CLEANER, SAFER, MORE EFFICIENT

Why heavier and longer trucks are needed on New Zealand roads

The forest industry welcomes the government's proposed changes to the Land Transport Rule that sets size limits for heavy vehicles operating on the nation's roads. Apart from a system of special permits introduced in 2001 that allows some log trucks to carry 22 metre loads, this will provide for the first change in maximum vehicle weights and lengths in 20 years.

The changes, which will bring New Zealand into line with other countries, will mean fewer trucks on the roads than would otherwise be the case. There will be a big reduction in fuel use and greenhouse gas emissions. Our export industries will be more profitable, the country will be better able to meet its Kyoto obligations, and less overseas exchange will be spent on fuel imports or buying carbon credits from overseas.

FOREST OWNERS ASSOCIATION

From here to there

At present, a laden heavy vehicle that does not have a special permit must not weigh more than 44 tonnes nor exceed 20 metres in length. Under proposed new rules the maximum weights of laden vehicles with special permits will be increased on suitable highways and district roads linking forests, mills, processing plants, ports, railheads and customers.

Most of the 2000 trucks in New Zealand's log and forest product transport fleet are modern vehicles with engines, brakes, steering and suspension systems designed for the much heavier maximum loads that are permitted in Europe, Australia and elsewhere. These vehicles will require little or no adaptation in order to capture very real economic, environmental and safety benefits. Depending on their precise specification, most of these trucks are suitable for carrying maximum loads in the range of 53-63 tonnes.

Under the proposed changes, if vehicles exceed 44 t and 22 m they will need a special permit. In addition, vehicles weighing more than 53 t will need approval from the NZ Transport Agency (NZTA). This means older, underpowered and low-specification vehicles will not be involved.

Heavier and longer vehicles will also be restricted to travel on designated routes. The NZTA is responsible for granting approvals for routes involving state highways. District Councils, through Road Controlling Authorities, have a big say in the approval of routes involving district roads - an important safeguard, as it will enable them to channel heavy traffic in a way that best suits local communities.

Most of the trucks in the NZ log and forest product transport fleet have engines, brakes, steering and suspension systems designed for the much heavier maximum loads permitted overseas

The NZ Forest Owners Association (NZFOA) has made a major contribution to the research and other initiatives that have led to a marked improvement in log truck safety in recent years. It has also funded research that has raised awareness among decision makers as to the potential gains that could be achieved by improving the weight and dimension limits for the country's heavy vehicles.

The Association is seeking some amendments to the proposed rules to ensure that the benefits for the industry and for the New Zealand economy and environment are maximised.

A shot in the arm for forestry

In early 2007, the NZFOA prepared a report for the forest industry which identified major benefits from allowing longer and heavier trucks on selected parts of the national roading network.

If these increases were applied to 40% of the forest industry road transport task, it was estimated there would be a 20% improvement in productivity and a 9% improvement in fuel efficiency. Based on a constant rate of harvest, fuel consumption would fall by 9 million litres and carbon emissions by 20,000 t a year.

The 20% improvement in productivity means 20% fewer trucks would be needed to carry the same amount of freight. For the residents of Rotorua and Nelson respectively that would mean 8000 and 6000 fewer forestry vehicle movements through their cities each year.

Although 60% of NZ logs are processed in New Zealand, the easiest way to explain the economic significance of the proposed changes is to compare the cost of transport to the value of an export log.

A typical export log is worth $95 a tonne delivered to the port. The cost of that delivery, on an average 125 km journey from the forest, is more than $20 a tonne, or about 25% of the value of the log itself.

From the remaining 75% the forest grower must pay for all the costs associated with owning the land on which the forest is grown, as well as planting, pruning, protecting and harvesting the forest over its life cycle - typically 30 years for radiata pine. A saving of 10-20% (approx $2 - $4 a tonne) on road transport is therefore of great importance to the viability of the industry.

The proposed increase in vehicle weights will also greatly assist wood processors and other export manufacturers transporting large shipping containers to ports or railheads. Because these containers exceed current vehicle weight limits when fully loaded, part-loads are now freighted to the port or railhead for consolidation.

