Freight demand management

Introduction

Freight needs to be moved to meet the daily needs of the population. It also needs to be moved to enable the country’s businesses to sell and develop their products, including receiving imports and sending exports, and therefore maintain and grow New Zealand’s economy.

Although heavy vehicles are the most obvious vehicles that move freight on the roads, there are also light trucks, vans – notably courier vans – and even cyclists, particularly around the urban areas. Trains and ships will generally move freight between regions, although inland ports can be used to consolidate road-based freight loads and rail them through urban areas to sea ports.

Current indications are that by 2031, the freight task for key commodities will rise by 70-75% in terms of tonnes lifted and tonne kilometres transported (based on 2006/7 figures). Most freight operators know that simply increasing the number of heavy vehicles on the road will not be sufficient to meet this demand.

These figures are currently being updated following the global financial crisis, the Canterbury earthquake and changes in international shipping operations. (see http://www.transport.govt.nz/research/nationalfreightdemandsstudy/)

Demand management for freight

In the past, the term ‘demand management’ has generally been applied to personal travel and measures that allow people to avoid making trips, make more efficient trips or make trips using different modes. Freight too can be moved more efficiently through better management of existing services and infrastructure, and using different modes.

GPS impact

In the Government policy statement on land transport funding 2012/13–2021/22, the government sets out the kinds of short- to medium-term impacts it believes will contribute to economic growth and productivity. This includes ‘improvements in the provision of infrastructure and services that enhance transport efficiency and lower the cost of transportation through … more efficient freight supply chains’.
## Objective

The aim of freight demand management is to improve the efficiency and cost of freight movements, while also reducing the impact of freight transport on communities and the environment.

## Benefits

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<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tr>
<td><strong>Congestion reduction</strong></td>
<td>Controlling access to the network and spreading peak freight use to different times of the day can help to reduce congestion on the State Highway network. Similarly, consolidating freight and using coastal shipping, rail and air freight, as appropriate, can also reduce congestion on the state highway network. However, achieving widespread mode change of this kind presents a more challenging goal.</td>
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<tr>
<td><strong>Health</strong></td>
<td>Reducing the number of heavy vehicles on urban roads reduces people's exposure to noise, vibration and pollution (particularly PM10), which can all cause health problems.</td>
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<td><strong>Cost savings</strong></td>
<td>The impact on roads and increased maintenance costs associated with high truck use can be reduced through freight consolidation, modal choice and specially constructed freight lanes.</td>
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<td><strong>Environment</strong></td>
<td>Through the implementation of freight demand management tools, negative environmental outcomes from freight transport can be reduced. These include:</td>
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<td>- pollution, particularly CO₂</td>
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<td>- spills, some of which, although not hazardous to humans, may be hazardous to the environment (e.g. milk).</td>
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<td><strong>Efficiency</strong></td>
<td>Improved efficiency can be achieved by coordinating freight transportation, using the most appropriate mode of delivery and constructing infrastructure, such as freight bypass lanes and dedicated freight ramps. Improved efficiency will reduce costs.</td>
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<td><strong>Journey time reliability</strong></td>
<td>By implanting freight demand management principles, the time to move freight between destinations can be reduced and, more importantly, can be more predictable. This allows delivery of goods in a timely manner and without unexpected delays.</td>
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<tr>
<td><strong>Economy</strong></td>
<td>Moving freight more efficiently and safely reduces the cost of trade, which can result in cheaper goods for New Zealanders and lower costs for importers and exporters. This will grow our economy and our wealth as a country</td>
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<tr>
<td><strong>Safety</strong></td>
<td>Managing freight movements and reducing the interaction between heavy vehicles and other road users will contribute to safer roads.</td>
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Strategic interventions for freight demand management

**Introduction**
Unlike many vehicle trips made by the general public that can be made by different modes and at different times of the day, the movement of goods from one location to another needs to occur within certain timeframes, and mode choice is generally very limited. Improving the efficiency and safety of freight movements can improve overall transport efficiency and safety.

**Initiatives for freight movement management**
The types of initiatives that can help improve the movement of freight are:
- considering land use through the targeted location of freight-related developments
- dedicated traffic management
- off road loading facilities
- dedicated/priority lanes
- freight-specific signage
- parking and rest facilities
- freight bypasses
- engineering features to reduce freight vehicle impacts
- road space allocation measures
- moving more freight with fewer trucks.

**Land use planning**
Ensuring freight-related developments are located as close as possible to the major transport networks – shipping, rail and state highways – will help reduce future freight-related road problems and allow freight to be moved with relative ease through a region and nationally. Additionally, locating heavy industries and commercial operations that rely on freight next to these major transport networks can create a buffer to residential areas and hence reduce reverse sensitivity issues.

