



PETER HART

Absorbing the shock

up to about 7 tonnes can be adjusted by turning the top eye through 180° or 360° to alter the adjustment of the fluid openings in the internal plunger. Soft, Medium and Firm adjustments are available.

Shocks are tuned to the suspension geometry. If they are leaning forward, the characteristics are chosen for that orientation. Uninformed substitution of the shock absorber is likely to change the suspension response. For this reason, the road friendly suspension certification rests on replacing a worn shock absorber with the original specification. Use of adjustable shock absorbers will also affect both the certification and ride quality. By the way, it does not follow that a suspension design that meets the road-friendly technical standard (Vehicle Standards Bulletin No 6) will necessarily produce a comfortable ride. The road and the driver's rear-end are in different locations!

Suspension engineers have their own terminology. Jounce means bump. Jounce condition is the most compressed condition. It is the limit of compression. Suspension blocks or stops are designed

to prevent suspension slam or shock absorber damage. Rebound is the response of the suspension after being jounced. Oscillation is rhythmic or irregular movements up and down. Suspension damping is provided to minimise jounce and rebound oscillations. Unsprung Weight is the total weight of the wheels, tyres and axles below the suspension. Unsprung weight falls into holes on the road and it makes the suspension work as it travels on rough roads. The suspension's role is to minimise the transmission of these vibrations to the Sprung Weight. The level of Unsprung weight is a factor in this success.

Heavy vehicle shock absorbers are usually softer in compression than in rebound so that shock forces into the chassis rails are minimised. This is called asymmetric damping. There is an optimum damping level for ride quality, and this can be at odds with the damping required for road friendliness, so the damping is mainly provided on the rebound stroke. Asymmetric damping factors of up to 5 may be used. This characteristic is achieved by changing the restriction of the plunger(s) to oil travel depending on direction and speed of travel.

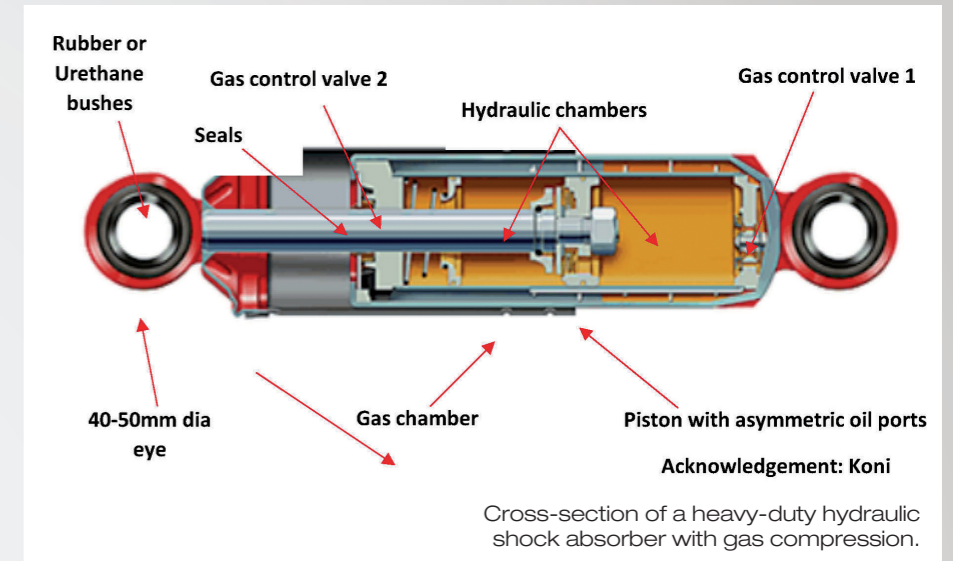
Some shock absorbers also contain a gas space, so the oil pressure compresses gas in a sealed compartment. Others have an inner and outer tube design that allows oil to be forced through a second fixed valve at the bottom, so the oil pressure works against trapped gas in the outer tube. The diagram shows the cross section of a typical heavy-duty vehicle shock absorber.

Suspensions are typically designed around the shock absorber length. As the shock absorber in many suspensions limit the rebound travel, using a longer shock absorber may result in damage

to suspension components, such as air springs pulling apart. The shock absorber must not limit the jounce travel of the suspension, because the shock absorber will be crushed, or the mount will fail. Shock absorber mounts must be carefully designed with a strength factor of safety of at least three. The bushes add some flexibility, which is essential because the shock absorber mounts at top and bottom are moving out of sync.