An increase in the weight limits for such vehicles will help reduce road congestion, operating costs and vehicle emissions.

What's happening overseas?

All else being equal, the legal limits on the maximum weight and length of a laden vehicle are the biggest factors in determining the economic and environmental efficiency of road transport. They also have a big influence on safety performance.

The EU, Sweden and Australia all allow longer and heavier trucks on their roads. The typical weight limits for trucks similar to those used for heavy transport in New Zealand are 55 t versus 44 t here. The increase in vehicle mass proposed by the government brings New Zealand in line with those countries.

In Australia, the biggest offshore market that the New Zealand industry competes in, road freight is significantly less costly than it is here. This is partly due to lower tax rates and longer journeys in Australia, but the main reason is the lower weight and dimension limits in New Zealand. A study released by the Road Transport Forum in 2008[1] showed that for individual vehicles, New Zealand costs are:

Loading a log truck in a German forest
Typical weight limits in the EU are 55 t versus 44 t here

- **Single articulated:** 15% higher than Victoria and 9% higher than Tasmania, when taxes and charges are excluded.
- **Truck and trailer:** 28% higher than Victoria and 24% higher than Tasmania when taxes and charges are excluded.
- **B-trains:** 48% higher than Victoria and 46% higher than Tasmania, when taxes and charges are excluded.

NZ freight rates were compared with Victoria (because of its similar size) and Tasmania (similar topography). On average, after excluding taxes and charges, the cost per tonne kilometre over 100,000 kilometres for the vehicle types trialled was 29% higher in New Zealand than Victoria and 25% higher than Tasmania.

How do heavier loads reduce emissions?

Assuming an unladen (tare) weight of 16 t for the vehicle, the weight of the load carried on a 44 t vehicle is 28 t and on a 53 t vehicle 37 t – about 32% more.

Because the weight of the truck itself is a smaller proportion of laden vehicle weight and air resistance (which is a function of vehicle profile and speed) is unaffected by either length or weight, a vehicle with a heavier load will use less fuel and generate fewer emissions per tonne of freight than the same vehicle with a smaller load.

The reality: a growing tonnage on our roads

New Zealand's total estimated freight movement in 2006/07 was 230 million tonnes.

Apart from general freight, the movement of forest products (logs, wood and paper products and by-products) was the largest road freight category, with a total volume of approximately 31 million t (nearly 4 billion tonne-km).

Forest product exports for the five years to June 2008 averaged NZ$3 billion and made up 10% of New Zealand's merchandise trade[2]. The total harvest for the June 2008 year was just over 19 million m^3 (approx 19 million t).

In the next five years, as new forests come on-stream in regions such as Northland, East Coast and Otago/Southland, harvests are likely to increase by 58% to around 30 million m^3 a year. In the next 20 years[3] the forest industry freight task (total tonnage multiplied by total distance) is expected to double.

Other industries will be generating much more freight too. The Ministry of Transport expects the total land freight task will increase by 70-75% by 2031 and most of this will be carried by road. Meanwhile, New Zealand is committed by 2020 to reducing its greenhouse gas emissions (a quarter of which are generated by transport) by about 25% below current levels.

These factors, as well as the need to reduce road congestion, make it essential for New Zealand to capture the benefits of increased heavy vehicle weights and lengths as soon as possible.

[1] Review of Road Freight Costs in New Zealand and Comparable Australian States, Pearson Transport Resource Centre, October 2008
[2] MAF Statistical Release - Exports of Forestry Products
[3] National Freight Demand Study, Ministry of Transport, 2008

FOREST OWNERS ASSOCIATION

No compromise on safety

The safety of log trucks, particularly roll-overs on public roads, has been an issue in the past. However, the forest industry has dealt to this problem. Thanks to its initiatives, there has been a 70% reduction in log truck rollover crashes (per million km) in the last eight years.

One of the most important of these initiatives was getting the government to allow special permits for longer and lower loads on qualifying 22 m truck and trailer units from 2004. These 20 m vehicles, which are allowed a 2 m load overhang, carry two or more 'bunks' of short logs and have a much lower centre of gravity than conventional log trucks.

