

Lifting the Spirit

Report on 2013 Rail Trial



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PROJECT SUMMARY

HITRANS, in partnership with Scotch Whisky Association (SWA) Highlands and Islands Enterprise (HIE), Moray Council and the EU Food Port, initiated a trial to test the feasibility of moving bulk spirit and other food products by rail between Elgin and Grangemouth. The trial took place during autumn 2013.

The objective was to offer rail transport between Elgin and Grangemouth on a cost neutral basis as many distillers had not used rail to transport bulk supplies from the north of Scotland in the last 20 years; the industry however does use rail extensively to transport finished product (i.e. bottled Scotch Whisky) from central Scotland to distribution centres in England and to English ports for export.

The project sought to assess the feasibility of moving bulk spirit from Elgin to Grangemouth and to identify the benefits and barriers to using rail transport. Bulk spirit was loaded into ISO tanks (26,000 litre capacity) at the participating distillery sites and was moved by road to the rail terminal at Elgin. From there, the tanks were transported by rail, via Aberdeen, to Grangemouth. Road haulage was then used to transport the tanks to their final destinations.

In majoring on an iconic product we were able to demonstrate the availability of alternative transport infrastructure and thus enhance or at least retail the area's competitive position at a time of growing transport costs and increasing demand for transport.

The project received wide publicity in Scotland and in the UK as a whole, and in other EU Member States, particularly the six North Sea Food Port countries (Belgium, Denmark, Germany, Norway, Sweden and the United Kingdom). It featured on national and local news, in newspapers and in the rail press.

A separate report analysing the environmental benefits of the trial was produced by the Transport Research Institute, based at Edinburgh Napier University. It concludes that for each round trip lorry load displaced by rail, approximately half a tonne of CO₂ is saved and approximately £200 of marginal social benefits accrue. For each train laden with 20 containers, this amounts to 10 tonnes of CO₂ saved and £4000 of marginal social benefits to society. Over a year, these benefits would amount to 520 tonnes of CO₂ saved and £208,000 of marginal social benefits.

RATIONALE

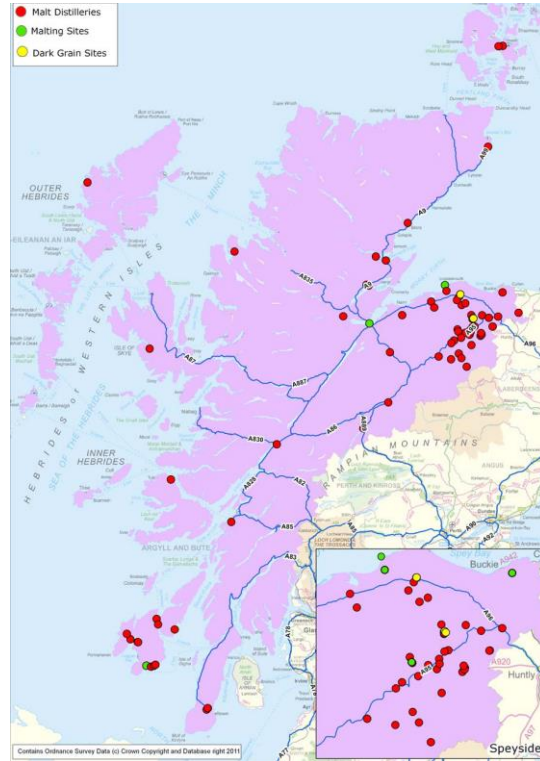
HITRANS seeks to assist in the transfer of freight from road to more sustainable modes. The EU has set targets for modal shift of 30% of goods moving over 300km by 2030, 50% by 2050. The overriding objective of the Scotch Whisky Industry Environmental Strategy¹ is to deliver long-term economic, environmental and social sustainability. The industry is committed to working with its supply chain to minimise the environmental impact of the industry.

The whisky industry is currently enjoying a period of sustained growth in production: new distilleries are being built, existing distilleries are being expanded, new warehouses are being built, and bottling plants are being expanded. The highland region (including Speyside) accounts for over 80% of malt distilling capacity. Most maturation, blending and bottling takes place in the central belt, although there are some large maturation complexes within Speyside (and three relatively small bottling operations).