There are pros and cons in the choice or bushing material between urethane and rubber. Rubber is usually softer, and it provides damping and vibration isolation. Urethane has become the preferred bushing material over rubber because of its toughness and longevity. Urethane also provides a more direct road feel and is easier to install than rubber bushes because of its toughness. Follow the suspension manufacturers recommendations with bush choice. Loss of damping will result in greater magnitude oscillations. I recently drove beside a tri-axle group on an A-trailer that had the centre wheels oscillating noticeably more than the other two. Shock absorber failure is indicated. In the extreme case, a wheel might lift off the road. So how can you tell if the shock absorber is worn out? It is difficult to make this assessment based on the ability or inability to move the shock absorber by hand.

Misting of shock absorbers is often misdiagnosed as failure. Shock absorber rod seals rely on a thin film of oil to keep the seal lubricated. If the internal oil is hot, a thin coating of hot oil becomes exposed outside when the shock absorber is compressed. The oil evaporates and some of it condenses onto the cooler outside shocker body. This is normal misting. Over time the film will collect dust and grime. In contrast, seal failure results in oil



Cross-section of a heavy-duty hydraulic shock absorber with gas compression.

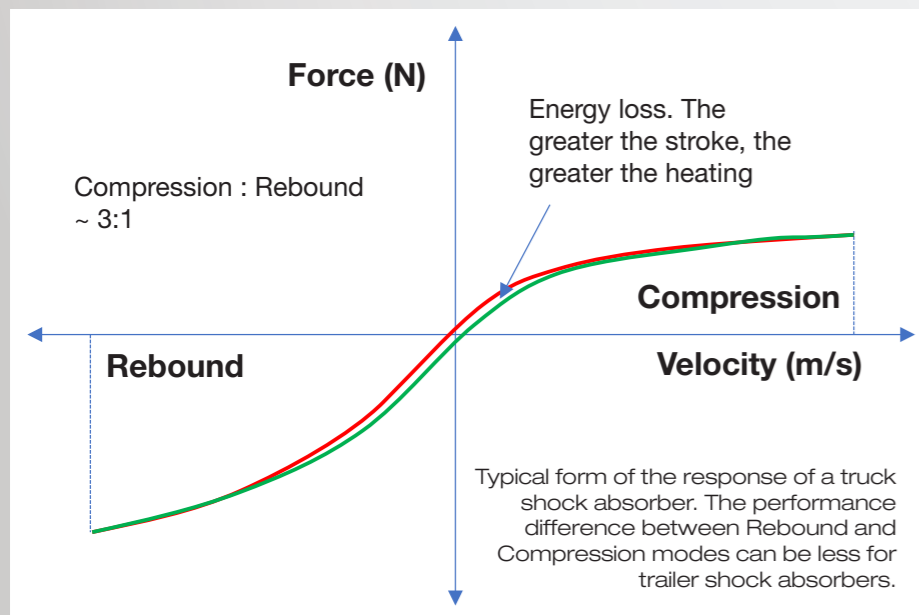
dribbles or streams from the upper seal. Oil dripping occurs. To check the condition without removing the shock absorber, raise the chassis to full suspension travel and inspect the full length for leakage.

A visual inspection of the in-situ shock absorber might reveal oil leakage; loose, bent or broken mounting bolts; deteriorated or missing mount bushes; broken or damaged dust shield; body tents or bends. Any of these observations require remediation and probably replacement of the shock absorber. The National Heavy Vehicle Inspection Manual (see NHVR website), which is an authoritative document, lists all the above as reasons for rejection. Note that superficial surface cracks on rubber or urethane bushes can be tolerated. Shock absorbers absorb vibration energy. They heat up. A working shock absorber will be warm or hot to touch after driving on sealed roads. On an unsealed road, shock absorber outer body temperature might reach an extreme temperature of 175°C. Road testing of shock absorbers is easily done. Drive the laden or unladen vehicle for about 15 minutes on a road with moderate imperfections. Within a few minutes of the road test, check the shock absorber temperatures using a non-contact (infra-red) heat gun. Use the frame steel temperature as reference. Cold shock absorbers probably need to be replaced.

