

KENWORTH

SPECIAL TRAILER FEATURE

DOWN UNDER

EASYSYSTEMER EVOLUTION



**Less Drag • Big Fuel Economy Gains • Increased Payload
Enhanced Vehicle Handling • Improved Load Sharing
Reduced Tyre Wear • Reduced Pavement Damage**

Evolution of **EASYSSTEER**

Impressive fuel economy with reduced tyre wear and increased payload from Elphinstone's revolutionary EasySteer trailer are impressing customers so much that order takeup for new trailers exceeds initial forecasts. But there is much more to this story, a helluva lot more!

Words and Photography by Howard Shanks



It is always interesting catching up with Elphinstone Engineering founder Graeme Elphinstone.

Over a cup of coffee at the Brisbane Truck Show, he shared an enlightening story about his latest EasySteer trailer.

For the time being, at least, Graeme Elphinstone has a content smile because his revolutionary new trailer suspension design he calls EasySteer, is performing better than anticipated. But the long journey of getting EasySteer on the road has been fraught with regulation red tape.

What is EasySteer?

"The EasySteer concept evolved from R&D work we were conducting with logging and pole trailers," Graeme began. "Initially, we were investigating ways to increase the manoeuvrability of our trailers, all the while minimising the ground impact of the trailer and at the same time achieving maximum payload."

"Many of our logging customers haul timber from private tree plantations, and the land owners don't want trucks and trailers gouging furrows on their land during the transportation process," Graeme explained. And, we are seeing a similar trend with our power pole customers. More and more, there is an emphasis on minimising the environmental footprint."

"But it's probably better to start with a little history lesson first," Graeme suggests. "That way, you'll better understand the evolution of trailer and suspension design," Graeme smiled. "Steerable and self-tracking trailers are not a new idea. In fact, the first government road train introduced in December 1930, and in later years Kurt Johannsen's Road Train both had self-tracking style trailers."

"And, for many decades, jinker pole trailer configuration has been widely used in logging transport in Australia, New Zealand, and the Canadian Pacific Northwest. The logs in this configuration transfer the towing forces from the prime mover to the trailer. In the Canadian Pacific Northwest, they use a stinger-steered pole trailer connecting to the prime mover's rear chassis. The trailer-mounted bolster is mounted on a turntable, and the pole has a telescopic section that extends as the truck corners. This allows the trailer to self-track, improving manoeuvrability through tight corners." "The EasySteer trailer takes these concepts a few steps further." Graeme continued.

"EasySteer has a single articulation point on top of the centre of the trailer ballrace turntable, extending the suspension travel range and creating more even load-sharing characteristics. Then we've connected the pole to the trailer rather than the towing vehicle, enabling EasySteer to work in numerous general transport applications, not just logging."

"Furthermore, because the trailer has a single oscillation point, we can easily fit our loadcells which deliver the industry's most accurate on-board weighing systems."

EasySteer Benefits

By connecting the steering pole to the trailer itself, the EasySteer trailer can be towed by a standard prime mover, so no additional investment is required in the prime mover.

Additionally, because the steering mechanism results in improved low-speed turning performance, the EasySteer trailer can potentially be longer than a conventional semi-trailer with more deck length and a greater load volume while achieving a better swept path than a traditional semi-trailer.





The leading axle in the EasySteer suspension steers at all speeds.



EasySteer trailers have Elphinstone Auto Air Tensioner winches with quick-release load restraint latches.



EasySteer trailers come equipped with loadcells to provide high accuracy weighing.