In 2011 HITRANS completed a Whisky Logistics Study¹ which identified the flows of products to and from distilleries in the HITRANS area. The spreadsheet tool is able to predict the increase in lorry traffic

¹ <http://www.scotch-whisky.org.uk/what-we-do/environmental-strategy/>

resulting from planned increases in production, and to identify the additional burden on the road network. Currently 48% of the HGV traffic on the A95 Keith-Aviemore is estimated to be whisky-related.



HITRANS put forward a project that would assess the viability of bulk spirit transfer by rail; identify barriers (physical, structural and financial); and consider the environmental benefits of modal shift to rail for the whisky industry.

The reinstatement of the disused freight yard at Elgin allows the region's products to be transported via a green corridor to Europe via Central Scotland, helping to overcome problems associated with being on the periphery.

Innovation was largely systemic and through the concept of risk sharing, in order to produce societal benefits including non-disruptive and environmental gains. With the public sector taking the lead we were able to demonstrate the feasibility of the system when individual actors' resources are pooled.



PROJECT PLAN

The project proposed trialling Speyside-produced spirit (either Scotch Whisky or 'immature spirit' (new-make Scotch Whisky spirit) on rail from Elgin, working with distillers and logistics providers to move bulk spirit to Central Scotland where it is bottled prior to storage and export.

The spirit would move in demountable container tanks (intermodal ISO tanks) on rail wagons. Lifting equipment would be required at Elgin to facilitate transfer from local hauliers, and the tanks would be sent to an intermodal terminal in Central Belt for onward delivery. Empty casks could be sent northbound to Speyside in containers. Various trials of a number of commodities would be undertaken.

The exercise would be designed to be cost-neutral to the producers, and open to all. Security and integrity of the product would be closely monitored at all steps of the project. Data from our Rail Freight Capability Study 2010 would be used to inform gauge, length and routing. Key outputs would include:

- modal shift to rail
- maximising the use of rail's capability, demonstrating resilience and performance
- assisting with the development of the Moray economy
- encouraging collaboration among producers
- making the case for further infrastructure investment

¹ http://www.hitrans.org.uk/Documents/Whisky_Logistics_Study.pdf

FUNDING

A suitable funding package was identified. Food Port is a North Sea Region (NSR) Project which aims to develop the NSR as the best food cluster and hub in Europe for food products delivered via efficient and sustainable transport systems e.g. 'green transport corridors'.

Food Port operates under the umbrella of the INTERREG IV B - North Sea Region Programme, part of the European Regional Development Fund. The project started on September 1st, 2010 and runs until August 31st 2013. The total project budget is €4.9M, of which the ERDF co-finances 50%.

The project investigates and develops green transport corridors for food products between regions around the North Sea. This will lead to concrete modal shift pilots along the identified green transport corridors and to the development of (new) food platforms or hubs. In order to improve the food-logistics chain, new technological solutions will be incorporated, such as a technical support platform. Food Port brings together partners from six North Sea countries (Belgium, Denmark, Germany, Norway, Sweden and the United Kingdom) to find practical solutions to improve the efficiency, effectiveness and sustainability of the food supply chains.

The central **aims** of Food Port are to:

- optimize and coordinate food logistic chains in the North Sea Region;
- improve the accessibility and transport logistic system of different food clusters in the North Sea Region;
- strengthen the food industry within the NSR strategic position as Food Hub.

Food Port **priorities** are to promote the development of multi-modal and transnational transport corridors; and to promote the development of efficient and effective logistic solutions.

Food Port brings together partners from six North Sea countries (Belgium, Denmark, Germany, Norway, Sweden and the United Kingdom) to find practical solutions to improve the efficiency, effectiveness and sustainability of the food supply chains.

ERDF funding was matched by contributions from HITRANS, Highlands and Islands Enterprise and Moray Council.



PRELIMINARY WORK

Preparatory discussions were held with the Scotch Whisky Association Distribution Working Group, and individually with a number of distillers. Volumes and destination information were used to inform the project plan.

Discussions were held with infrastructure owner Network Rail and DB Schenker, controller of Elgin Yard, on rail access.

