FreightBestPractice Scotland

Highland Waterborne Freight

Case Study

The Scottish Government

Acknowledgements

This case study was funded by the Scottish Government, and was compiled with the assistance from:

- Ferguson Transport (Spean Bridge) Ltd
- JST Services
- Scottish Woodlands Ltd

Freight Mode Shift Grants

For Scottish Government Freight Mode Shift Grants contact:

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www.scotland.gov.uk – Search 'Freight Grants'

Introduction

Including all 790 islands, Scotland has around 10,000km of coast - some 69% of the total UK coastline. It is not surprising that waterborne freight has played an important role in unlocking the country's large natural resources.

Ferry services and waterborne traffic continue to serve industry and provide employment in many areas which are poorly linked by road and rail.

Contributing to the Economy

In 2006 in Scotland, 20.6 million tonnes of waterborne coastal traffic was moved to other UK ports. 44 million tonnes was exported, with 1.5 million tonnes being transported by supply vessel to oil installations in the North Sea.

Dry bulk cargos, Containerised and Roll On/Roll Off (RoRo) ferry traffic make up the growth sectors in domestic waterborne freight movement and coal contributes to around 20% of all tonnage moved.

This Case Study looks at two current services which both:

- Operate in North West Scotland
- Carry locally sourced produce
- Remove HGV miles from local roads
- Contribute to sustainable transport solutions
- Reduce fuel use and CO_2 emissions

Contributing Towards a Sustainable Solution

By removing HGV mileage and reducing the CO_2 produced in road freight movement, your company may qualify for financial help with the capital or revenue costs of a new project.

Freight Mode Shift Grants are available from the Scottish Government. More information on these can be found here: h**ttp://www.scotland.gov.uk/Topics/Transport/FT/freightgrants1**

This case study details two waterborne freight services, the first being assisted by a Freight Facilities Grant (FFG), and the second operating without grant aid, showing that water freight options can be wholly commercially driven.

Both of these operations deliver significant operational and environmental benefits, as well as delivering improvements in service to their customers.

Scottish Woodlands Ltd/JST Services

Scotland's Resource

Scotland has many hundreds of square miles of timber growing in the North West of the country where growing seasons are long and harvesting of the same parcels of land can be done on a 35-40 year cycle. A growth in demand for locally sourced timber has resulted in more inaccessible locations of the Highlands becoming increasingly economically feasible to harvest.

The road haulage of timber can damage public roads and forest roads. Repair costs of this infrastructure can place large financial strain on both Local Authorities and land owners.

Timber Location

Located in the temperate North West of Scotland (Figure 1) Sandaig is a commercial forest managed by Scottish Woodlands Ltd. Planted in the 1960s, it is now reaching maturity. The forest makes up part of The Eilanreach estate near Glenelg, 25 miles South of Kyle of Lochalsh (by road) or around 8 miles by sea.

The forest has some 60,000 tonnes of Sitka Spruce and Lodgepole Pine. Road access into the area is extremely limited and vehicles have to pass over the single carriageway Ratagan Pass with gradients of up to 20%. This is an unsuitable and dangerous route for regular HGV traffic.

Figure 1: North West Scotland

Reaching the Sea

The problem for Scottish Woodlands Ltd was how to remove a large parcel of timber from a remote and 'sea-locked' region of North West Scotland.

After planning and development work, in conjunction with JST Services, a system was devised whereby a floating pier could be moored temporarily by the shore, connected by a linkspan bridge strong enough to carry repeated vehicle movements and yet flexible enough to move with the tides.

The pier needed to be able to carry a 40t crawler crane with a boom long enough to load timber at a rate of 100t/hour onto a vessel of up to 3,000 tonnes DWT (Dead Weight Tonnage).

JST Services developed the floating pier system with the help of a Freight Facilities Grant (for capital) of £292,083 from the Scottish Government; the total capital investment was £820,000.

> **Neil Stoddart – Scottish Woodlands Harvesting Manager**
>
> for the construction of the shoreside access/ link road and infrastructure we received 75% grant aid amounting to £60,000.00 from the Scottish Strategic Timber Transport Scheme (SSTTS) awarded by Forestry Commission Scotland.