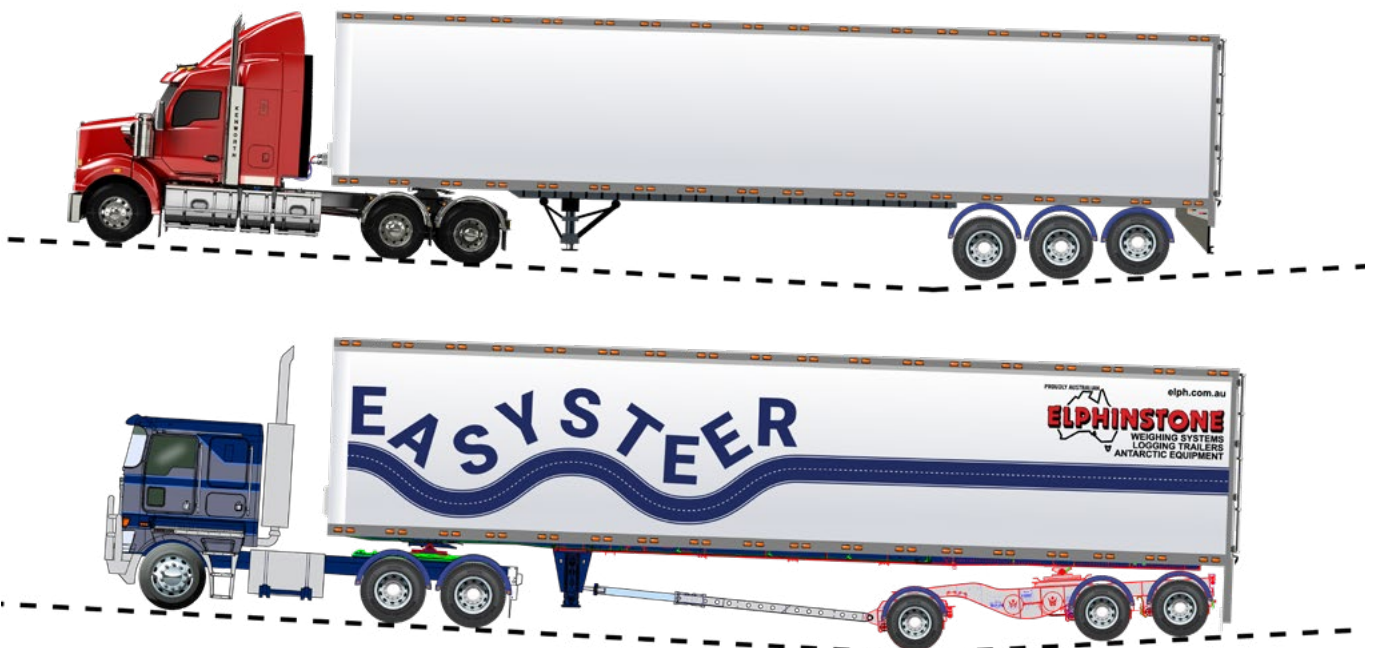
EasySteer operates seamlessly at all speeds, unlike self-steering axles that lock in a straight-ahead position once the vehicle reaches 25-30kph.

The EasySteer trailer axle configuration consists of two axle groups, similar to a 3-axle dog trailer, thereby giving the trailer axles a greater weight capacity of 25.5 tonnes compared to a conventional tridem axle group with only 20 tonnes found on a semi-trailer. Therefore, using existing legal limits, EasySteer has a potential gross combination weight limit of 48.5 tonnes compared to 42.5 tonnes for a conventional semi-trailer combination at standard mass limits.

But even more surprising is the results of a swept path comparison between an EasySteer trailer combination extended to 18.5 meters and a conventional extendable trailer extended to the same length. The low-speed swept path (LSSP) of the extended EasySteer is 8.67 meters (Level-2), while the traditional extendable requires 9.35 meters putting it in the Level-3 category.

EasySteer operates seamlessly at all speeds, unlike self-steering axles that lock in a straight-ahead position once the vehicle reaches 25-30kph.

Because of EasySteer's natural self-tracking ability, when used in a road train configuration, the LSSP improves significantly compared to a traditional Road Train. But notably, rearward amplification is reduced dramatically.



Above: This diagram demonstrates EasySteer's exceptional load-sharing characteristics compared to a conventional tri-axle suspension crossing a gutter with a 3.5-degree incline. Note the leading axle on the standard tri-axle has run out of travel and hangs in the air carrying no load. The middle axle only carries a small proportion of the load, while the trailing axle now carries most of the load. On the other hand, all axles on the EasySteer suspension have an equal load.

Right: Graeme Elphinstone holds one of the loadcells manufactured at his Triabunna headquarters. Elphinstone Loadcells deliver an accuracy of 0.5 of the payload when calibrated correctly.

“So, you can quickly see there are significant benefits for operators with EasySteer,” Graeme said. “With increased payload, fuel economy gains from the reduced drag of the trailer and reduction in tyre wear.”

Improved Load Share

“But one consideration often overlooked when putting forth new PBS concepts is reducing the vehicle’s impact on the road. Because EasySteer has a central pivot point, the trailer’s load is transferred through the pivot point and shared equally across all axles in the EasySteer group,” Graeme explained. “We’ve got a quad concept EasySteer version we’re working on, but more on that later.”