HITRANS funded test runs to establish distillery site access for bulk spirit ISO tanks. The results from the test runs concluded that predicted volumes were less than anticipated partly due to site constraints. Some sites couldn't accommodate the taller ISO tanks, whilst some companies have already invested in amending their tanker loading facilities to accommodate bottom loading of tankers – the Scotch Whisky has committed to voluntarily moving to bottom-loading of tankers by 31 December 2024 as a health and safety measure. As a result HITRANS widened the range of products from bulk spirit to include other commodities from the food and drink sector in order to create trainload volumes and frequencies.

An engineering study of Elgin Yard was commissioned to determine what investment was required for the traffic to run.

PROCUREMENT

HITRANS issued an Invitation to Tender (ITT) to rail freight operating companies (FOCs) This firmed up the cost of rail haulage to specified destinations and wagon hire of c.28 no platforms. The tender was designed to maximise flexibility, so that trains ran until funds were depleted, and every effort was made to service as many distilleries as possible. Access to Elgin Yard was assumed regardless of ownership/control. A total of five FOCs were invited to bid, three of them expressed an interest and two submitted indicative bids. In accordance with the criteria laid down, DB Schenker (DBS) were named as preferred bidders and subsequently appointed Train Operators for the project. DBS immediately worked with Network Rail to ensure optimal pathing.

HITRANS procured a logistics management partner (LOGMAN) to oversee the leasing of ISO tanks as required, and to co-ordinate the collection, delivery and loading of intermodal units. JG Russell were awarded preferred bidder status as they have significant intermodal experience throughout the UK, experience of handling bulk spirits and trained staff with appropriate equipment. They already handle bulk spirit for many of the distillers in the Speyside and Highland areas and operate intermodal terminals in Coatbridge, Glasgow, Inverness and London.

Distillers themselves managed collection and delivery through their existing supply chain contracts. LOGMAN handled security arrangements at Elgin Yard, and was responsible for compliance with HM Revenue & Customs.

An academic partner, TRI Napier, was procured to identify the environmental benefits that result from the transfer to more sustainable distribution.

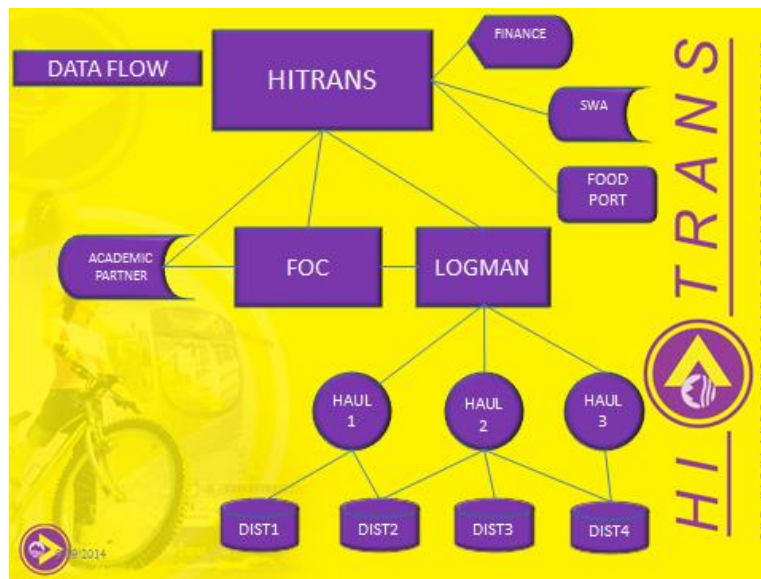
An infrastructure maintenance company was engaged to implement re-sleepering and other improvements at Elgin Yard as identified in the engineering study, while Network Rail undertook extensive devegetation and DB Schenker overhauled switches and crossings. Ballast was purchased from a local quarry and Moray Council assisted with yard sweeping

PROJECT MANAGEMENT

A part-time Project Manager was engaged by HITRANS to assist with the successful delivery of the project, in particular identifying volume from food and drink producers.

Financial control was vital to ensure that suppliers were paid timeously.

