ČD Railjet News
OUIGO Initial Results
China To Europe Freights
Wheelset Torsion Oscillations
Arlanda Express EMU Modernisation
Planning for a rail link to Arlanda airport began in the early 1980s, and in 1993 the Swedish Government invited tenders for a public-private partnership to build the 19 km double track branch from the Stockholm to Uppsala, Gävle and Sundsvall line, the Östkustbanan. In August the following year the contract was awarded to a consortium formed of the Nordic Construction Company, Slab, Vattenfall, GEC Alsthom and Mowlem. Construction began in 1995 and A-Train was created as the operating company, its concession running until 2040. Inauguration of the line, which forms a loop leaving the Östkustbanan at Myrbacken and rejoining it at Skavstaby, took place on 25 November 1999. Three stations are provided, one at Sky City, on the loop, and two on the short branch serving Terminal 5, and Terminals 2, 3 and 4. All the airport stations are subterranean, the main tunnel (excluding the branch) being 5,101 m long. Electrification is the standard Swedish 15 kV AC 16.7 Hz.

A-Train holds the monopoly for carriage passengers between Stockholm Central and the airport, whilst other operators can only serve Sky City, and are not allowed to carry passengers between there and the capital. A-Train services are quarter-hourly, with five departures per hour at peaks, journey time being around 20 minutes. The standard single fare is 260 SEK (29.7 EUR), though with various discounts (for instance, the return fare for pensioners and youngsters up to 25 years of age is 120 SEK, and there is a weekend two-for-the-price-of-one offer).

Since 2004 A-Train has been owed by the Australia-based Macquarie Group, which paid 70 million SEK for the company and also assumed responsibility for a debt of 330 million SEK (35 million EUR). The same year the Swedish National Audit Office criticised the way the Arlandabana project had been developed, and in particular the fact that A-Train was able to set fares as high as it wished, resulting in patronage levels which were too low to make the service economically self-supporting (the initial target specified in the late 1990s was 5.1 million passengers per annum by 2005). The Swedish Parliament reached similar conclusions in a motion passed on 7 October 2008, also noting that A-Train was free to charge as much as it wished to other train operators wanting to divert their services via the airport line.

In that year Arlanda Express carried 25 % of all passengers travelling between Stockholm and the airport, and 9 % of all airport employees (the latter, around 16,000 of them, enjoy free car parking at Arlanda). Although the state held an option to purchase operating rights from A-Train in 2010, and thus reduce fares and line access charges, it was reckoned that this would be a waste of public money, since in any case in 2040 the line would revert to state ownership, without any charges involved. Moreover, early in 2010 Stockholm residents using the service voted Arlanda Express the best company in the travel industry.

The Trains

A batch of seven four-car 200 km/h Class X3 EMUs was ordered from GEC Alsthom’s Birmingham works in 1998/9. These 93.4 m long, 3.06 m wide, air conditioned trains, which have a Bo’Bo’ + 2’2’ + 2’2’ + Bo’Bo’ axle arrangement, are rated at 2,240 kW (each three-phase asynchronous traction motor is rated at 280 kW) and Onix control and IGBT converters. They were originally fitted with single-class 2 + 2 seating, in rows, for 190 passengers. Luggage stacks were provided, together with wheelchair spaces and a wheelchair-accessible WC cubicle. The interior colour scheme was predominantly russet red and grey, with yellow grab-rails. Tare weight was initially 193 t.

The first Arlanda Express train arrived in Sweden in June 1998, more than one year before the start of regular service. There was thus plenty of time for an exhaustive series of test runs. A very extensive programme was completed before the trains could enter service. No fewer than three government agencies were present to monitor the test runs: the Swedish National Electrical Safety Board, the Swedish National Rail Authority and the Swedish Railway Inspectorate. After an exhaustive year-long trial, the first Arlanda Express EMUs entered service in November 1999.

In 2006 the X3s were subjected to an interior refurbishment programme, this including new fabrics on the old seats, a new colour scheme on some of the bulkhead walls and new carpet on some parts of the floor. Three colour schemes, green, orange and blue, were used, the design being realised by those who designed the fashion label of the former Swedish tennis player Björn Borg, and with the same name and motif (a tennis ball on the antimacassars).