“You would have seen what happens when a standard semi-trailer enters a transport depot, and the trailer goes across the gutter at the entrance?” Graeme quizzed. “As each axle in the trailer group passes over the dip in the gutter, the wheels are left hanging in the air. In this case, when the front axle of the trailer is hanging in the air, the two rear axles are now carrying all the load, so if that triaxle trailer is loaded legally to 20 tonnes, then those two rear axles are carrying ten tonnes each. As the trailer continues over the gutter, the middle wheel is left hanging in the air, meaning the two outer axles now carry ten tonnes each, so it continues.”

“But EasySteer behaves differently thanks to the centre-mounted pivot point,” Graeme smiles. “When an EasySteer trailer crosses the same gutter, the front wheels follow the contour of the pavement because the centre pivot provides additional freedom for the suspension to operate and follow the road profile. Importantly, though, the pressure in the airbags remains the same across the group meaning that the 25.5 tonnes are shared equally over all three axles. Furthermore, the extra distance between the leading axle and the middle axles means that when the middle axle arrives at the centre of the dip, it is still on the ground thanks to the centre pivot as the suspension group continues to follow the contour of the pavement out of the gutter.”

“When logging in Tasmania all but ceased over a decade or so back, we explored every avenue to keep our employees working and our doors open. At a time, many businesses that relied solely on forestry work were forced to close, but the EasySteer project boosted morale in our factory. Right from the start, we designed EasySteer to work in various transport applications.

By the time we had the first EasySteer prototype operational, we had over forty years of experience building logging equipment that lasts in rough going”

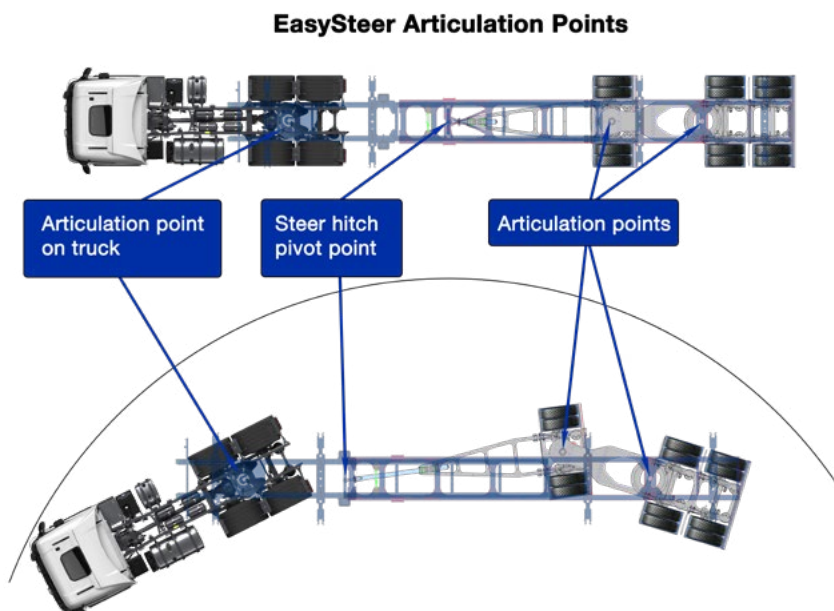


Graeme continued. “It’s common for our trailers out last two or three prime movers and cover distances of over eight million kilometres. So we have a good understanding of how to build equipment to last in harsh conditions. Consequently, we designed EasySteer to work in logging applications, Graeme emphasised. This ensured that EasySteer would withstand operating in harsh environments and provide plenty of scope for EasySteer in ‘ON-Highway’ applications.

There’s a pause in the conversation. Graeme is silent for a few moments, then leans forward.

“Road owners are also looking for better solutions to reduce the wear and tear on their roads and minimise maintenance costs,” Graeme said with conviction.

Some road owners even question the damage caused by overloaded axles to their roads. We demonstrated a fully





loaded EasySteer log trailer at AusTimber a few years back. Look at the photos of where we'd been turning around on soft sandy ground over four days. You can barely see where we've been. They brought a B-Double in to turn around after we'd left, and it looked like someone had ploughed the ground after only one turn."

Rough and Rocky Road.

But let's rewind the clock a decade or so to better understand the challenges and hurdles Graeme and his team worked through on the rough and rocky road to get the EasySteer trailer approval.



In 2007 after several years of research and development, Australian road transport was introduced to the Performance Based Standards (PBS) system for regulating vehicle size and weight as an optional alternative to the then-current prescriptive regime. One of the fundamental ideologies of the PBS approach is that the PBS system defines what the vehicle should be able to do rather than what it should look like. The upshot of this principle is that the PBS system was expected to facilitate innovation in vehicle design.

