSS/RSC trailer systems due to the high prevalence of the rollover of articulated vehicles and the lower cost of trailer systems.

The majority of key stakeholders consulted during this project favour use of the technology. Therefore, there is likely to be strong support for a publicity campaign encouraging transport operators to fit the technologies to any new equipment purchased by their companies. A number of operators have valuable positive experience with using the technologies which could be used as case studies to support the campaign.

Future actions
As an outcome of this report, TMR intends to promote heavy vehicle stability safety technologies to the transport industry.

TMR will also monitor the mandatory use of the technologies in the United States and Europe and further consider mandatory introduction in Australia when the appropriate technical standards have been identified in those jurisdictions.

Road toll update

For the period 1 January to 31 October 2011, there were 45 fatalities as a result of crashes involving heavy freight vehicles within Queensland, which represents 21.4% of the Queensland road toll.

Of the 45 fatalities, 8 fatalities (or 17.8%) were heavy vehicle drivers; two fatalities (or 4.4%) were passengers of heavy vehicles and 35 fatalities (or 77.8%) were other road users (drivers, riders, passengers, pedestrians or bicyclists).

Between November 2009 and October 2011 the number of fatalities in crashes involving heavy freight vehicles has remained fairly steady with the exception of spikes during December 2010 and May 2011.

The figure shows the fatalities as a result of crashes involving and not involving heavy vehicles within Queensland between September 2009 and October 2011.

Distractions when driving

It only takes a split second to lose your concentration.

In 2009, one in every ten deaths and up to one quarter of all crashes on Queensland roads were the result of drivers being distracted.

These figures have increased as the number of in-vehicle distractions has increased, particularly the use of mobile phones while driving.

This article is based on information kindly supplied by the Centre for Accident Research and Road Safety at the Queensland University of Technology (CARRS-Q). This article covers:

- the causes of distractions while driving
- the safety risks of driving while distracted
- the safety risks of using a mobile phone while driving
- current and future government responses to the issue.

Distractions

The idea that men or women can multitask is a myth. The human brain biologically cannot perform two tasks at the same time. Instead, it must stop working on one task and then start working on the second task.

A distraction is anything that occupies the brain, preventing it from working on the task at hand. They force the brain to constantly switch back and forth between the two tasks. The more complex or difficult the main task or distraction is, the longer it takes for the brain to switch between tasks.

Driving involves a complex set of tasks. As such, drivers are more vulnerable to distractions, and the consequences of distracted driving are more serious.

Driving while distracted

Deciding how to react to a hazard and then properly executing that reaction requires many different parts of the brain to work together, for example:

- visual information
- auditory information
- conscious decision-making
- physical action.

If a driver is distracted, these different areas of the brain may not be functioning at full capacity or may be otherwise occupied. For example, the part of the brain that is responsible for perceiving movement (the parietal lobe) is also used for processing language.

Drivers tend to make three different types of errors if they are distracted. They:
- do not recognise hazards
- make poor decisions how to react to hazards
- do not properly execute their response to a hazard.

When the human brain is overloaded it tries to filter out information to reduce its workload. This can lead to drivers ‘looking but not seeing’, when the brain ignores critical information, such as red lights, corners and objects on the road.

Even if a distracted driver recognises a hazard on the road, they are less likely to react properly to it.

For example, just listening on a phone has been shown to reduce activity in the parietal lobe by up to 37 per cent, greatly reducing a driver’s ability to properly react to a visual hazard.

A person using a hand-held or hands-free mobile phone while driving is four times more likely to have a serious crash that results in hospital attendance.

Further to this, studies of drivers using hands-free phones have shown that drivers suffer from ‘tunnel-vision’, as the overloaded brain narrows its focus on the road.

Even if a distracted driver recognises a hazard on the road, they are less likely to react properly to it.

For example, just listening on a phone has been shown to reduce activity in the parietal lobe by up to 37 per cent, greatly reducing a driver’s ability to properly react to a visual hazard.

Using a mobile phone while driving

Using a mobile phone while driving, especially to text, is highly distracting. Recent research has also shown that using a hands-free device is no safer than using a hand-held phone.

Many long-distance drivers report that they use a phone while driving to help combat fatigue. However, researchers are concerned about using a phone to help combat fatigue.

When tired, the human brain is much less able to deal with complex information such as driving or conversations. As such, tired drivers already have slow reaction times, which become even worse when distracted. Using a phone while tired seriously reduces a driver’s ability to recognise and react to hazards.

Additionally, the increased mental workload of driving while talking is likely to increase fatigue more rapidly.

Research has also shown that external stimulus, such as opening a window, turning up the music or having a
conversation, only delays the effects of fatigue for very short periods of time (a few minutes at most).

Consequently, while using a phone may help you stay awake for a very short amount of time, it does not prevent fatigue and it results in unsafe driving behaviour.

**Government responses**

The Queensland Government has adopted a number of strategies to combat distracted driving, including:

- roadway alerts, such as flashing lights, warning bells and rumble strips to alert drivers to particular hazards, such as level crossings and intersections
- roadway-vehicle communications, such as radio-voiceovers in tunnels and before level crossings
- bans on highly-distracting activities while driving, such as texting or using hand-held phones while driving
- education campaigns about the risks of distracted driving.

**Heavy vehicle safety email list**

The Heavy Vehicle Safety Systems (HVSS) team, Department of Transport and Main Roads, maintains an email group for notifying industry members of information relating to heavy vehicle safety.

If you would like to be included on this list, please email the HVSS team at hvss_unit@tmr.qld.gov.au.