After five years, the forest industry is well experienced in the operation of these longer vehicles. In addition to their excellent safety record, their extra length has attracted virtually no negative comment from other road users.

The big log truck safety improvements began with the setting up in 1996 of the Log Transport Safety Council (LTSC) by forest owners, the log transport industry and government agencies with an interest in improved road safety.

In the last five years, the annual log truck rollover incident rate has been 0.25 – 0.3 per million km travelled and of these rollovers, few have involved 22 m units. The log truck rollover rate is now similar to the rest of the country's heavy vehicle fleet, even though log trucks generally operate in more difficult conditions than other heavy trucks.

The forest industry is determined that none of its safety gains will be compromised in the move to increased weights. Research shows that loads on 22 m truck and trailer units can be increased to 53 t, while still ensuring excellent vehicle stability and a centre of gravity below the industry target.

For most heavy vehicles used in New Zealand, higher weight limits will not make any difference to safety performance, because they have braking and steering systems designed for the much heavier weight limits allowed in most overseas countries. The 8-axle log, timber and chip truck & trailer units used in New Zealand are typically rated for gross weights of 58 – 62 t.

Where the proposed rules allow for trucks to be longer – in order to carry additional load units on the trailer, such as multiple packets of pulp, panels, or 6 m logs – their loads will generally be lower, despite an increase in weight. This will result in a lower centre of gravity, greater stability on the road and therefore improved safety.

Forest industry operators and the LTSC believe there are further driver and fleet management initiatives that could accompany increased weights and dimensions and are keen to progress these in step with the wider road transport industry.

Will anyone notice the difference?

44-tonne, single-bunk trailer – *Existing maximum 22-metre rig load*

53-tonne, double-bunk trailer – *Proposed typical 22-metre rig load*
Note the lower trailer load height, resulting in a lower centre of gravity, greater stability on the road and therefore improved safety

Other log transport safety initiatives

As part of its commitment to improved safety in the forest and on the road the forest industry engages in many initiatives. Those designed to improve log truck safety include ...

- The Log Transport Safety Accord: Originally signed in 2001 and updated in 2008, the Accord commits everyone involved in the transport of logs to high standards of safety
- LTSC research and development projects: Surveys of vehicle speeds on corners, collection and analysis of rollover statistics, and improved driver training
- The IRIS (Incident Recording Information System) incident reporting database: All injury-causing accidents in the forest industry including those involving log trucks are recorded, analysed and used to inform improved practice. This database is now receiving interest from Australia
- Improved truck lighting
- The 0800 LOG TRUCK free phone service for motorists to report positive and negative driver behaviour.

The LTSC's 2008-2012 strategy includes a review of many aspects of the Log Transport Code of Practice, including best practice standards for loading and unloading, load security and maintenance management. The "Log Load Securing Requirements" section of the code has been issued by Land Transport NZ as a Code of Practice, replacing the relevant part of the NZ Truck Loading Code.

A generic hazard register is being developed. This will identify all likely hazards associated with log loading, unloading and transport, along with advice on prevention. Forest owners and log truck operators will then tailor the advice to suit their own workplaces.

The LTSC also has a driver health and wellness programme underway called Fit for the Road.

Overtaking longer vehicles

The average motorist will not notice a 2 m increase in maximum heavy vehicle lengths. Nor will it add significantly to the risks involved in overtaking such vehicles on the open road.

As at present, drivers of other vehicles must have sufficient clear road ahead of them to carry out a manoeuvre that may involve them driving for up to 30 seconds on the opposite side of the road. On many roads, the safest option is to wait for a passing bay.

It is also important to remember that the proposed new weight and length limits mean there will be fewer heavy vehicles on the roads than would otherwise be the case.

High productivity specialist vehicles

Most of the forest industry's major processing plants are situated on or near high quality state highways that serve export ports and railheads. These highways are suitable for high productivity truck and trailer units.

In Ministry of Transport co-ordinated trials of heavier vehicles during 2008 and early 2009, a limited number of B-trains with laden weights of more than 60 t were trialled. One of these was a 25 m B-train transporting wood pulp and sawn timber between the Pan Pac mill at Whirinaki and the Port of Napier.