Framtidståg

In 2008 A-Train launched its Framtidståg (Future Train) project, budgeted at 100 million SEK (10.6 million EUR). This was prompted by the need to encourage more airline passengers to switch to rail travel between Arlanda and the capital. Such is the volume of road traffic to and from the airport that...
Two views of the interior of the Framtidståg: note the thin seat shells, the wood trim on the luggage racks and window frames, and the spot lighting.

Photos: Patrik Johansson

the CO₂ limits established for the area around the latter have now been reached, and should they be exceeded the Swedish Government can order the number of aircraft arrivals and departures to be reduced. In 2008 Arlanda Express was used by around 3.2 million passengers (up by 25 % on the 2005 figure), while the airport handled some 18.1 million passengers (7 % more than in 2005). The train would appear to be gaining ground, and in response to this the operator decided to increase seating capacity by 20 %, while not compromising on comfort standards, since the objective is to win as many passengers as possible.

In early 2010 the first of the X3s was sent to the Euromaint Rail works in Malmö for its second refurbishment, and was outshopped in late June 2010. The seventh X3 returned to service in 2011. Idesign was given overall responsibility for the refurb design, exterior and interior. The interior included all visible parts such as seats, window frames, lighting, handrails, the WC fittings, sun protection and the integrated displays in the glass walls. A-Train worked closely with the suppliers of all these components, considering also the choice of materials, colour schemes, and designs.

A full-size mock-up of a train interior was finally developed in A-Train’s workshop, using design concepts prepared in two and three dimensions. Such a mock-up was considered essential, to test out the design among potential passengers and to assess the opinions of handicapped passengers, including those with only partial sight. The seat units were produced by Safeman of Olofström, the lighting was mainly produced by Flux, and the whole of the refurb was undertaken by Euromaint. Idesign subsequently received the Red Dot Design Award for the interior design of the trains and in May 2011 in the Global AirRail Award the Framtidståg have been named as Project of the Year.

Idesign describes the refurb as „New Nordic”, featuring wood trim on the window surrounds and along the overhead luggage racks. The seat units feature woolen upholstery in pastel shades of brown, grey and blue, while the vacuum-formed plastic seat backs, slightly shell-shaped to offer passengers greater privacy, are thinner than those originally fitted on the trains.

Space is provided for small items of luggage to be stowed under the seats, and the armrests, which can be raised and lowered, are made of brushed steel. There is a cup holder between each seat, together with a socket for powering personal electronic equipment. More seating space has been gained through the elimination of the original luggage stacks, situated adjacent to each entrance vestibule, replaced by conventional overhead longitudinal racks with transparent bases, the latter enabling passengers to keep an eye on their personal belongings. Spaces designated for wheelchair harness points or prams are fitted with tip-up seats. The original heating ducts, situated where the side-walls meet the floor, have been replaced by new ones, of a shape which enables them to be used more comfortably as footrests by those passengers occupying window seats. Seating capacity has been increased to 237.

Interior lighting was originally by means of fluorescent tubes. These have been replaced by a spot lighting system, which offers a more subdued illumination and which is controlled by GPS. When the train is on the move the lighting level is reduced, coming to full strength at station stops. The degree of illumination can also be adjusted manually by train staff. New carpets have been laid, floor and ceiling acoustic insulation has been enhanced. The windows are now fitted with sun blinds, and these can be individually adjusted by passengers.

The video screens, used for both information and advertising purposes, are now mounted on the glazed interior bulkheads. The ceilings of the entrance vestibules are decorated with a leaf motif pattern. One of the intermediate cars now has a lounge area. There are shelves on each sidewall, large enough to accommodate not only a cup or glass, but also a laptop. Bar-style stools are provided adjacent to the shelves. Free wireless Internet is offered and this car also includes a Service Point desk which, once tickets have been checked, is staffed by the train crew. Here information concerning the airport complex, airline services and hotels can be obtained. The X3s originally had one WC cubicle, in one of the intermediate cars. This was wheelchair-accessible, but has been replaced by a new one, somewhat larger.