For Scottish Government Freight Mode Shift Grants contact:

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Or Search 'Freight Grants' at **www.scotland.gov.uk**

The Operation

The Glenelg floating pier includes a barge and arch backed steel bridge. The stages of constructing the system as detailed in Figure 2 include:

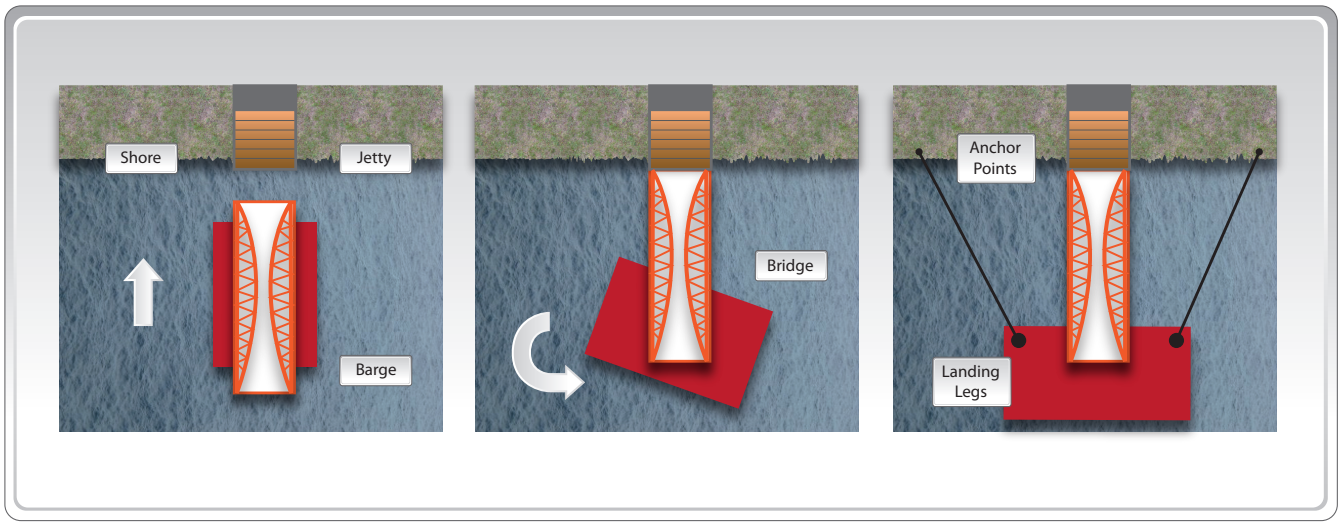
- Pushed by tug, the barge carries the bridge straight into shore
- One end of the bridge is secured onto a temporary jetty
- The barge then 'wheels' itself away from the shore and turns 90 degrees
- Landing legs are then lowered to the sea bed
- The whole assembly is anchored to the shore via anchor plates buried on the shore line.

On the Eilenreach Estate the short haul to the shoreline means that timber extraction can be done by agricultural tractor and trailers. These specially built low ground pressure vehicles include trailers with multi-wheel axles which spread the load evenly over the crown of the road.

Advantages of this vehicle choice are:

- Less risk of 'bogging down' than a 44 tonne HGV
- Reduced damage and maintenance costs to forest roads
- Shorter turning circle than HGVs

Figure 2 – Diagram of Floating Pier Installation



Loading the Vessel

The timber vehicles are driven onto the floating pier where they are offloaded by crane onto the waiting vessel, JST's own 1,400 tonne MV Red Duchess.

The floating pier reaches far enough out from the shore to deep water allowing the vessel to remain moored and loading 24 hours a day. Operational advantages of utilising the vessel:

- Payload of 1,400 tonnes equivalent to 56 HGV truck loads
- Timber can be stockpiled conveniently on the shoreline
- Loading can take place 24 hours a day high or low tide
- The vessel can be loaded in a single working shift

Timber Haul Route

Depending on the demand for timber the MV Red Duchess is required to deliver round logs to sawmills in Inverness, Troon – Ayrshire, Cork in Ireland and Genk, Belgium. Woodchip is also transported to Birkenhead.

Two local sawmills in Inverness and Corpach were identified as the most likely destinations by road for timber from this forest. As such the Scottish Government Mode Shift Grant was provided to remove HGV traffic from these road routes. When fully loaded, at a top speed of 10 knots, the MV Red Duchess can complete an estimated 2-3 return trips to Corpach each week, less for the longer journey to Inverness.

For longer trips to the South the vessel can return with a load back to the area, typically rock salt for the Highland Councils winter road maintenance programme.

By road the equivalent journeys between Glenelg and customers in both destinations are very slow, often passing over single track roads with little opportunity for passing other vehicles. Off road operation, steep gradients, and the narrow road network means that this haul route is hard on HGV fuel consumption.

Neil Stoddart – Scottish Woodlands Harvesting Manager

rather than haul 60,000 tonnes of timber through Glenelg village and over the Ratagan Pass on timber trucks at 25 tonnes a time, we planned a more environmentally friendly approach, seeking a sea going alternative.

Environmental Benefits

Over the duration of the Scottish Government Mode Shift Grant project there will be an estimated removal of 20,000 tonnes of timber and approximately 120,000 HGV miles from the roads between Glenelg and sawmills in Corpach and Inverness per year.

By utilising sea freight the total tonnage removed from this area has very little impact on the local environment. The removal of repeated HGV movements has very positive benefits to road safety along the timber haul routes.