Remove the cold shock absorber and shake it – the sound of free metal parts rattling may be heard. By the way, the greater the oil volume and the greater the outer surface area, the lower should be the temperature.

Suspensions are non-linear mechanical systems so their road friendliness and ride-comfort performance changes with mass, speed and road profiles. Adjustable damping characteristics could allow on-the-road tuning of suspension performance. Electric shock absorbers are often talked about but are still a long way off being robust enough and stiff enough for heavy-vehicle use. The principle is that a powerful magnet (or solenoid) moves inside a coil. Thereby current is pushed through the electrical load connected to the coil. The electrical load can be changed depending upon conditions. The current level needed to produce useful damping on a heavy truck is hundreds of amps. Albeit it is a low voltage. However, the management of such currents is expensive and the energy that could be scavenged is probably not worth the complication. A successful electric shock absorber will probably also have a hydraulic sub-system. I am grateful to Hendrickson Australia for providing some of the information in this article.

Dr. Peter Hart,
ARTSA





GEOFF CROUCH

Trucking Australia – where industry meets

understand the limits of paper-based safety management systems and, more importantly, the threats those systems present to safety. Following the launch of the inaugural ATA and Teletrac Navman Driving Change Diversity Program, the conference welcomes diversity champion and program ambassador Wayne Herbert. Wayne will explore the proven benefits of diversity in the workplace and share the outcomes of the ground-breaking Driving Change initiative before introducing the program participants – trucking’s newest diversity champions. Joining Michael, Greg and Wayne are award winning journalist Megan Woodward, emergency preparedness expert Robyn Neilson, ‘attitude doctor’ Dr Tom Mulholland, and communications guru Anne Fulwood, who will lead our Meet the Industry’s Future Leaders session. Trucking Australia 2020 will also see the return of Trucking Q&A with Tony Jones, which proved a huge success after its launch in 2019. The hard-hitting discussion forum engaged delegates and the wider industry, who were able to contribute to the panel discussion by submitting questions prior to the conference, ask questions directly during the session, or share their views online in real time as we livestreamed the session across Facebook. I am pleased that we will be bringing this session and Tony Jones to Cairns where we will have an even more powerful discussion as we tackle the real issues that affect operators on a daily basis. In developing the conference program, we were pleased to collaborate with ATA member the Queensland Trucking Association. The QTA will be delivering a series of Smart Business Seminars that have

a focus on business finance, technology and training. Open to all delegates, these sessions will provide practical advice and helpful tips that can be implemented into your business immediately. While Trucking Australia is a time for robust discussion, it’s also a time to celebrate what makes our industry great and build positive relationships. The ATA is committed to recognising outstanding individuals and businesses each year at our Foundation Sponsors Gala Awards Dinner, where we acknowledge the high standard of professionalism and passion of industry members through the National Trucking Industry Awards. Trucking is essential to the Australian way of life and is connected to every industry. It’s important we recognise those who inspire others and make a positive impact. Always a highlight of Trucking Australia is the Kenworth Legends Lunch, bringing trucking stalwarts together to share their journeys, successes and hopes for the future. Like the Kenworth brand, the Kenworth Legends are people who have shown inspirations strength, perseverance and success throughout Australia’s trucking industry. I invite you to join us in Cairns to make your voice heard, build your network and celebrate industry excellence. Don’t miss your opportunity to connect, collaborate and share your experience with industry. This is your chance to make a difference.

Trucking Australia 2020 will be held in Cairns from 1-3 April. To view the conference program or register, head to www.truckingaustralia.com.au

Geoff Crouch
Chair, ATA



KIRK CONINGHAM

Rearview mirror isn’t the only one we need to look in

The ageing of Australia’s workforce is a whole-of-economy challenge, but it is particularly acute in the road transport sector. A large-scale industry survey conducted in 2016 found the average age of a truck driver in Australia is 47, with more recent industry estimates putting that number closer to 50 years of age, with just 15 per cent of drivers estimated to be below the age of 30. If not addressed, looming workforce shortages will lead to higher costs in the freight transport sector – and these will ultimately be reflected in higher prices paid for goods by consumers and businesses. By extension, this means the industry needs to attract younger workers to its ranks. But it is a mistake to think this will simply happen of its own accord. Some industry participants have noted that driving heavy vehicles is not seen as an attractive career choice, particularly for school leavers. There is ample research available which indicates the millennial generation of workers is more mobile and more likely to change jobs and industries than any of their forebears. A 2016 survey undertaken by Gallup noted that 21 per cent of millennials had left their job to do something else within the preceding 12 months – a figure three times higher than that for non-millennials. More strikingly, the same research reported that six in ten millennials say they are open to new job opportunities outside their current organisation – again, far higher than