Distillery owning groups were asked to provide HITRANS with information on their costs for existing road movements to Central Scotland. These were required by HITRANS to calculate the difference between road only, and road-rail-road, to ensure revenue-neutrality.



PARTNER ENGAGEMENT

From the earliest stages the Scotch Whisky Association (SWA) and some of its members were involved in discussions about the potential to move bulk spirit by rail from distilleries in the north of Scotland to the central Scotland warehouse and bottling locations. It was agreed that Elgin was the most suitable terminal although Keith was also considered. To simplify the arrangements it was agreed that each distiller would use its existing transport partners for movements from the distillery to the Elgin rail terminal and for deliveries from the Grangemouth terminal to the Central Scotland locations which are in the Clydebank, Glasgow and Alloa areas. It was agreed to use two sizes of top fill ISO tank – 26000 litre and 33000 litre, standard off the shelf equipment.

Meetings were held with funding partners Highlands and Islands Enterprise and Moray Council as well as Food Port colleagues. HITRANS was fortunate to enter the project part way through thanks to the assistance of SEStran.



IMPLEMENTATION

Based on projected volumes two trains per week were planned, with the terminal operator loading bulk tanks of 26000 and 33000 litres with a reachstacker. Skeletal trailers were provided in the Elgin area to support intermodal movements. Such trailers are not generally used around Elgin and were hired and positioned from the Glasgow area.

In preparation for the rail trial tests were carried out at various sites to determine the suitability of loading bulk spirit at distilleries. These trials, funded by HITRANS, identified seven sites which were suitable. HITRANS also paid for pipework modifications to accommodate tank loading. HITRANS also approached a number of other distillers before and during the trial to determine their level of interest.

The first train ran on 1 September 2013. A large number of stakeholders including Richard Lochhead MSP Cabinet Secretary for Rural Affairs and Environment saw the loading of an ISO tank at Longmorn Distillery onto a skeletal road trailer before being loaded to rail in Elgin Yard. Media coverage was extensive.

Two wagon types were used during the trial. The 54ft FKA wagon was the most commonly used, being able to carry 8ft 9 in containers via Aberdeen or 8ft 6 via Inverness. The 60ft FAA wagon (platform length 40ft) carried 9ft 6 containers via Aberdeen and 8ft 9 in containers via Inverness. The trial represented the

first use of high cube wagons on the Aberdeen – Elgin route since the gauge was enhanced route by Scottish Government in 2007 and their performance was up to expectations. Ideally some 60ft platforms (FCA) would have been used but their absence did not impact on the trial.

There was limited interest in moving 9ft6 containers during the trial. These are extensively used by several major food producers in the Elgin area.

Prior to the trial there had been considerable interest in using 33000 litre containers and these were provided for the start of the trial. However, those tanks could only be filled to 30,000 litres and hence 26000 litre container proved more suitable and became the standard unit for the later part of the trial.

Some trains were cancelled were due to insufficient loads. The Project Manager had forecast in the region of 10 – 14 tanks per train. However, the number of tanks carried was fewer because the maximum insurance provision was sufficient for no more than 3 tanks per company. It is recognised that these short notice cancellations were a major issue for some distillers. In total, 9 trains ran.

A key learning outcome from the trial was that an early and clear understanding of the roles and responsibilities of each of the various parties is required. Unfortunately, for practical reasons, the trial commenced before all of the full legal and insurance arrangements had been finalised. It is usual that the transport provider offers sufficient and appropriate cover, not only to cover losses to the physical containers and train but also for the contents of the tanks and the excise liability in case of spirit losses.

A mid-term project review took place on 27 September with the 2 largest participants. The main issue at that stage was lower than expected volumes caused by distillery loading constraints and liability issues.

The project manager held regular discussions with participants during the trial.

Distance from the rail head, individual company transport arrangements, low volumes, seasonal production, and duration of the trial (likely to be too short) were some reasons why other distillers could not participate.

Moving malted barley in containers was examined but road haulage costs at both ends, and uncertainty over return loads made this unattractive. Alternative wagon types with 60ft platforms would make this much more attractive in future.

While the road haulage of whisky products was carried out by the haulage partners appointed by the distillers, there may be opportunities to streamline this in future to improve utilisation of skeletal trailers and to support transport opportunities available for local haulage of other inbound traffic.