External benefits to the local environment extend to improved relations between the timber industry and continued local support for such initiatives. Key benefits:

- Cost effective movement of a sustainable resource
- Reusable infrastructure will leave no footprint after removal
- Reduced pollution from HGV movements through towns and villages en route
- Reduced pollution as a result of maintenance and construction work on the sensitive Highland road network

Future Plans

Since the beginning of the Glenelg Project a further 400,000 tonnes of inaccessible timber has been identified for harvesting from four new floating pier sites in the immediate area. In time the onshore infrastructure, harvesting machinery and vessel may all be employed on the new sites.

Driven by a market demand for timber and an increasing demand for sustainable transport solutions this service has proven that with the correct investment timber transport in the Scottish Highlands can continue without additional burden on the road infrastructure and the environment.

Ferguson Transport

Fish Farming in Scotland

Exports of Scottish Salmon have soared by over 500% in the last 20 years. There are over 1,500 people employed in fish farming in Scotland and the industry is thought to be worth £500 million a year.

Offshore salmon farms can include accommodation units and be self sustained during the working week with regular supply by small vessels from the mainland.

This Case Study looks at a commercially driven service, which consolidates fish food delivery from one location onto a much larger vessel for supply to fish farms located on the North West coast of Scotland.

Fish Food Supply

For each 1kg of salmon harvested 1.2kg of fish food is consumed. With a Scottish salmon harvest for 2009 of just over 100,000 tonnes the environmental impact of supplying the industry with feed and taking away the harvested product is significant.

Fish food is supplied as loose pellets in bags weighing 500kg or 1,000kg. The growing fish farm industry has increased the number of HGV journeys to and from small coastal towns and ports. Many of these towns are linked by single track roads that have been adversely affected by the movement of these vehicles.

From shore, fish farms have traditionally been supplied by small landing craft. Owing to their size they are limited in their range, operating payload and ability to work in open water and bad weather. Typical payloads of up to 10 tonnes mean that many return journeys to local ports to reload are required.

Innovative Supply Chain

Working with fish food suppliers and fish farm owners, Ferguson Transport (Spean Bridge) Ltd identified the missing link in the supply chain and over time have invested in larger coastal and sea going vessels as well as supporting port infrastructure.

The dock site at Kishorn near Strathcarron, Ross-Shire was identified by Fergusons for its deep water and accessibility by road.

The company currently operates two vessels from Kishorn; the 80t multi-use MV Harvest-Anne and the 550t MV Vermland. With a shallower draft the Harvest-Anne also works from Corpach near Fort William to service fish farms closer to shore and to the south.

Road Freight Operation

Fish food is supplied by Ferguson's HGV fleet from Invergordon and Grangemouth (as shown in Figure 3). A constant level of supply to the warehouse at Kishorn ensures that there is always stock for the MV Vermland and MV Harvest-Anne when they return approximately every 2-3 days to reload.

Fish food has a finite shelf life and is typically produced, trucked overland and delivered by sea within 3-5 working days. This requires a very robust supply chain, with flexibility in road supply, onsite stock and planning against delay through poor weather.

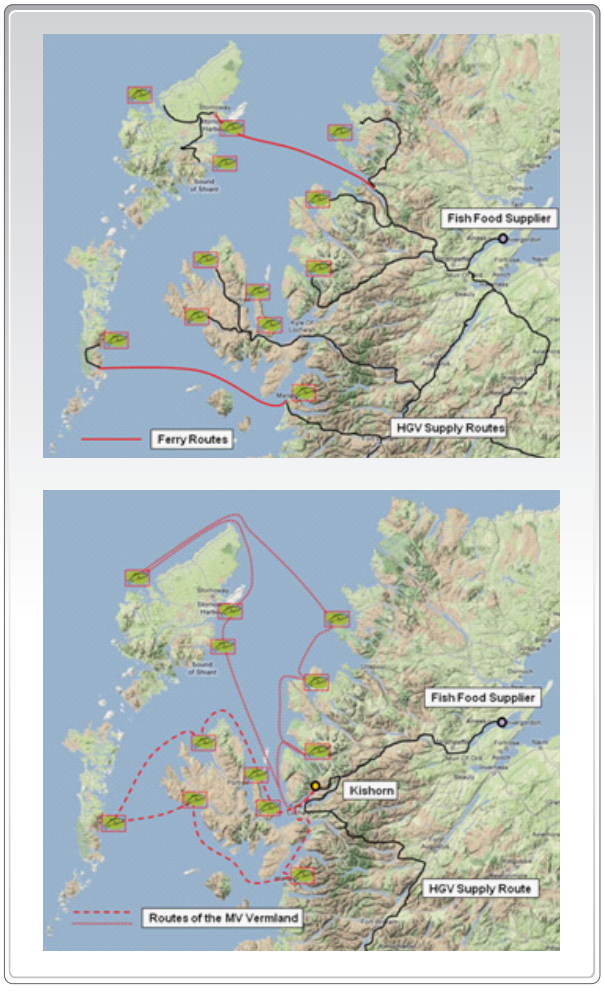
The Ferguson fleet is designed for maximum flexibility using 44t curtainside and flatbed vehicles which allows them to be used for various backloads and other work. This vehicle choice ensures that for each trip to Kishorn the maximum tonnage is carried, reducing the total number of trips required to service Kishorn Port.