In practice, the PBS system has yet to be used extensively for developing innovative vehicles. Instead, the largest number of vehicles approved under the scheme have been conventional truck and dog trailer combinations operating at increased gross combination weights.

Graeme first displayed an EasySteer trailer at the Melbourne

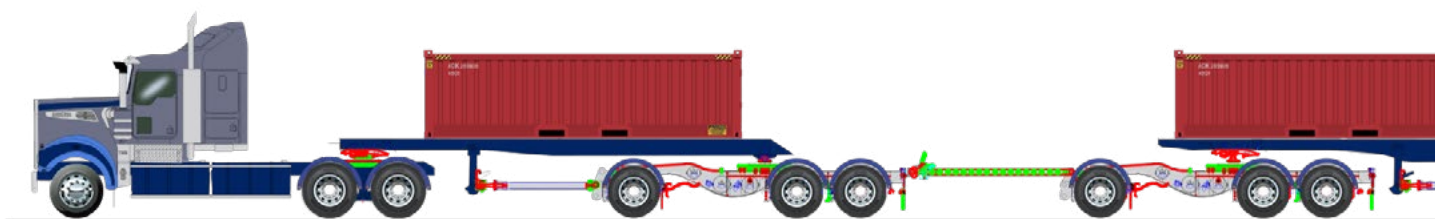


Top Left: A loaded EasySteer trailer demonstrates its low-impact footprint during turning operations in soft sandy terrain at the AusTimber Expo.

Above Left: The fully loaded EasySteer barely leaves any imprint on the soft ground.

Left: The advantages of EasySteer's self-tracking action is evident here on this soft sandy ground.

Below: Big payload gains, improved vehicle handling and fuel economy savings are achievable when EasySteer trailers are coupled together in Multi-Combination Road Train configurations.



6500	17000	9000	17000	9000	17000
Gross (With Mass Management)					
6500	16500	9000	16500	9000	16500
Gross (Standard Mass)					

“Road owners are also looking for better solutions to reduce the wear and tear on their roads and minimise maintenance costs.”

Truck Show in 2012 and demonstrated it at AusTimber later that year. Sadly, the NHVR rejected EasySteer’s PBS application because the panel then deemed it a belly axle trailer; consequently, it did not meet the definition of a semi-trailer. However, after much persistence, EasySteer finally received Development Approval (DA) in mid-2015 after a letter from past PBS Manager Rob Di Cristoforo in May 2014 explaining the former panel had made a mistake.

Yet, today it’s commonplace to see belly axle trailers running up and down the highways.

Road Test

“If you’re interested and can spare a day, I’ll make some calls, and you can go for a trip with an EasySteer trailer,” Graeme offered. Needless to say, I was.

A few moments later, Graeme informed me that I could meet up with the EasySteer driver at the Apple Tree Creek Roadhouse the following Monday morning.

Driver Shane Palmer pulled into the roadhouse a few minutes early. We passed pleasantries before Shane suggested we get rolling. Shane is a veteran truck driver on the Bruce Highway, familiar with nearly every pothole along the route between Brisbane and Cairns. And when it comes to specialised loads, his talents are highly sort after.

“Every year, I bring a couple of loads of live crocodiles from the NT back to a farm here in Queensland,” Shane smiled. “They’re about one meter long and understandably require careful treatment.”

The new EasySteer had just commenced its third-week hauling poles from Maryborough, 1500 kilometres north, to Cairns. So far, Shane has nothing but praise for the EasySteer trailer, citing

a significant improvement in vehicle ride quality and handling. “But the most significant difference I’ve noticed is at the fuel bowser compared to the older standard trailer I’d had previously, Shane said. “Towing the EasySteer trailer, I’m saving a considerable amount of fuel, easily between \$100 - \$120 per trip.

In the log yard, the EasySteer left no discernible footprints of its presence in the dirt. Furthermore, when pulling around a sharp left-hand rise onto the weighbridge, the EasySteer trailer rolled effortlessly on without any requirement for additional power. On the other hand, the drag of a standard triaxle trailer requires additional throttle input to pull the trailer around and onto the weighbridge.

