

SCANDINAVIAN DREAM PAYS OFF

The rail and road link between Denmark and Sweden has had a positive economic impact across the entire Baltic region, as Chris Dickinson explains

The construction of a fixed link between Sweden and Denmark, across a stretch of water known as the Oresund, was given the go-ahead in 1991. The success of the road and rail bridge, since it opened in 2000, is significant given the innovative and complex nature of the project and the environmental questions it raised.

The link joins Copenhagen, from a point close to its airport, with Malmo in Sweden, 16 km away. It includes, a 3,510-metre tunnel on the Danish side, and a 4,055 metre-long artificial island. The line rises from the island onto a 7,845 metre-long bridge, which has a 55 metre-high section in the middle to enable shipping to pass underneath. The toll terminal is at the Swedish end, at Lernacken.

The artificial island has a reinforced cap formed from pre-fabricated concrete sections, which were cast on shore and then sunk into position before being sealed.

The rail link was funded as a Trans European Network (TEN), using loans underwritten by the Swedish and Danish governments. Motorists and railway companies have to pay tolls but trains do not stop as the tolling system is electronic. The link has created an economic hub that is now the sixth largest in Europe.

The debt from the €2.4 billion

Chris Dickinson is an IRO Board Member and rail director, London, for Hyder Consulting UK, a management owned company involved in worldwide rail, road, tunnel and bridge engineering and operations. The company has roots going back 150 years in the UK.

scheme is forecast to be paid off by 2028; the annual charges are part-fixed and part-variable for the rail element. The associated investments in the area eventually exceeded the cost of the link itself and included a mini metro and a university.

RAILWAY DESIGN

The line was designed for 200km running on a two-track railway. The railway runs in a parallel tunnel in the tunnelled section and the island, but then underneath the road bridge. Slab track was used to reduce the height of the tunnel sections and keep costs down. The maximum gradient is 1.56 per cent.

One problem that had to be overcome was the difference in the railway systems of Sweden and Denmark. For example, a green signal in Sweden permits line speed running but in Denmark it means that a stop signal can be expected beyond the green aspect. The system was designed in 1996, before ERTMS solutions for Automatic Train Protection. A complex but reliable joint ATP system was created, which involved widespread software changes to the signalling systems of DSB and SJ railways. Testing was extensive and not always smooth. The existence of a lot of metal around a train on the bridge sections led to ghost transponder signals, as the structure effectively acted as an aerial. Some components had to be redesigned to cope with chill factors as low as minus 40 degrees, particularly transponders. The interlocking used in both countries also differed, requiring a special interface to translate signal



status, ATP telegrams and other features.

The radio systems were also different; Sweden used digitally based GSMR, whereas Denmark operated a system similar in concept to our current, soon to be replaced, analogue cab secure CRS system – but, in this case, linked to the ATP computer. A transponder changes the systems so that the driver can always speak to the correct controller.

The OLE interface between the Swedish 15kv, 16 2/3Hz and the Danish 25kv 50 Hz systems required a neutral section. However, the system was designed so the power feed could be from either rail system's supply, if this should be needed.

Even the permanent way standards differed, with Swedish rail inclination set at 1:30 and Denmark at 1:40. Commonsense prevailed and one standard was applied – the Swedish one – at least on the bridge section.

OPERATIONS

Language was another barrier to overcome. A point in Swedish is a 'Vaxel'; in Danish it is a 'Sporskifte'. So, a four-week rules and regulations course was designed and 150 words of joint railway speak were created in a sort of Swe-Dane hybrid language. Special attention was paid to emergency planning for staff on both systems. A contingency plan was finalised six months before opening and training took place – not only of railway staff, but also of the 12 emergency authorities and agencies involved. Over 2,000 staff attended courses where simulated 'table-top'

accidents were used to test readiness. Three scenarios were used:

1. An HGV accident in the road tunnel, involving a hazardous cargo and a multiple pile-up behind it, with passengers trapped;
2. A train fire on the bridge section, necessitating evacuation on to the motorway bridge;
3. A derailment in the rail tunnel section, again requiring emergency access and egress through British-designed fire doors, which are gravity operated to seal off an area from smoke and fire.

The system has largely worked safely and efficiently since opening.

BENEFITS AND LESSONS

So, what can the UK learn from this? First, that a project of this nature is not planned in isolation. The whole economic infrastructure of the area has been taken into account.

Second, that market needs and market forces have been the prime driver of requirements, a considerable achievement in two countries hitherto more famous as progressive social and welfare-based economies.

Third, a determination that the link would be an engine of future economic growth and structural change to the economy. It was not simplistically based on existing trading patterns and employment interchange, but seen as a vision of the potential in a new economic hub designed to stimulate emerging and growth industries.

Joining Malmo and Copenhagen has rejuvenated the Baltic region, with significant growth in the economies of the former eastern bloc countries of

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DIARY OF EVENTS

NORTH WEST AREA

Tuesday 25 January, 1800 for 1830, Liverpool. Venue: The offices of Merseytravel, Hatton Garden, Liverpool. This is a joint meeting with the CLIT. Speaker: Mr Patrick Verwer, managing director and Mr Rudi Boersma, concession development manager with Merseyrail, 'Merseyrail: A Model Railway?'