**Dedicated freight management**
Given the nature of heavy freight vehicles compared with the majority of vehicles on the road, traffic management systems specifically developed for freight vehicles will help optimise freight movements. This can include:
- providing bypass lanes where traffic stops or slows, especially on upward slopes
- detecting freight vehicles approaching traffic signals to extend a green cycle and reduce the amount of stop/start conditions for trucks
- providing advanced warning for trucks of incidents to allow drivers to change route sooner rather than negotiating bypasses or being completely stopped by an incident.

**Freight-specific signage**
Warning signs specifically aimed at heavy vehicles are already legally available and are described in the *Manual of traffic signs and markings* (MOTSAM). This includes height, width and curve speed warning signs, as well as variable messaging.
### Strategic interventions for freight demand management contd

<table>
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<tr>
<th>Onsite heavy vehicle parking</th>
<th>Where loading or unloading of heavy freight vehicles may adversely affect other road users, particularly in the future, the district plan should require new developments to have off-road facilities for heavy vehicle parking to mitigate these effects. This will also improve the freight supply chain by enabling greater flexibility and allowing the driver to rest while leaving their truck parked onsite.</th>
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<tr>
<td>Parking and rest facilities</td>
<td>Truck drivers are required by law to have short and long rest breaks, depending on how long they have been working. However, given the size of heavy vehicles, it can be difficult for drivers to find places large enough to park close to the facilities they need – which could be as little as a toilet and fresh water. Most fuel stations in rural areas provide truck parking and facilities, although the distances between these stations can be very long. In general, heavy vehicle drivers experience the biggest problems in urban areas, including large rural towns. Fuel stations and other facilities are usually located in areas where truck parking is difficult or impossible. Drivers are then forced to find parking on back streets – unnecessarily extending their journey and potentially damaging local roads.</td>
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<td>Priority lanes</td>
<td>Where there are significant freight movements, allocation of road space to freight vehicles only may help optimise freight movements, as well as general traffic movements.</td>
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<td>Freight bypasses</td>
<td>Heavy vehicles are best kept out of towns and cities, apart from when they are delivering goods. Such areas often require drivers to stop and start, slow and regain speed and generally travel inefficiently, which increases their emission levels. Depending on road widths and the levels of activity on urban routes, the presence of heavy vehicles can also be a safety concern to local residents. Freight bypasses should be considered in these circumstances. Note that while bypasses may be physically longer than the direct route through the urban area, they should be easier to negotiate and therefore quicker.</td>
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Truck priority lane – Auckland
### Designing for freight

Ensuring the facilities that freight vehicles use are of a high standard will help efficient freight movement. This includes the design of:

- ports and their interaction with the rail and road systems
- the rail network, including its interaction with the road system and the modal exchange with heavy road vehicles
- the road network, including detailed design to ensure heavy vehicles can easily manoeuvre.

### Moving freight off the road network

The *Transport Network Optimisation* paper (commissioned by the NZTA, 2008: [http://viastrada.co.nz/sites/viastrada.co.nz/files/transport-network-optimisation_NZTA.pdf](http://viastrada.co.nz/sites/viastrada.co.nz/files/transport-network-optimisation_NZTA.pdf)) suggests: ‘Pricing measures applied to the road network have significant effects on freight transport. Internalising road user costs such as road wear, congestion and traffic crashes by applying distance-based charges can make road freight transport more expensive and therefore rail and shipping become more commercially attractive modes’. The paper also acknowledges the overlap with private vehicle movement, suggesting that if private vehicle movement was reduced (also through pricing), freight transport efficiency would increase.

### Warehouses on wheels and consolidation centres

The more recent supply chain management practices of lean inventory and use of just-in-time deliveries have been very effective in creating ‘warehouses on wheels’. This has considerably reduced supply chain costs.

The downside of this practice is an inefficient service due to urgency of delivery. It is extremely difficult to trade off time-critical deliveries against time-intensive load building to make best use of the transport asset. This is especially the case in urban areas.

One way of overcoming this impact and encouraging efficiency is to use urban consolidation centres. For New Zealand, this requires more integrated logistics thinking (land use planning, and applying public transport type tenders to freight routes, e.g. franchising. The potential benefits are, however, significant.
Strategic interventions for freight demand management contd

50max

50MAX is the term used to describe a new generation of truck that allows for safe and more efficient transport of freight goods.

50MAX vehicle combinations have one more axle than conventional 44 tonne vehicles combinations, meaning the overall truck load is spread further and there is no additional wear on roads per tonne of freight.

This gives operators an option to carry increased payloads on parts of the network that carry lower volumes of freight. The increased payloads of 50MAX can lead to economic benefits for producers, customers and our communities.
Case study – Fonterra's intermodal freight hubs

**Rail**

New Zealand dairy company Fonterra is moving increasing volumes of freight by rail rather than by road and is looking to channel greater export volumes through fewer ports. The opening of a $25m inland freight hub at Crawford Street in Hamilton in 2005, complete with warehouses and dry store facility, has increased the company’s efficiency and greatly reduced heavy vehicle movements in the region.