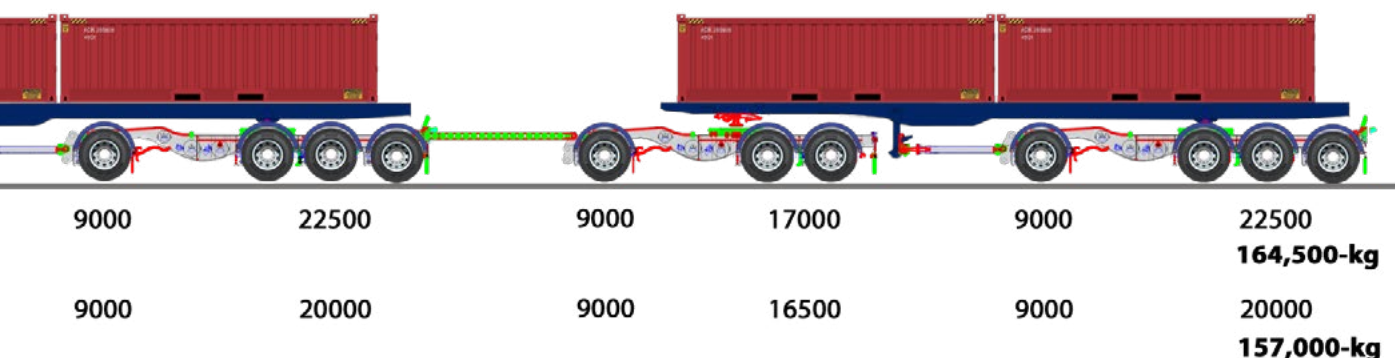
The Bruce Highway is in terrible shape. And undergoing countless road works sections. Shane said the massive volume of road works adds at least two hours to his trip. “Some days, it can extend to three hours depending on how many delays I encounter,” Shane said.

Nevertheless, the road’s poor condition provided an ideal opportunity to experience the superior handling characteristics of the EasySteer trailer. The unique design of the EasySteer sliding pole system enables the trailer to continue its steering function at high speed. As a result, when the prime mover turned, so too did the EasySteer trailer, and it followed almost the same path as the prime mover. Wherever you poked the prime mover’s nose, the trailer faithfully followed.

“Look, I’m so impressed with this trailer that I told the boss if he takes it off me, I’m going to find a new job,” Shane volunteered. “It’s by far the best trailer I’ve ever towed. It’s indeed in a league of its own.”

The Future

EasySteer has a big future in many applications and is especially beneficial to bulk haulage tasks with high product density. Graeme is licencing his patented EasySteer to other trailer manufacturers to enable a diverse range of applications to enjoy the benefits of EasySteer.



Customer Testimonial

Leading North Queensland transport and logistics company Law Transport, renowned for delivering innovative freight solutions to their customers, recently took delivery of the first EasySteer with Expanda-Skel deck trailer for their pole transport operation.

When Lance Law started Innisfail Carrying Company with a single truck almost three decades ago, he had a clear vision of the services he'd deliver to his customers, and he wasn't afraid to embrace new technologies and innovate. "We've transported power poles right from the start," Lance recalled.

"My involvement in the EasySteer evolution story commenced while touring around Tasmania with a friend," Lance revealed. "While travelling through a forest with some particularly tall trees, I happened to mention to him that we were tendering for a new pole carting contract. I'd been contemplating how a logging-style trailer might put me a step ahead of my competitors. My friend suggested I try an Elphinstone trailer as they are very popular with loggers in Tasmania."

"Consequently, I called Graeme the following day and arranged a meeting," Lance said. "I spent a good couple of hours with Graeme. He listened to our requirements before showing me his EasySteer concept."

"Honestly, I was wrapped on the spot! Over the next few months, Graeme and I had regular phone meetings to fine-tune all the details and measurements. Graeme, painstakingly devoted much time to assisting us in getting the PBS approval we needed to operate the trailer. He even arranged a demonstration day in Brisbane for the NHVR and road owners with our new EasySteer to highlight its manoeuvrability in confined spaces. Also, Graeme highlighted EasySteer's superior load-sharing capability compared to a standard tri-axle suspension. It was indeed an eye-opening experience for the attendees," Lance added.



We are proud we were there at the start and to be part of the EasySteer Evolution story; because innovation has always been a big part of our business philosophy. Lance said. "It is what puts us in front of our competitors. Our customers' long-standing loyalty is evidence delivering innovative transport solutions doesn't go unnoticed."

"Right from day one, the EasySteer trailer demonstrated superior ride and handling characteristics," Lance revealed. "Our main driver, Shane, loves the thing. One of our other senior drivers, Ken, also remarked how well the truck handles with the new EasySteer trailer."

"We're saving fuel and carrying more payload," Lance added.

"EasySteer trailers will play a bigger part in our business in the future," Lance concluded. "In fact, I'm in the process of ordering more now."



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