WIN-WIN

TRAMANCO'S CHEK-WAY ELIMINATOR® AND INS-COM® SYSTEMS DELIVER BENEFITS AND SAVINGS FOR HEAVY VEHICLE OPERATORS AND ROAD AUTHORITIES

Highly regarded for both its accuracy and robust performance in the field, TRAMANCO's CHEK-WAY Eliminator® On-Board Mass Management System has played a major role in helping heavy vehicle operators to maximise efficiency by enabling them to load to legal limits and reduce the chance of being prosecuted for overloading, while also allowing them to participate in programs such as the IAP (Intelligent Access Program) and take advantage of HML (Higher Mass Limit) routes. But the benefits don't stop there.

Taking advantage of the CHEK-WAY Eliminator® system's patented software-based design, the team at TRAMANCO has also been able utilise the collected dynamic mass data to provide an extremely an extremely accurate method of monitoring and reporting on the condition of both the vehicle's suspension and the road surface along the travelled routes.

Known as INS-COM®, the system has the potential to deliver significant savings and efficiency gains for heavy vehicle owners/operators and road authorities alike.

BENEFITS FOR HEAVY VEHICLE OPERATORS

Throughout Australia, Performance Based Standards (PBS) and Higher Mass Limit (HML) operations are predicated on the vehicles being fitted with Road Friendly Suspension (RFS). Road-Friendly Suspensions are required to meet the performance standard as published by the National Transport Commission (NTC) as *'Road-Friendly Suspension – Performance and Component Requirements, and Acceptable Test Methods'.*

Importantly, as outlined in the Federal Department of Transport and Regional Services Vehicle Standards Bulletin VSB 11, the functionality of RFS must be maintained so it continues to meet the Standard.

Traditionally, what that has meant for heavy vehicle operators, is that the RFS on every vehicle must undergo repairs and a full assessment and recertification of the RFS as part of its maintenance schedule. Unfortunately, what this generally means in practical terms, is an expensive and sometimes unnecessary procedure that sees the truck and trailers off the road for up to 24 hours.

Now, thanks to TRAMANCO's INS-COM® system, heavy vehicle operators can access extremely accurate data as to the performance and of their vehicle's RFS, allowing for a significant improvement in maintenance scheduling for suspension. TRAMANCO's Founder and Managing Director, Roger Sack, explained:

"In short, for RFS to comply with VSB 11 and the NTC's Performance Based Standard, the frequency of the sprung mass above the axle or axle group in a free transient vertical oscillation must not be higher than 2.0 Hz; and the mean damping ratio DM must be more than 20% of critical damping (Co) for the suspension in its normal operating condition."

"The dynamic load data collected by the CHEK-WAY Eliminator® whilst the vehicles are operating is utilised by the INS-COM® system to provide an extremely accurate stream of live data as to the actual oscillation and damping of the suspension without the need to remove the suspension from the vehicle, or the vehicle from the road," he added. "What's more, depending on the configuration of the system, it can provide this data from the left and right side of the vehicle for up to 8 separate axle groups as a pre-warning of roll-over"

"With the average cost of re-bushing the suspension for a B-Double (prime mover with two trailers) currently coming in at around $5,000 – and an average of 24 hours off the road – we believe that the INS-COM® system not only has the potential to significantly improve safety and compliance across the heavy vehicle fleet, but also to deliver significant cost savings to heavy vehicle operators," he added.

BENEFITS FOR ROAD AUTHORITIES

Perhaps not surprisingly, in the same way that this dynamic mass data can be used to monitor the performance of the Road Friendly Suspension when it encounters bumps in the road, it is used in conjunction with the recorded GPS location data to provide a valuable insight into the exact location of severe bumps, and more specifically, the severity of the bump and how they are deteriorating over time.

"Monitoring the condition of the nation's road network is a massive task, and while traditional asset monitoring and condition reporting techniques may cover section of the network on a bi-annual or annual basis, deterioration can happen at a much faster rate – particularly when it comes to ruts and potholes exposed to heavy vehicle loads at highway speeds," Roger Sack said.

"By combining live load data that accurately measures the dynamic excursions of the mass, with pinpoint GPS location and vehicle speed data, we are able to detect potholes, ruts and other issues such as subsidence in the lead up to bridge abutments etc. with incredible accuracy."

"Furthermore, as vehicles fitted with the CHEK-WAY Eliminator® and utilising the INS-COM® system continue to pass these locations, the data provided enables us to quickly build up a highly accurate profile of how badly the pavement is deteriorating," he added. "This, in turn, enables road authorities to accurately target road maintenance activities where they're needed most."

GOOD BUMPS, BAD BUMPS and GOOSEBUMPS.

The following excerpt from a presentation by TRAMANCO's Founder and Managing Director, Roger Sack, provides a clear and concise explanation of how the data being received via the INS-COM® system can be utilised to provide extremely detailed and highly accurate road condition data:

A GOOD BUMP is one which has a very small excursion coming into the bump then a large excursion in the bump and quite a smooth excursion on exit from the bump. This allows us to accurately determine Damping Ratio and the Bump Frequency of the suspension to determine wear rates and compliance with VSB-11.

