

SOUTH ISLAND FREIGHT



Using rail to take pressure off roads

By Andrew Maughan

Photo by Glen Anthony

A new study has identified rail as an economic way to take the pressure off freight movements on South Island roads by calculating the value of externalities and factoring these into an indication of costs vs benefits that could be realised; KiwiRail has already increased its log capacity from the West Coast by 50%

HOW DO we choose if we move freight by road, rail, or coastal shipping modes in New Zealand? Is the true cost of moving freight by each of these modes understood and factored into the decision on which mode is used, or are some costs not fully included in this decision? South Island transport infrastructure owners want to know the answers to these questions now because freight movements in the South Island are expected to increase by 40% within the next 30 years, and they need to plan how they cater for this.

Planning and investing in infrastructure is a long-term decision. Some infrastructure assets are designed to last for 150 years or longer. Building and repairing infrastructure is an expensive and long-term burden on the public sector organisations that own the assets. For example, up to 60% of rural local authorities' budgets can be spent on roads.

Rates (and therefore ratepayers) from rural councils across New Zealand are typically required to contribute 40–50% of the money invested in local roads on their network to enable them to access funding from the government, via the National Land Transport Fund (NLTF) and associated road user charges (RUC) that contribute to this fund.

The forecast increased demand has road infrastructure owners concerned about maintenance, safety and the environmental impacts on the existing transport network – and they want to know what can be done now to mitigate the impacts of the demands from rising freight movements.

A South Island-wide concern

In commissioning this study, regional trans-

port committee (RTC) chairs identified freight mode shift as a South Island-wide concern and opportunity, and necessary to support sustainable growth: "Road freight has more negative impacts than rail or coastal shipping, but costs are not captured in current pricing. We pay through increased congestion, crashes, air quality, fossil fuel emissions and the higher numbers of trucks on our roads causing more wear and tear."

In this study, Stantec (in association with Richard Paling Consulting and Murray King & Francis Small Consultancy) identified rail as an economic way to take the pressure off freight movements on South Island roads by calculating the value of externalities and factoring these into an indication of costs vs benefits that could be realised. This showed through case studies that a \$20–\$30 million investment in rail projects might save up to \$12–\$18 million costs annually, when these wider costs were appropriately considered.

It also showed that investment in one region that led to a freight mode shift from road to rail had potential significant flow-on benefits to an adjacent region.

As part of the study, we spoke with transport companies, ports and their customers. The study developed a methodology for assessing costs and applied it to eight case studies. These case studies indicated that for an approximate investment of \$20–\$30 million, an equivalent of 8% of existing road freight could be shifted by rail in the future, raising rail freight volumes by about 40%.

Context

The South Island generates about a third of

the nation's freight – about 80 million tonnes per year – with the forecast increase mostly due to the agriculture and mineral industries, as well as population growth.

The Ministry of Transport has previously forecast considerable growth in freight traffic in the South Island. While some will be carried by rail and coastal shipping, a large part of this growth is likely to be carried by road, resulting in a range of environmental and safety issues.

In part, this growth in road traffic will be supported by the lack of pricing for externality effects which by making road transport relatively cheap compared to other competing modes is likely to exacerbate the emerging issues.

Industry views

We spoke to key industry representatives about their current mode choice for freight movement (road vs rail vs coastal shipping). We found there were a number of issues to be addressed. Forecast increased freight movement on roads will lead to an increase in safety risks and an increase in harmful emissions released into the environment.

Regarding safety, a 2016 Ministry of Transport factsheet highlights that while trucks accounted for 6% of total distance travelled on roads, truck crashes accounted for around 20% of the total deaths on the road, and 87% of those who died in these crashes were not in the trucks. Put simply, while there might not statistically be a higher chance of having a crash if you are driving a truck, there is a significantly higher chance that if there is a crash between a truck and a car, people are more likely to be killed or receive serious injuries.

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More trucks on the road therefore increases the likelihood of proportionately more deaths and serious injuries than if there are more cars on the road.

Road transport contributes to a range of environmental impacts; it accounts for around 18% of New Zealand's gross emissions, and trucks on roads are a disproportionate contributor to this compared to cars based on the proportion of vehicle fleets that are trucks. Getting trucks off roads and shifting freight by rail will be a positive contributor to a reduction in greenhouse gas emissions.

Reliability and resilience

Mode choice and supply chain reliability were also raised as issues associated with the capacity of port handling facilities, intermodal hubs and available rolling stock. We found a number of examples in particular where industry representatives stated that rail would be the mode of choice if there was more rolling stock capacity. In this case, the supply of rolling stock was not meeting the demand for it and is an opportunity lost, even under existing pricing structures.

Resilience is another issue highlighted by infrastructure owners. The increased reliance on just-in-time delivery across the supply chain means there is inadequate stockpiling of essential goods in isolated communities (often key tourist destinations) leading to people and businesses becoming more vulnerable to the effects of

transport network outages.

Increased impacts from climate change and recent earthquakes are placing more of our communities at risk as a result of this reduced resilience.