Crawford Street freight hub

**New coolstore**

Crawford Street provides a consolidated staging area for Fonterra’s central North Island dairy operations, particularly Te Rapa and Te Awamutu, which produce 55 percent of the region’s milk. Its key advantage is the direct link to the main rail trunk line juncture, allowing easy access to the Port of Auckland (72 percent) and Port of Tauranga (20 percent).

Fonterra’s huge hi-tech Crawford Street coolstore, with its automated stacking robots, was completed at the end of 2009 and is the largest facility of its type in Australasia. Integrated with the Kiwirail rail network, the coolstore removes 50,000 truck movements form local roads each year and helps to improve safety and reduce congestion, noise and emissions. Up to 634 containers pass through the stores each week.

**South Island**

In the South Island, Darfield, 45 kilometres out of Christchurch, is Fonterra’s newest milk processing site and the first to be built in 14 years.

The first stage of the development includes a milk powder drier which can produce up to 15.5 metric tonnes of milk powder every hour.

Work has completed on a second milk powder drier at the site. This is the world’s highest yielding and most efficient milk powder drier – taking the title from Fonterra’s ED4 drier at Edendale.

A new rail link connecting Fonterra’s Darfield distribution site to New Zealand’s busiest rail line through to Lyttleton opened in 2013.

The train is expected to carry the freight of approximately 90 trucks every day as the second drier comes on line. It also delivers environmental and financial benefits with fewer emissions and economies of scale.
## Case study – Fonterra's intermodal freight hubs continued

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<tr>
<th>State-of-the-art trucks and trailers</th>
<th>Across New Zealand, Fonterra’s fleet of 500 tankers is the largest in the country. In 2009, the company started introducing Volvo trucks because of their lower operating costs, using 30% less diesel, and reduced emissions – 35% lower than older trucks.</th>
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| Major cost savings                   | Fonterra expects to reap $200m of savings in the three years to 2011 from its supply chain, mainly from its move to focus on four key export ports – Auckland, Tauranga, Napier and Lyttelton.  
This is complemented by its warehousing hubs, such as Crawford Street in Hamilton and the new Mosgiel site near Dunedin. CEO Andrew Ferrier says Fonterra’s target is to reduce permanent warehouses to about 45 from 80 currently, with the inevitable reduction in truck movements across the country. |
Case study – Heathrow airport retail consolidation centre

**Problem**
BAA is a leading airport operator that runs London's Heathrow and Stansted airports. A decade ago, BAA was under pressure to provide a solution to Heathrow airport's physical constraints. Some 400 vehicles were delivering goods on an unscheduled daily basis to retailers, causing massive congestion within the airport and on the approach roads.

**Solution**
Offsite consolidation was the solution chosen for this problem, with the operation commencing in May 2001.

**Contribution to environment strategy**
The environmental strategy for Heathrow identified base data, measuring, monitoring and setting targets to demonstrate the improvement in air quality and packaging waste management – as well as service levels and ease of access.

**Results**
Heathrow airport has seen a significant reduction in the number of vehicle movements as a result of this scheme. On-time delivery performance to the retail outlets is currently 95 percent. BAA has been able to set targets at full implementation of a 75 percent reduction in the number of vehicles delivering to the airport and a 90 percent use of vehicle load capacity.

**Benefits for retailers**
Retailers operating within the airport receive more effective, on-time deliveries on high-security shared-user vehicles. The project has been so successful that any new retailer uses the consolidation centre as a condition of contract.

**Other applications**
With such positive commercial and environmental benefits, this type of solution may be adopted not only by other airports but also by retailing operations with similar congestion problems, such as those based in city centre locations.

**Link**
[www.freightbestpractice.org.uk/case-studies](http://www.freightbestpractice.org.uk/case-studies)
**Case study – UK retail supply chains**

**Asda**  
Asda, Britain’s second largest food retailer, decided to cut four million lorry miles by 2004 as part of a move to expand its use of rail freight. From October 2003, it imported goods through the port of Felixstowe, with GB Railfreight providing a five-day service to and from Daventry for Asda locations in the Midlands. This removed up to 2000 containers from Britain's congested road network each year.  

Asda spokesperson Rachel Fellows said, ‘The existing business is a huge success – the trains are quicker, they arrive on time, often better than passenger operators’. The EU Working Time Directive, which placed stringent limits on the hours lorry drivers can work, was at the core of the company’s plans.