At the end of the trial a major food producer was assisted to move product by rail for export via Grangemouth, the operation being dubbed Taking the Biscuit. This might provide substantial volume for any future commercial rail freight service.

All of the trains operated ran to schedule, with one exception in late October. In that case the time sensitive freight was transferred to road movement in accordance with customer requirements. Any costs associated with these arrangements were absorbed by HITRANS. On time performance was in the region of 94%.

KEY OUTPUTS

- Track improvements value £25000 carried out in Elgin Yard to permit traffic to run
- Train plan with DB Schenker drawn up
- LOGMAN JG Russell procured 33000 and 26000 litre ISO tanks
- Reach stacker procured by JGR for container lifting
- Access to distilleries for loading ISO tanks has been tested
- Proved the pathing to and operation of the yard
- Understood the optimum wagon/container combination to maximise gauge availability
- Developed an alliance between Network Rail DB Schenker JG Russell and HITRANS to successfully operate trains
- Found solutions to the contractual/liability issues
- Tested the market for 33000 litre ISO tanks vs. 26000 litre ISO tanks
- Operated the terminal in a safe and secure manner
- Satisfied the distillers' requirements for tank cleaning
- Funded alterations to distillers' loading infrastructure
- Attracted widespread media and trade press coverage including BBC news
- TRI carried out the environmental benefit study;
- In addition to bulk spirit, seed potatoes for export in reefers, empty whisky casks in deep sea containers and, significantly, food product for export were consigned.

BUDGET

- Total project value EUR 361,975
- Total ERDF support EUR 180,062
- HITRANS EUR 180,988(includes Moray Council £20000, HIE £30000)

ENVIRONMENTAL REPORT EXECUTIVE SUMMARY

1. The aim of the report is to analyse the environmental benefits of moving whisky spirit by rail from Elgin to Grangemouth.
2. It describes the trial mode switch from road to rail which took place between September and November of 2013 and which involved 4 distillers and 7 distilleries plus a potato grower in the HITRANS area of Scotland.
3. The trial involved the use of specialised inter-modal containers filled at the various distilleries, taken by road to Elgin, transferred onto a train and taken to Grangemouth where they are off-loaded onto lorries to be transported to their final destination in the central belt of Scotland.
4. The methodology used was the Department for Transport's (2009) Mode Shift Benefit analysis which is used for assessing mode shift grant schemes in the UK. It is designed to assess the net social benefit of transferring freight from road to rail (or water).
5. This methodology takes into consideration the costs of congestion, accidents, noise, climate change, air pollution, infrastructure and other costs. The net social benefit (NSB) of transferring freight from road to rail (or water) is made up of 'the net benefit of reducing the amount of freight traffic on road and the net cost of increasing the amount of freight traffic on other modes' (DfT, 2009). The mode shift benefits thus reflect the NET effect of transferring goods from road to other modes. Although very general, this methodology is probably the best available at the time of writing and for the scope of this report.
6. The analysis in the report also accounts for the additional road legs at either end of the rail trip.

7. Using data provided, marginal social benefits were calculated. The conclusions are quite clear that there are substantial benefits from this modal switch, both in terms of pure environmental benefits in the reduction of CO2 and the wider social benefits.

8. The report concludes that for each round trip lorry load displaced by rail, approximately half a tonne of CO2 is saved and approximately £200 of marginal social benefits accrue.

9. For each train laden with 20 containers, this amounts to 10 tonnes of CO2 saved and £4000 of marginal social benefits to society. Over a year, the benefits would amount to 520 tonnes of CO2 saved and £208,000 of marginal social benefits accruing to society.

SCOTCH WHISKY INDUSTRY ENVIRONMENTAL STRATEGY REPORT 2013

Transportation of bulk spirit by rail has the potential to cut road journeys and emissions and offer flexibility in transport options for a growing industry. If train transport became a permanent option, it would give distillers additional flexibility when planning movements of spirit to the central belt for bottling when the industry is expanding to meet increased global demand for Scotch.