This vehicle produced what one industry observer has described as "stunning" results – productivity increases of 67% and fuel savings of 22%. If such vehicles were used to freight the 1 million or so tonnes of processed wood products, pulp and paper trucked from Pan Pac mill to the port each year, there would be 13,000 (67%) fewer journeys than at present. Greenhouse gas emissions between the mill and the port would fall by 22%.

Despite being 5 m longer than normal trucks, neither the company nor the Ministry of Transport received any complaints or expressions of concern from other road users about the truck's operations. Indeed, it appears no-one noticed anything.

B-Trains are best suited to loads with high mass such as wood-based panels, baled pulp, paper and green sawn timber. This enables much heavier loads than normal to be transported without lifting the centre of gravity to the point where it affects the vehicle's stability.

The government and forest industry agree that these types of vehicles are likely to be used on only a relatively few routes servicing export ports and railheads. Examples include Whirinaki to the Port of Napier (above) and from Nelson Pine Industries, Richmond, to Port Nelson.

This 25 m B-train (also depicted on the cover) took part in Ministry of Transport trials, producing "stunning" results

Despite being 5 m longer than normal trucks, there were no complaints from other road users – indeed, it appears no-one noticed anything

Fine-tuning the proposed rules

The forest industry has made submissions to the Minister of Transport asking that the proposed new rules governing vehicle weights and length be fine-tuned.

- **Increasing maximum lengths to 24 metres**

  If the maximum allowable length of log trucks is increased from 22 m to 24 m, there will be big additional gains for the forest industry, the economy and the environment.

  In 2004 the forest industry established the case for some log truck and trailer units to be as long as 22 m - 2 m more than the normal maximum. Because these vehicles were lower, they helped reduce the number of roll-overs. Because they were longer, they enabled the industry to truck multiple bunks of 4-metre (3.7 m to 5 m) logs much more efficiently.

  However, a significant part of the domestic and export log transport task is made up of logs around 6 m long. These are preferred by domestic mills and by some major export log markets, especially China. At present, as well as under the proposed new rules, these logs can only be carried in single packet loads.

  The obvious solution to this is to increase the allowable length of these vehicles (including their loads) to 24 m, compared with the 25 m maximum permitted on public roads in Europe. This would enable 6.1 m packets on the trailer to be double-bunked. The same vehicles would also be able to carry 3.9 m logs in triple-bunks on the trailer and double-bunks on the truck.

  The effect of this would be that for the most common log lengths, the vehicle could carry 53 t, but would be lower, more stable and therefore safer than existing 44 t combinations carrying logs of the same size.

  Increasing the overall permitted vehicle length to 24 m would also require some technical changes to the rules, including the length of the front overhang on the trailer, which would have no effect on vehicle stability.

- **Under-run protection**

  The new rules propose that there should be guards fitted to the back of log trailers to reduce the risk of injury to following motorists in the event of a rear-end collision. This is unnecessary - rear end collisions with log trucks are fortunately very rare.

  Also, because logging trailers are normally manoeuvred and loaded off-road on very uneven ground, under-run protection is prone to snagging and damage. For these and other reasons, Europe, Australia and many other countries do not require under-run structures on log trucks.