**Superdrug**  
Superdrug, the leading health and beauty retailer, started using EWS Intermodal Express rail services for the movement of goods imported through the port of Felixstowe to the EWS-run terminal at Wakefield. Superdrug’s Head of Transport said, ‘Intermodal express services offer fast reliable and regularly timetabled services which enabled them to connect rail with our own distribution network and improve its availability’.

**Argos**  
Argos, the UK’s largest non-food retail chain, has started using EWS services to move containers of mixed cargo from Southampton to the EWS intermodal terminal at Willesden, north-west London. The containers then go forward (sometimes by rail via other railheads up country) to Argos' high street and out-of-town discount stores.

**Marks and Spencer**  
Marks and Spencer has been using rail freight for imports from France and Spain since early 2001, as well as daily deliveries to its distribution centre in Scotland. The continental service is based around four rail-connected warehouses at selected locations in France. Consignments are received by road and consolidated into rail wagons for onward movement by EWS trains to the UK, direct through the Channel Tunnel to rail-connected warehouses at Daventry.  

Steve Mulvey from Marks and Spencer explained, 'Rail freight is part of a mix of supply chain solutions that assist in keeping the company competitive. Security of supply is vital to us; no one route or mode is totally secure so having the rail alternative is important in providing us with diversity in the supply chain that would not otherwise exist.'  

Rail has been found to be 15 percent more efficient (per pallet) to unload than a road vehicle and rail better utilises warehouse resources in the UK as the rail wagons do not clutter the exporting truck loading docks.

**Safeway**  
Safeway, at the leading edge of many transport initiatives, was the first to integrate rail into a daily part of the supply chain in 1998. It currently uses an EWS daily service to take goods from depot almost directly to its stores across northern Scotland. One of the big advantages of rail for Safeway is its speed compared with a road operation, as the trains run at 75mph and that brings a significant time saving. The temperature-controlled intermodal swap bodies used look almost identical to conventional trailers but are fitted with strengthened lifting points.
Case study – UK retail supply chains continued

| No better time for rail | There has seldom been a better time to promote rail freight. Road congestion levels will continue to get worse with no clear prospect of any improvement, making rail freight a more attractive alternative.  
Road congestion does not just reduce speeds, it also reduces reliability, since a congested road is more vulnerable to disruption forcing hauliers to build in 'recovery time' to their journeys to ensure right-time arrival every time. This in turn reduces productivity and adds cost.  
Retailing is very competitive, shoppers are very demanding and the logistics companies that move the goods have to offer the highest standards of speed and reliability at the best rates possible. For rail to be chosen as well as road speaks volumes for the way the market now perceives rail. |
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<tr>
<td>Link</td>
<td><a href="http://www.freightonrail.org.uk/CaseStudies.htm">http://www.freightonrail.org.uk/CaseStudies.htm</a></td>
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</table>
Case study – freight delivery by bicycle, Cambridge, UK

Introduction

In Cambridge, an innovative cycle courier business has been operating successfully since 2005 and is now the largest business of its kind in the UK. The business focuses on delivering small and medium-sized packages, using special light cargo bikes.

Like many cities, Cambridge faces problems with congestion, pollution and noise. In addition, Cambridge’s inner city is closed to cars during the day, so the founders of the Outspoken Delivery service realised that using cargo bikes for deliveries was not only beneficial from an environmental point of view, but also promising from an economic point of view.

Cargo bikes

The cycle courier business uses special cargo bikes for delivering the freight: they are light, fast and capable of carrying up to 80kg in weight. The cargo is stored in a box which can be easily removed. The box is waterproof and lockable because that allows the transportation of high value and delicate goods, such as computers or documents.

Success

At the moment, Outspoken delivery employs nine people and each of its bikes travel around and has more than 100 customers, ranging from the Cambridge City Council, to cake shops and solicitors. Their freight is typically light freight and the parcels are medium sized.

Because of its success the company is planning to expand with a broader range of services such as on-forwarding (first and last mile solutions) and home deliveries. With each bike travelling around 19,500 km per year, Outspoken delivery contributes to a reduction in noise, exhaust fumes and traffic congestion in Cambridge and their expansion proves that freight deliveries do not necessarily produce exhaust fumes and increased traffic congestion.
Complementary measures

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<tr>
<th>Tolling</th>
<th>Tolling and especially the provision of freight toll lanes can improve travel times and improve certainty of freight arrival times.</th>
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<tr>
<td>Land-use planning</td>
<td>Providing for freight and related land use in appropriate locations will help improve the freight network.</td>
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What other policies will this address?

<table>
<thead>
<tr>
<th>Health</th>
<th>Reduction in emissions from freight vehicles and improved road safety from fewer conflicts between modes.</th>
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<tr>
<td>Environment</td>
<td>Reduced impact through less land take, lower emissions and reduced freight noise.</td>
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<tr>
<td>Economy</td>
<td>Improved freight movement will lower business costs and improve the economy.</td>
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Further information