There was real willingness from distillers to get involved in this collaborative demonstration project and some bulk spirit and casks were taken by train during the trial. While we await the formal outputs which will be published by HITRANS, many challenges were revealed during the trial – some of which will require strong collaboration to overcome in the long term.

The programme showed it was physically possible to move bulk spirit by train but it demonstrated that there are many practical, health and safety, compliance and contractual matters that need attention before rail transportation of spirit can become a long term option for distillers. The trial demonstrated real appetite across the supply chain for change and we hope that commitment can be maintained to make the logistical and commercial aspects of rail transport work to become a permanent option.



MODEL TRAIN

Train performance and consist was analysed to develop a theoretical model for future operations: TOFT- Totally Optimised Freight Train. If Freight Facilities Grant /Mode Shift Revenue Support can be attracted, a regular freight train between Elgin and Central Scotland train can produce a surplus. The model below with a variety of commodities in both directions shows that the train can break even with support of just £220 per round trip.

LIFTING THE SPIRIT- Towards TOFT -Totally Optimised Freight Train 20 platform

HITRANS

| Commo | Rail Costs £ | | | | Handling costs £ | | | | | Rail v Road | | | |
|---------------------|--------------|-----------------------|---------------------|---------------------|------------------|----------------|---------------|--------------|----------------------------|--------------------|----------------------|--------------|---------------------------|
| | Contain | Rail plats used | Cost per plat | Cost per part | Cont hire | C Belt lift | Elgin lift | Road legs | Total handling costs | Rail + handling | Road only cost | Net 1 way | Net 2 way ² |
| Spirit ¹ | 20 | 0.5 | 450 | 225 | 60 | 40 | 46 | 200 | 346 | 571 | 530 | -41 | -41 |
| Food | 40 | 0.67 | 450 | 301.5 | 0 | 40 | 46 | 150 | 236 | 537.5 | 450 | -87.5 | 250 |
| Food | 40 HC | 1 | 450 | 450 | 0 | 40 | 46 | 150 | 236 | 686 | 450 | -236 | 102 |
| Potatoes | 40 HC | 1 | 450 | 450 | 0 | 40 | 46 | 200 | 286 | 736 | 480 | -256 | 104 |
| Casks | 40 HC | 1 | 450 | 450 | 0 | 40 | 46 | 140 | 226 | 676 | 450 | -226 | 112 |
| Retail | 40 HC | 1 | 450 | 450 | 0 | 40 | 46 | 200 | 286 | 736 | 450 | -286 | 52 |
| Misc | 40 | 1 | 450 | 450 | 0 | 40 | 46 | 180 | 266 | 716 | 450 | -266 | 72 |
| Misc | 20 | 0.5 | 0 | 0 | 0 | 40 | 46 | 100 | 186 | 186 | 300 | 114 | 114 |

¹ 2x20 loaded 1x empty

² backload at 75% cost

| | | | | | | | | | | | | | | | | | | | | | | | |
|----------|------|---------|------|---------|----|---------|---|---------|---|---------|----|---------|----|---------|----|---------|----|---------|----|----|----|----|------|
| -225 | -225 | -225 | -225 | 56 | 56 | 228 | 0 | 0 | 0 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | LOCO |
| Wagon 10 | | Wagon 9 | | Wagon 8 | | Wagon 7 | | Wagon 6 | | Wagon 5 | | Wagon 4 | | Wagon 3 | | Wagon 2 | | Wagon 1 | | | | | |

Train consist northbound Surplus -303

| | | | | | | | | | | | | | | | | | | | | | | | |
|----------|------|---------|-----|---------|----|---------|-----|---------|-----|---------|----|---------|----|---------|----|---------|----|---------|----|----|----|------|--|
| -225 | -225 | 125 | 125 | 52 | 52 | -82 | -82 | -82 | -82 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | LOCO | |
| Wagon 10 | | Wagon 9 | | Wagon 8 | | Wagon 7 | | Wagon 6 | | Wagon 5 | | Wagon 4 | | Wagon 3 | | Wagon 2 | | Wagon 1 | | | | | |

Train consist southbound Surplus 84

| | |
|---------------------|--------|
| Mode shift benefits | £4,000 |
| Surplus | -£220 |
| Balance | £3,781 |