An additional underlying concern from infrastructure owners was the disproportionate amount of damage on roads from trucks. While this damage is funded through RUC, evidence shows that some types of trucks and their load configurations damage some roads more than others.

This means that, particularly on lower-volume road networks across the country, the available funding through RUC, which is necessarily derived from national datasets that ultimately come back to a series of averages, may not be sufficient to enable local communities to maintain the infrastructure to convey the freight demand on particular roads.

New opportunities

On the positive side of the ledger, there are exciting new opportunities developing in urban distribution networks where new technology and better-quality real-time data will enable faster adoption of more efficient distribution, higher levels of customer service and more sustainable use of transport infrastructure in urban environments.

We found numerous opportunities to address the concerns raised by the sector. The study was limited in time and budget, so we prioritised opportunities in discus-

sion with representatives of infrastructure owners and funders. In particular, we focused on better utilisation of rail.

We found better use of rail reduced safety risks, reduced environmental impacts, and provided more reliable outcomes when moving some types of freight, including better utilisation of existing infrastructure capacity. We found longer-haul movement of commodities was an area of greater opportunity, given the focus of the study on mode shift opportunity.

Real change

This was not to be a solely theoretical exercise. The study sponsors wanted where possible to catalyse beneficial change where there was a real opportunity to do so. We therefore developed case studies, which demonstrated the benefits of using rail compared with roads when looking at the full true cost of transport (including externalities) and addressing a number of the issues identified by industry.

In this context, KiwiRail is currently exploring the potential of road/rail hubs for logs across Southland and southern Otago to address growing demand and increasing constraints on the road network (including access to ports and deteriorating roads). KiwiRail has also increased its West Coast to Lyttelton log capacity by 50%.

Proof

From a long list of potential case studies identified with industry, we explored a few to quantify and demonstrate how the ben-

Case Study	Product	Annual volumes (tonnes)	Annual volumes (m tonne-kms)	Total annual externality benefits (\$m pa)	Unmet road wear costs (\$m pa)
Stillwater logs	Logs	30,000	7.3	0.2	0.1
Milton/Milburn logging terminal	Logs	50,000	9.0	0.2 for movements to Bluff	0.1
Garnet	Industrial materials	150,000	51.6	1.0	0.2
Water	Consumer products	400,000	92.4	3.2	0.4
Greymouth terminal	General freight	25,000	6.3	0.2	0.1
Waste	Waste	60,000	4–20	<0.1 for alternative storage points 0.5 for movement from Christchurch	0.0 0.1
Port Chalmers Inland Port	General freight	285,000	3.7–7.7	<0.2	0.0
Total		1,000,000	174–198	5.8–5.9	0.8

efits could be realised. This then provided a 'toolkit' to enable decisions supporting investment in infrastructure that in turn will encourage freight shifted by rail rather than road.

A summary of the case studies and results are in the table above.

If the provision of rail services facilitated the development of new projects, rather than switching traffic from road to rail, the potential benefits are likely to be higher.

Summary of findings

We found there is a clear opportunity to shift freight off roads, and the study team believe there are total opportunities of around 500 million tonne-km (mtk) across the South Island per annum.

In 2017 there was in the order of 28.3 billion tonne-km (btk) of freight movements across all modes in New Zealand. Approximately 8.1 btk of these movements occurred in the South Island (29% of the total), and around 6.2 btk was on roads. Therefore, if the opportunities identified in this study were realised, we believe freight demand on roads could be reduced in the South Island by nearly 8%. This would equate to a potential increased demand on rail by around 40% against current volumes.

These benefits would be realised through capital investment in public infrastructure of up to \$10 million for the case studies and potentially in the order of \$20–\$30 million total when including the remainder of the South Island.

Updated freight forecasts produced as part of the study confirmed that there is considerable freight growth forecast in the South Island, reflecting economic and population growth and increasing production of a number of agricultural and mineral products. If this freight is moved by road even at current modal split levels, it will create pressures on transport infrastructure and on the broader community.



Industry representatives have stated that rail would be the mode of choice if there was more rolling stock capacity

There are externalities involved in the movement of freight that are currently unrecognised in freight pricing. Those for road are very much larger than those for rail. These have been quantified by this research.

Transfer to rail would bring externality benefits in terms of access, safety and environmental impact, but intervention is needed to internalise them or compensate for them (for example, by funding particular interventions).

The study identified a number of opportunities (demonstrated with case studies) that could increase freight haulage by rail, possibly by substantial amounts, and these opportunities could be readily extended beyond the specific case studies that this

research project considered.

There are some very significant barriers and constraints to be overcome, including rolling stock capacity and rail reliability.

New technology can help deal with the adverse impacts of freight growth within cities, but again intervention may be necessary.

Conclusion

This study concluded that there is a case for change, supported by robust evidence, towards a more optimised freight mode split in the South Island. The study also provided a method to help robustly quantify and support the achievement of this more ideal mode split of road freight movement onto rail.



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