Wednesday 16 March, Manchester. Chris Leah, chairman of the IRO and the North West Area AGM. To contact the North West area on any matter, please contact Clive Evans on 01270-629009 or e-mail us at: Northwest@railwayoperators.org

MIDLANDS AREA

Monday 24 January – presentation on the Cherwell Valley resignalling project

Monday 21 February – provisional date

Monday 21 March – provisional date

Monday 25 April – provisional date

Monday 23 May – provisional date

Saturday 18 June – provisional date

To contact the Midlands Area on any subject, please contact Julia Stanyard on 0121 345 5030 (NEW NUMBER) or e-mail: Midlands@railwayoperators.org

SOUTH EAST AREA

All South East Area meetings take place at the Union Jack Club, Sandell Street, Waterloo. Doors open at 1800 and the talks commence at 1830. To contact the South East area on any subject, please e-mail: Southeast@railwayoperators.org

NORTH EAST AREA

Tuesday 11 January, 1730 for 1800, York. Speaker, Chris Exley, Operations Specialist with the Rail Safety & Standards Board on 'The development of GSMR from NRN and CSR to meet the needs of the modern industry'. Venue: GNER Studio 1 on platform 9 at York station.

The full programme of events for 2005 will be published next month. The North East Committee would like to wish seasonal greetings to all and looks forward to seeing you in the New Year.

On Tuesday 2 November 2004, 20 members met at York in the GNER training centre, Studio 1, to hear a presentation by Mike Hogg, EWS General Manager Performance and Operations Development, on the evolution of EWS and the general performance of its services. He described the types of traffic inherited by EWS from the three BR freight divisions and the changes that had taken place in commodities and routes, over the life of the company to date.

After the meeting, Mike announced that he was stepping down as chairman of the North East Area as he has joined the IRO Board of Directors and felt that he could not do justice to both roles. Mike has been the local chairman since the inception of the IRO, has developed the area and contributed significantly to the education programme. The members thanked Mike and wished him well in his new role. Gordon Dennis, currently

treasurer in the North East, agreed to assume the responsibilities of chairman with immediate effect. The North East Committee would be pleased to hear from any member who would like to join the committee and bring experience and ideas to the team. Contact Gordon Dennis at gordon.dennis@networkrail.co.uk

North East Area meetings normally take place at 1730 for 1800, at York.

For further news on the IRO in the North East contact us by e-mail at: Northeast@railwayoperators.org

SCOTTISH AND IRISH AREA

IRO members are assured of a warm welcome at the following Scottish CLIT meetings:

Tuesday 11 January – 1730 for 1800, Edinburgh. The Annual Political Event : Fergus Ewing MSP on 'The SNP's Vision for Transport', Edinburgh City Chambers, High Street, Edinburgh EH1 1YG

Tuesday 15 February – 1730 for 1800, Glasgow. Bill Burns, MD of the Hunterston Container Terminal on 'Clydeport and the Development of Hunterston', 16 Robertson Street, Glasgow G2 8DS.

NIGHT TRAVEL

Members heard a talk from Willie Black, manager of the Caledonian Sleeper services, on making 864 beds every night. First Group had just taken over the ScotRail franchise and, like the Scottish Executive, is committed to the Sleeper

business. Out of a fleet of 53 vehicles, 48 are needed nightly, which is demanding, since there are specialised vehicles included, such as the lounge car and the Club Brakes. Willie described the work that is going into improving the telesales booking system and customer service for passengers once they are on the train.

SPREADING THE NEWS

The local committee recently gave a presentation to managers of rail companies operating in Scotland to introduce them to the educational modules and to discuss how best the activities of the area council could be arranged, given the problems of shift work and a large geographical area. It seems likely that the activities will concentrate on a few events each year, with a reduced emphasis on evening talks. This highlights the need for members to keep advising the IRO of changes to their e-mail or other addresses. A significant number of messages from the committee in the past year have been returned by the e-mail postmaster. For information, please contact Scottish@railwayoperators.org or phone Jim Summers, acting chairman on 01324 625284

SOUTH WEST AREA

For information on all South West events and matters, contact Lawrie Hall on 01453 822150 or e-mail us at Southwest@railwayoperators.org

Latvia and Lithuania. In summary, transport innovation has been used as an engine of growth, and not simply as a method of securing a return on capital.

Our own experience in Ashford, with the advent of high speed commuter trains, may similarly change the way rail infrastructure improvements are viewed and appraised here, in contrast to the present situation where many projects struggle for funding. Rail in Europe is seen as an integral part of economic growth in a world where capital, employment and production is acutely sensitive to transport links.

EDUCATION PROGRAMME NEWS

We are now accepting applications for enrolment on both our Associate Course and Member Course. For course information and application forms, please contact Mike Hill on 01344 875328 or education@railwayoperators.org. Employees of corporate member companies receive a 30 per cent discount on course fees, whether the fee is paid by the employer or the individual.

MEMBERS' NEWS

The following employers operate a Corporate Membership scheme, by paying a one-off annual fee, which covers all their employees' Affiliate or Associate

membership subscriptions. Network Rail Eurostar UK Ltd, ScotRail, First Great Western, First Great Western Link, One, Central Trains, EWS Railway, Northern Ireland Railways, Freightliner, Virgin Trains, First North Western, Thameslink, GB Railfreight, Hull Trains, South Eastern Trains, Corus Rail Consultancy, Iamród Éireann, Arriva Trains Wales, Southern, London Lines, Transport for London/London Underground Ltd/Docklands Light Railway, Stagecoach Rail (South West Trains, Island Line, Sheffield Supertram).

Those with full Membership will continue to pay their subscription personally, irrespective of whether they can subsequently claim it back. Please note

that, as subscriptions are tax-deductible, a receipt will be issued for all payments.

PROFESSIONAL QUALIFICATIONS FOR RAILWAY OPERATORS

Have you got experience of operating the railway? Would you like professional recognition, development and qualifications? The Institution of Railway Operators has been established to provide a professional structure and qualifications for people with knowledge and experience of operating the railway, at all levels. An information pack is available for anyone interested in finding out more. Contact Claire Wickes at the above address to get a pack for yourself or colleagues.