Ferguson Transport has restricted their road fleet to a maximum 48 mph reducing fuel consumption and operating costs. Delivery routes are planned to strict journey times guaranteeing good fuel return and safe vehicle operation.

Alasdair Ferguson – Managing Director

road safety is of paramount importance for our company, not just for our own drivers' safety but also for public perception of our vehicles operating in the Highlands.

Figure 3 – Comparison of Traditional and Current Supply Chains



The MV Vermland

The MV Vermland is much larger than vessels previously used for fish food delivery on Scotland's coast. It is more robust and can work in much poorer weather than traditional vessels. Even though it has a maximum payload of 1,100 tonnes, fish food is bulky rather than heavy and a full cargo is closer to 550 tonnes.

The vessel has an onboard crane and blower system which discharges the cargo into fish farm storage chambers by pipe. This has the following advantages:

- Faster delivery; meaning more deliveries each day
- Increased biosecurity as packaging remains onboard the vessel
- Piped delivery system safer than craning 1tonne bags of feed

With two crews rotating the vessel's operation, the MV Vermland can be loaded in around 5 hours. The vessel is used on a number of set routes doing 'milk round' delivery patterns which can be as far North as the Shetland Isles and to the Clyde coast in the South.

Even the dockside handling equipment has been specially ordered to include forklift trucks with low emission diesel engines and hydraulically extendable forks to allow HGV trailers to be offloaded from one side, saving fuel, saving time and saving man hours.

Over the course of one year the MV Harvest-Anne delivers approximately 15,000 tonnes of fish food. The MV Vermland does much longer distance journeys from Kishorn for a total of 40,000 tonnes delivered per year.

This 'one-stop' approach to offshore fish food delivery has provided fish farm operators with an extremely efficient delivery system to approximately 35 fish farms along the mainland coast and Western Isles. Advantages to both customer and operator of this type of operation are:

- Reduced cost per tonne of delivery
- Reduced number of HGV and Landing Craft trips
- More accurate stock and transport management to dockside
- More efficient utilisation and planning of the road fleet
- Flexible service allows new fish farm sites to be easily added to a route cost effectively

Environmental savings

By reducing the road mileage required in servicing fish farms along the North West coast Ferguson Transport has removed an estimated 150,000 miles of HGV traffic per year from the narrow roads of the Scottish Highlands. Additional savings include:

- Reduction in HGV movements to islands and small coastal towns
- Reduction in road maintenance bills for Highland Council
- Improved relations between fish farms and local communities

Tables 1 and 2 show that every year this operation; saves 150,000 HGV miles from the Highland road network, consolidates 55,000 tonnes of freight to one location, saves nearly 250 tonnes of CO_2 emissions by the road fleet and 518 tonnes of CO_2 by marine vessels.

Table 1 – Comparison figures for HGV supply of fish food

	To all Previous Locations	Total Kishorn Service
Fish Food Delivered to Dockside	55,000t/year	55,000t/year
Total HGV Deliveries (full load 24 tonnes)	2,292	2,292
HGV Mileage to all Ports	650,000 (approx.).	502,512
Total Fuel Use (litres)	411,971 (at 7.1mpg)	318,493 (at 7.1mpg)
CO_2 burden (2.64kg/litre)	**1,088 tonnes**	**841 tonnes**

Table 2 – Comparison figures between MV Vermland and Landing Craft delivery

	Total Landing Craft	MV Vermland only	MV Harvest – Anne only
Fish Food Quantity	55,000t/year	40,000t/year	15,000t/year
Vessel Payload	10t (ave.)	400t (ave.)	80t (ave.)
Total Number of Journeys	5,500	100	188
Fuel Used - Each Journey	100 litres (approx)	2,880 litres (ave trip)	350 litres (ave.trip)
Total Fuel Use for Project	550,000 litres	288,000 litres	65,800 litres
CO_2 burden (2.64kg/litre)	**1,452 tonnes**	**760 tonnes**	**174 tonnes**

Summary

This Case Study demonstrates that modal shift combining road and sea solutions can be successfully accomplished by both private initiatives as well as through assistance by Government Freight Grants.

If your business could benefit from a sea freight solution in Scotland, in the first instance call Justin Huthersall at the Scottish Government to determine if your business solution qualifies for grant assistance.

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Multi-**MODAL**