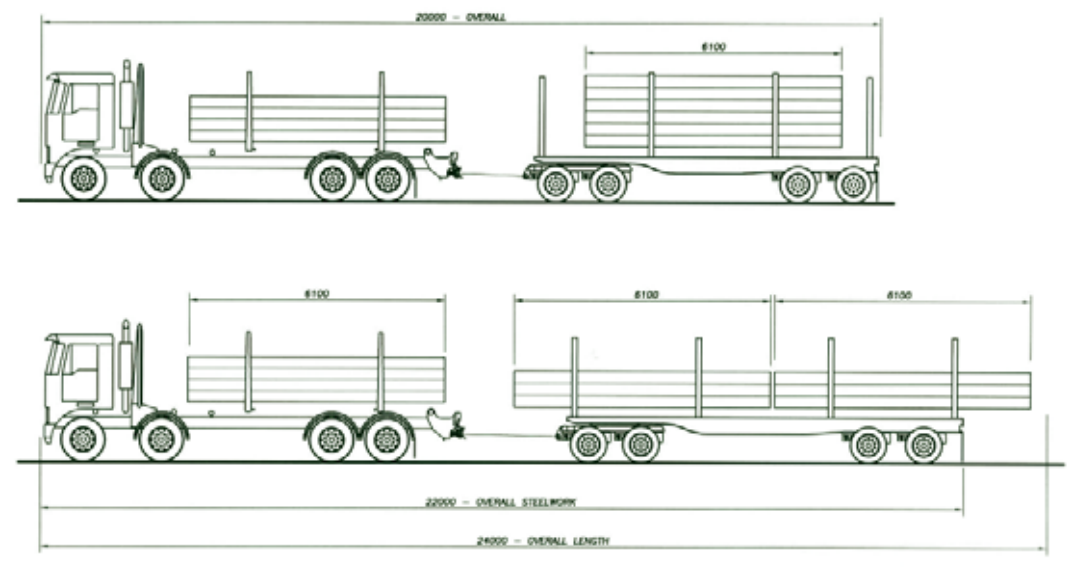
- **Funding and approvals**

  The NZFOA has asked the government to develop a system that ensures that local bodies receive a share of the extra road user charges generated by heavier vehicles operating in their district. This will ensure they are properly funded for bridge upgrades and any increases in road wear and tear.

  In addition, because of the complexities involved in getting route approvals from multiple agencies, forest owners believe the government should give the NZTA the authority for co-ordinating and granting approvals for the use of heavier vehicles on selected routes. The precise routes through built-up areas would still be determined by local roading authorities, rather than just simply being the shortest distance of travel. This would give them greater say over heavy vehicle movements through their communities than they have at present.

For more detail, see: Roading costs - who should pay?

Longer, lower, more stable, safer



Forest owners want the proposed new rules to provide for log trucks up to 24 m long

This schematic drawing of a 24 m rig shows how 4 extra metres of load could be used to dramatically lower the centre of gravity of the trailer, thereby greatly increasing vehicle stability and safety

What will heavier trucks mean for tunnels and bridges?

Heavier trucks will be no higher or wider than existing trucks, so they will fit through existing tunnels.

In addition, the loads on log trucks are retained within bolsters, so they are narrower than most other heavy vehicles. This means that at the front and rear of the load they have a smaller turning 'sweep' than other vehicles of the same length.

Bridges pose a significant challenge. A recent survey commissioned by the Ministry of Transport suggests that bridge capacity will restrict the use of heavier vehicles on more routes than previously understood.

In some cases, the problems are readily fixed. For example, upgrading two bridges north of Rotorua at a cost of about $525,000 would open the 150 km Taupo to Tauranga route to heavier vehicles. On other parts of the state highway network, significant investment is needed.

Where bridges and tunnels have weight and/or height restrictions these will remain in force until they are strengthened or replaced.

Benefits for all

In 2008 and early 2009, the Ministry of Transport co-ordinated nation-wide trials of longer and heavier vehicles in a range of industries. These trials showed that by allowing increased vehicle lengths and weights, transport productivity nation-wide could increase by 10-20%, there would be 16% fewer journeys than otherwise would be the case, fuel use would reduce by 20% and GDP would increase by $250-$500 million a year.

All New Zealanders will share in these benefits. Directly, through reduced road congestion and a lower transport cost component in their everyday purchases. Indirectly, as a result of the lower costs of transport for many of the country's major industries, particularly the export giants - dairy, forestry, horticulture and meat.

The greater profitability of these industries will be reflected in the economic health of rural towns, the regions and ultimately, the country as a whole.

The role of rail and coastal shipping

Rail has a 15% share of the national land freight market. The government expects this share will remain roughly constant as total freight volumes increase.

Each year about 3.5 million tonnes of logs and forest products are railed to metropolitan areas and export ports. Rail carries more than 80% of the products transported from major mills in Kinleith, Karioi and Kawerau. Inland ports at Marton and Masterton are also used to feed export products to CentrePort in Wellington using the rail network.