An example can be seen in Figure 01 which represents 10 seconds of captured data from the vehicle. This data shows it is an isolated bump and the suspension is working well with good damping ratio and frequency both well within the requirements of VSB 11. It has what we call a 'GOODBUMP' with a smooth entry and exit.

The INS-COM® system also allows us to pinpoint the exact location of the bump on both a Route Map View (Figure 02) and via a Google Earth satellite image (Figure 03).

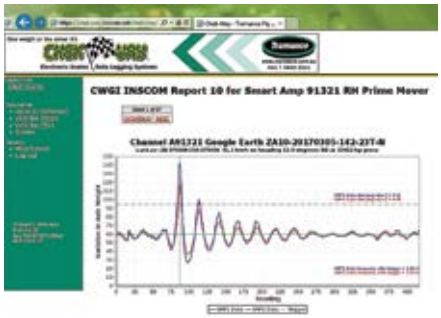

Figure 01: GOOD BUMP - Data captured from the vehicle shows an isolated bump and the suspension is working well.

Figure 02: Data capture points are pin-pointed along the route map.

Figure 03: The INS-COM® system can also utilise GPS data to highlight locations using Google Maps.

Not all BUMPS are created equal, of course.

An example of a BAD BUMP can be seen in the 10-seconds of data shown in Figure 04 below. This is a large bump which is generating another large bump within the bump. There is a very rough entry combined with a rough intermediate section and a very, very rough exit and this in clearly indicated in the data being received via the INS-COM® system.

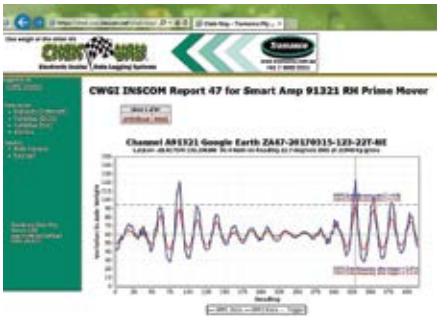

Figure 04: BAD BUMP - Collected data shows a large bump which is generating another large bump within the bump.

The entry speed to this bump was 94.4 km/h which is 26.2 m/s. So, if you measure along the horizontal axis you can tell exactly where the bumps are within the bump. The vehicle has travelled 262.2 m during this 10 seconds so the total length of this bump from entry to exit of the bump is also 262.2 metres. This bump will start to develop corrugations in the road surface unless it attended to, as soon as possible.

Again, this bump can be easily and accurately located on the Route Map View and via a Google Earth satellite image.

The final example is of what I like to refer to as a GOOSEBUMP. I call it a GOOSEBUMP because this is what it would give me if I was driving a truck and knew that this bump was lying in wait for me in the road ahead.

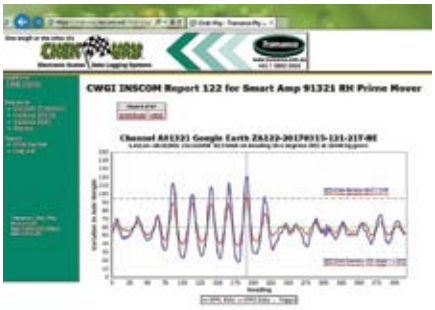

Figure 05: GOOSEBUMP – An accident waiting to happen. The collected data shows a section of road in desperate need of repair.

Here are the reasons why:

1. First of all, there are bumps on entry which is causing the suspension to become active;
2. Secondly, the data shown in Figure 5 (below) shows that there are four (4) major bumps within the first 1.8 seconds averaging over 110 on the vertical scale which equates to impulsive dynamic excursions of mass or if you prefer, impact loadings of the order of 39,300 KGS which are going back into the road work within the next three (3) seconds;
3. Then there is the major peak at around reading 190 – 200 on the horizontal axis which equates to a single dynamic excursion of mass or, impulsive load of 42,880 KGS being returned to the road work.
4. It doesn't get any better because, from the 200th to the 400th + reading marks on the bottom line of Figure 5 we find that the bump is inducing rollover into the prime mover. It's easy to see because we are getting "overlapping" between the red line of Group 2 (the RH side) and the blue line of Group 1 (the LH side).
5. We can see from the damping ratios that there is significant difference between the left and right-hand side of the vehicle which also points to wear in the suspension. The group 1 and group 2 frequencies are as expected for a suspension with relatively good shock absorbers but with worn bushes and/or other suspension components such as bolts and spring hangers.

The important message here is that this GOOSEBUMP needs attention by the respective Road Authority before there is a serious accident caused by any number of factors including induced rollover.

For further information on the TRAMANCO CHEK-WAY Eliminator® and INS-COM® systems, please visit: **www.tramanco.com.au**