figures reported for other cohorts. On the face of it, this should be positive news for the heavy vehicle sector. However, the fact that younger workers are willing to take a look at other industries will only be of benefit if they like what they see. The unfortunate reality is that the heavy vehicle sector suffers from a continuing perception problem around its ability to welcome female participants to its workforce, as well as those from diverse cultural backgrounds. This is a considerable barrier to the attraction and retention of younger workers, who make their career choices (at least in part) on an organisation’s commitment to gender equity and diversity. As well as dealing with diversity issues, the sector’s workforce must also address the fact that the increasing influence of technology in the operation of heavy vehicles will demand a broader range of skills than may have previously been applicable in the industry. Although these efforts must be industry-led, there is certainly scope for governments to play a greater role in making certain the transport sector’s workforce is prepared for a changing world. Many industry participants continue to note that the transport sector has not received appropriate levels of attention when it comes to skills and training support, especially in comparison to the hospitality, retail and human services sectors. As part of the National Freight and Supply Chain Strategy, the Commonwealth Government has undertaken to develop a new Transport Sector Skills Strategy, in

partnership with industry. In its pre-Budget submission to the Federal Government, ALC has emphasised that the development of this Strategy must take particular account of workforce shortages being experienced by the heavy vehicle sector, and that the Federal Government must prioritise an increase in training opportunities available to those wishing to enter its workforce. This includes supporting education and awareness campaigns that combat stereotypes about the nature of the industry, and which prioritise the recruitment of new workforce participants from diverse backgrounds. ALC has also called on the Federal Government to place a greater emphasis on the importance of enhanced mental health outcomes amongst industry participants. Industry led programs such as *Healthy Heads in Trucks and Sheds* (the development of which is being led by Woolworths) exemplify a proactive approach in this area. ALC has recommended that governments should provide greater levels of recognition and support to such industry-led initiatives where they exist. Attracting a younger more diverse workforce for our heavy vehicle sector going forward will require a different approach to engaging potential recruits. ALC is committed to playing its part by combating stereotypes about the industry and highlighting the impact technology and innovation are having and aligning these with the skills and ambitions of new workforce participants. Kirk Coningham
CEO, ALC

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TONY MCMULLAN

Clearing the air

was one of the first regions in the world to introduce LEZs for trucks and busses, firstly in Los Angeles and then in other Californian cities. Many of these LEZs tend to work differently. Some totally ban older emission trucks from specified areas and apply heavy fines, or even vehicle deregistration, for repeat offenders, while other schemes allow more polluting vehicles access, however charge a significant entrance fee or tax, making continued long term access less attractive to operators of old polluting vehicles. The common themes and outcomes that all LEZs have are, newer vehicles accessing these areas, less pollution and better health outcomes for residents, workers and passers-by in these districts. The Truck Industry Council (TIC) has been a long-time advocate for reducing the age of our Australian truck fleet, pointing out to State and Federal government here the negative impacts that an old truck fleet has on road safety outcomes, road freight productivity, the environment and in particular the adverse health impacts for all Australians. Hence TIC was pleased to hear that a road access curfew proposed jointly by the Victorian Transport Association (VTA) and the Maribyrnong Truck Action Group (MTAG) was going to be introduced in Victoria. In July 2019, the Andrews government in conjunction with VicRoads, the VTA, MTAG and the Maribyrnong City Council, announced plans for the Smart Freight Partnership – Inner West. The government release included, “An Australian-first package of cleaner freight and road safety actions”, part of which includes an “Environment Freight Zone established in Melbourne’s inner west”. The initiative, while introducing new curfews for certain trucks, encourages the