The forest industry is open to making greater use of the rail network where it is practicable and economic to do so. In this respect it welcomes the government's investment in new engines, rolling stock and track upgrades, as well as its wish to see the national rail network managed efficiently and competitively on a commercial basis.

Rail plays an important role

Trains haul more than 80% of the products transported from some major mills and is ideal for moving large volumes of logs to ports in tight time-frames

Barging logs in the Marborough Sounds

Barging can be economic in some circumstances, but it is not usually a viable alternative to upgrading rural roads

Although the proposed increases in heavy vehicle weights will make road transport more competitive with rail on some routes, greater fuel efficiency will continue to give rail an advantage on long distance routes – an advantage that will increase when emission charges are introduced under the ETS in June 2010. Rail is also well suited to shifting very large volumes of freight in a short time frame as is required when loading export log shipments.

Coastal barging is used to transport logs from forests in the Marlborough Sounds and from offshore islands such as Great Barrier. It has also been used to move logs from Northland to Mt Maunganui, enroute to Kawerau.

Barging from remote areas, as an alternative to the upgrading and heavier use of country roads has been investigated several times, but in most cases it is not economically or environmentally viable.

Roading costs - who should pay?

All New Zealanders will benefit directly or indirectly from allowing heavier trucks on our roads. Nevertheless, it is important that local ratepayers are not required to fund any resulting increase in road wear and tear.

Road wear and tear depends on many factors but government policy is that pavement wear increases by the 'fourth power' of axle weight. This means that if an axle weighs twice as much it will generate $2^4 = 16$ times as much pavement wear. In other words, one pass of this heavier axle is deemed to be equivalent to 16 passes of the lighter axle.

The fourth power rule was originally based on research in the United States that has since been shown to greatly overstate the relationship between axle weight and the wear on a typical sealed road. Nevertheless it is the basis for the road user charges paid by heavy vehicles. A typical 50 tonne truck pays about two-thirds more and a 62 t truck nearly double the road user charges paid by a 44 t truck.

The NZFOA has therefore asked the government to develop a system that allows local bodies to receive a share of the substantial increase in road user charges that will be generated by heavier vehicles operating in their districts. Given that recent research[4] on NZ road pavements indicates that wear actually increases closer to the 'second power' as weight increases, the user charges generated should be more than sufficient to fund any increase in road wear and tear, as well as bridge upgrades, on routes that are otherwise suitable for heavier vehicles.

This funding is in line with the government's policy on land transport funding (GPS) which prioritises activities that will increase productivity and stimulate economic growth for the benefit of all New Zealanders.

A government infrastructure paper released in September 2009[5] also notes that while financial transfers from central to local government should generally be avoided, the funding of local roads using nationally collected user charges is an exception, because the NZTA which collects the charge is simply acting as an agent for the local entities responsible for carrying out the works. The same paper points out that much of the local road network was developed in the 1950s and 1960s and many bridges are now reaching the end of their useful life. Preliminary analysis by the NZTA suggests an increased investment of around $85-100 million will be needed to strengthen or replace bridges on candidate routes for heavy vehicle permits.

Fewer trucks in towns and cities

The 20% improvement in productivity resulting from longer and heavier trucks on selected highways and roads means 20% fewer trucks would be needed to carry the same amount of freight. For the residents of Rotorua and Nelson respectively that would mean 8000 and 6000 fewer forestry vehicle movements through their cities each year.

Who should grant approvals?

Under the proposed new heavy vehicle rules, trucks weighing more than 44 t and up to 53 t will need the approval of district road authorities to use the roads in each city and district through which they pass. The logistical hassles involved in negotiating with multiple district authorities for each selected route will be aggravated by the understandable fear of local bodies that the costs of additional road maintenance may fall on ratepayers.

For these reasons, the NZFOA has proposed that, in addition to providing local bodies with a fair share of RUC revenue, the government should give the NZ Transport Agency the authority for co-ordinating and granting approvals for the use of heavier vehicles on selected routes.

The precise routes through build-up areas would still be determined by local roading authorities based on the needs of their communities, rather than simply the shortest distance of travel. This would give communities greater say over heavy vehicle movements through their towns than they have at present.

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