The exterior livery has been revised, with the yellow on the cab ends being extended diagonally further back to roof level, and while replacing grey, the styling giving an impression of speed. „Arlanda Express” is embazoned on the sides of the cars in gold and silver letters. On the entrance doors is the Good Environmental Choice symbol. The pantograph has been painted green, again to emphasise the environmentally friendly aspects of electric traction.

Updating The Traction Equipment

As part of its efforts to maintain its high punctuality levels (as high as 99 %), in July 2012 A-Train selected ABB to design a refurbishment project for the trains’ traction transformers, to improve equipment performance, reduce lifecycle costs, and limit the risk of power breakdown and outage.

Each Arlanda Express EMU is equipped with one traction transformer. ABB has custom-designed a new traction transformer that fits per-
An ABB underfloor traction transformer similar to the one that ABB has designed for Arlanda Express. The transformer is fitted in a cubic measuring 3,700 mm in length, 2,260 mm in width and 810 mm in height (overall dimensions). It weighs 6,800 kg.

United Colours Of Junipers

As reported in R 2/12, p. 11, the Class 458/0 Juniper EMUs and the Class 460 Gatwick Express EMUs, owned by Porterbrook Leasing, are to be merged into a single fleet of trains for use by South West Trains. The 30 four-car 458s and eight eight-car 460s (in all, 184 cars) are to be recombined to create 36 five-car EMUs.

The modification work to the Class 460 intermediate cars includes over 5,000 wiring modifications, the re-gearing of the driveline from a top speed of 160 km/h to one of 120 km/h and the installation of Automatic Selective Door Opening. At Loughborough the Class 460 driving cars will lose their characteristic “Darth Vader” front ends, to be replaced by ones which are compatible with the Class 458s. The four DMLFO cars will have their passenger accommodation extended into the former luggage space. The problems with the Class 458/0 driving end corridor connections will also be rectified during the transformation, thereby allowing full access through trains when running in multiple.

The trains will also be made compatible with the Class 450 Desiro EMU fleet (although it is not intended to use them in multiple with the latter on a regular basis), and will be deployed on services between London Waterloo and Reading, operating in multiple as ten-car formations. Here we see TSO (Trailer Second Open) 74443 (from 460 004) being lifted ready for the next phase of work on 16 April 2013. TSO 74444 (from 460 005, not visible) was the vehicle closest to completion and will be used as a test „bench” before being fully fitted out.

2012 Results And 2013 Outlook

In 2012 3.3 million passengers chose to travel with Arlanda Express. A further 1.3 million travelled to and from airport with other rail operators that use the Arlanda Link. This total of 4.6 million rail passengers is the highest so far. Arlanda Express reported pre-tax profits of 142 million SEK for 2012, compared with 130 million SEK in 2011. Revenues rose to 642 million SEK (625 million SEK in 2011).

In 2012 the platform access and the platforms at Arlanda were upgraded with artistic installations, consisting of various contemplative designs with sounds and images providing a welcome oasis of tranquility for busy travellers. A new development is that since 9 December 2012 SL, Stockholm’s public transport authority, stops its Älvsjö to Uppsala suburban trains at Arlanda Central to set down passengers. This should result in an increase in the use of rail to access the airport. However, also from 9 December 2012 UL’s Upptåget service between Upplands Väsby, Arlanda and Uppsala has ceased to call at the airport.

On 9 December 2013 SL started a new all-stations suburban service linking Älvsjö and Uppsala, and thus calling at both Stockholm Central and Arlanda Central. Journey time from Stockholm Central to Arlanda Central is 37 minutes, compared with the 20 minutes offered by Arlanda Express. However the single fare is just 120 SEK, compared with that of 260 SEK charged by Arlanda Express. The SL service is operated using Coradia Nordic X60 EMUs, which have wider bodysides than do the Arlanda Express EMUs, and a different entrance door threshold height. Because of this the Coradia Nordics use Arlanda Central station in SkyCity, situated between Terminals 4 and 5. This is also used by other local and long distance services, whereas the Arlanda Express trains serve Arlanda South (for Terminals 2 and 3) and Arlanda North (for Terminal 5). Here we see X6055 on one of SL’s first all-stations cross-capital services to Älvsjö waiting to depart from Uppsala on 9 December 2012.