uptake of cleaner vehicles to deliver safer conditions for drivers and residents as a way of counteracting those restrictions. Principally the incentives were to be increased road access times for newer, cleaner, safer trucks. Trucks manufactured on or after January 1, 2010 that meet stricter emission control standards (Australian Design Rule 80/03 or Euro V and equivalents) would have three hours more access on weekdays than pre-2010 trucks and two hours more time on Saturdays. “The curfew changes were aimed to strike a balance for the local community and transport operators by addressing concerns about safety, noise and air quality, while keeping freight moving effectively”, the Victorian government said at the time. Pre-Christmas 2019, the parties to the agreement were informed by the Victorian State Government that it would not go ahead with the Smart Freight Initiative. Details of why the plan has been scrapped appear sketchy at best, however VTA chief executive Peter Anderson, has pointed the blame at Victorian public servants. “To me the biggest stumbling block isn’t the government ... it’s the ability to be able to be supported by the bureaucracy. They’re the ones stopping this, it’s not the Ministers,” he said. This is an extremely disappointing outcome. An opportunity to improve road freight vehicle safety and environmental outcomes in a community crying out for assistance has been scuttled, seemingly by the inability of the bureaucracy to deliver on the wishes of their masters, elected Ministers. If this proves to be the case, a worrying precedent has been set.

Tony McMullan
CEO, Truck Industry Council



PETER ANDERSON

Encouraging signs for landside port operators

Cost pressures have dominated conversations for landside freight operators servicing the Port of Melbourne and elsewhere over the past two years, as they grapple with managing the consequences of higher business costs that have impacted supply chains everywhere. This comes in the face of soaring demand pressures for all operators due to population growth, lower inflationary pressures on consumer goods, and the proliferation of online shopping. Managing increased demand was the theme of our just-held State Conference at Silverwater Resort, and was the subject of robust discussions amongst operators and other industry stakeholders. The VTA has been steadfast with its advice to operators that higher costs must be passed through the supply to avoid threats to jobs, future investment and the viability of the business. Ultimately it is the end consumer that must pay for procuring goods and services. So, it is with relief and optimism that we welcome two key initiatives that point to signs of relief for landside port operators. Firstly, a plan announced by Victorian Freight and Ports Minister Melissa Horne for a \$125 million investment to build on-dock rail at the Port of Melbourne is welcome news for landside operators. The plan is intended to make rail transport more competitive, reduce the cost of the port supply chain, and reduce truck congestion at the entrance to the port.

When the Victorian Government leased the Port of Melbourne in 2016 there was hope and scepticism from the transport industry, as a new vision, culture and resource was introduced by the new Lonsdale consortium owners. There was optimism that productivity gains would secure Melbourne as the freight capital of Australia, spurred on by promises from the government that ongoing development of the port would enhance its reputation as the leading port in Australia. So, announcements like those from Minister Horne for significant investments in new infrastructure like on-dock rail is welcome news for an industry desperate for productivity gains to offset higher trading and business costs. While improving rail access to the Port of Melbourne was a legislated condition of its lease, its delivery will help to improve rail freight across Victoria. We are also pleased the Andrews Labor Government is supporting the Port Rail Shuttle Network connecting freight hubs in Melbourne’s north and west to the port, new intermodal terminals planned at Truganina and Beveridge, new automated signalling for faster rail freight to GeelongPort and improvements in the regional rail freight network. Secondly, a draft of a Deloitte Port Pricing and Access Review Summary commissioned by the Victorian Government after petitioning by the VTA has confirmed costs for the transport sector are rising and having a flow-on effect throughout the state’s economy. The report reinforces the view long advocated by the VTA that action must be taken to ensure productivity

improvements are realised at the Port of Melbourne and to secure the Port’s position as Australia’s largest. It also recommended there is no compelling case for economic regulation of stevedore charges at the Port of Melbourne at this time. The Government has indicated it will hold off making formal decisions about the report’s recommendations until later in the year and after the ACCC releases its Annual Container Stevedore Monitoring Report. The year ahead will deliver important outcomes that we hope will further ease cost exposures for landside operators and which are out of their control. We anxiously await the ACCC review of Part X of the Competition and Consumer Act 2010, along with the Victorian Government’s response, which must deliver greater pricing transparency and efficiencies for operators at the port. The VTA Landside Improvement Strategy addresses issues confronting operators at the port with commonsense recommendations and solutions. While it is being considered by the Government it delivers on ensuring that the Port of Melbourne grows in its productivity and efficiency, and that the wharf carrier sector is not taken advantage of in the future. We look forward to working in close partnership with the Government and other key stakeholders to ensure these projects deliver maximum return for the road, rail and sea freight operators that use them, and in turn the people of Victoria.

Peter Anderson
CEO, VTA