

## SPOTLIGHT Germany

It could have been called the *Reunification Express*, but in the Deutsche Bahn timetable it is shown, less prosaically perhaps, as the Berlin – München Sprinter. Operating three times a day, the limited-stop Berlin – München service to be launched on December 10 offers a fastest journey time between München Hbf and Berlin Hbf of just 3 h 55 min. Complemented by regular-interval ICE services taking around 4 h 30 min with additional stops, the Sprinters symbolise one of the final stages in Germany's huge investment programme designed to unite the two halves of the country after the fall of the Iron Curtain in 1989.

A timing of under 4 h for the Berlin – München trip has been a long-standing objective, first articulated when Helmut Kohl's government announced plans for German Unity Project VDE8 (*Verkehrsprojekt Deutsche Einheit Nr 8*) in 1991. At that time the trip by IC train took nearly 8 h 40 min, a figure which has fallen to about 6 h 15 min as successive parts of the project have been completed. VDE8 was just one of 17 reunification transport investment schemes that included the high speed link between Hannover and Berlin, completed in 1998.

### 'Absolutely competitive'

Forming part of the TEN-T Corridor from Scandinavia to the Mediterranean, and thus qualifying for an element of funding from the European Union, the €10bn VDE8 project consists of a succession of upgrading schemes and sections of new line. The 107 km new line from Erfurt to Ebensfeld fills the last gap in the route, and DB is hoping to double its market share of all Berlin – München traffic from 20% to 40%.

Birgit Bohle, Managing Director of DB Fernverkehr, said in October that the operator anticipated carrying 3.6 million passengers a year between München and the capital, twice as many as currently. Rail will become 'absolutely competitive' with both air travel and the private car, DB asserted.



# Sprinting from München to Berlin

Opening of the Erfurt – Ebensfeld high speed line this month represents the final stage of a German reunification project launched in 1991. DB will cut the fastest München – Berlin timings to under 4 h, with the aim of doubling rail's market share on the route. **Murray Hughes** reports.

**DB Chairman Richard Lutz rode an ICE-T test train between Erfurt and Ebensfeld on June 16.**

The opportunities for new business certainly look attractive. From December 10, a business traveller will be able to make the return München – Berlin trip in a day, leaving München at 05.56 and reaching the capital's main station at 09.51; the return departure from Berlin Hbf at 18.05 reaches München at 22.03. With stops at Nürnberg, Erfurt, Halle and Berlin Südkreuz, the Sprinter services, operated by ICE3 trainsets, will travel 623 km; slower

services worked by ICE-T trainsets will be routed via Leipzig, covering 652 km. Some of the ICE-Ts will operate in multiple, with up to 10000 additional seats a day available.

DB also hopes to attract more leisure traffic. It cites journey times 'from 5 h 50 min' between Berlin and Kempten or the mountain resort of Garmisch-Partenkirchen. Journeys from Berlin to the Austrian Tirol, popular with German holidaymakers, will also be quicker.

Table I. Details of VDE.8 German Unity project

	VDE 8.1		VDE 8.2	VDE 8.3
	Upgrading	New line	New line	Upgrading
Section	Nürnberg – Ebensfeld	Ebensfeld – Erfurt	Erfurt –Halle/Leipzig	Leipzig/Halle – Berlin
Completion	In progress	2017	Dec 13 2015	2006
Length km	82	107	123	187
Maximum speed	160 to 230	300	300	200
Tunnels	2	22	3	0
Length in tunnel km	7.3	41.0	15.4	0
Viaducts	2	29	6	2
Length on viaduct km	0.4	12.3	14.4	0.9

### Project stages

Described as the largest infrastructure scheme in Germany, VDE8 consists of four sections between Nürnberg and Berlin (Table I). To this must be added the München – Nürnberg leg of the route, which is not strictly part of VDE8. Upgrading of the München – Petershausen section at the southern end was completed by 2003, and work to improve the Petershausen – Ingolstadt section followed in 2010-14. North of Ingolstadt, DB chose to construct an

89 km new line to Nürnberg. Only the second route in Germany where trains operate at 300 km/h, this opened in 2006 in time for that year's football World Cup.

Completion of VDE8 has been neither easy nor quick. The project ran into trouble soon after Helmut Kohl's government had given the formal go-ahead. As the planned route of the Ebensfeld – Erfurt line passed directly through the Thüringer Wald, groups of environmentalists were quickly up in arms. They argued in favour of upgrading the existing but sinuous line via Saalfeld and Lichtenfels. This would not serve Erfurt, the *Land* capital of Sachsen-Anhalt, and the route through Thüringen and Bayern was agreed in 1993, being confirmed at federal level a year later. Despite this high-level support, officials attending a ceremony to mark the start of construction in April 1996 could hardly have been surprised when the event was interrupted by noisy protesters.

Worse was to follow. Financial agreements were reached in 1997 for the Ebensfeld – Erfurt line and the Gröbers – Leipzig part of the route, but in July 1999 the federal government, under pressure to make savings, announced that work on the Nürnberg – Ebensfeld upgrade and the Ebensfeld – Erfurt line would be halted. Work was soon slowed down or stopped entirely on some sections, leaving half-finished structures scattered across the countryside. Only in 2002 did Chancellor Gerhard Schröder's government agree to release further funding, allowing the work to resume. DB had meanwhile tried to continue site work so that the construction permits did not lapse.

Some progress was finally evident in 2003 when a 23 km section of new line was opened from Gröbers to Leipzig/Halle airport. This was followed in 2006 by the completion of upgrading work to permit 200 km/h running on the northernmost section of the route from Halle and Leipzig to Berlin. Two years later DB opened the rebuilt station at Erfurt that had been comprehensively remodelled to serve as a future hub for ICE services — this required reconfiguring of tracks and structures over a length of 5 km.

**Engineering challenge**

Quite apart from the environmental concerns, the 107 km alignment from Ebensfeld to Erfurt through the Thüringer Wald presented a huge challenge to the project engineers. Built for

**The VDE8 project consists of upgraded lines from Berlin to Leipzig and Halle, new lines from those two cities to Erfurt and Ebensfeld, and upgrading from there to Nürnberg.**

300 km/h, the route climbs from the Main valley to reach a summit 603 m above sea level at Goldisthal near the Rennsteig boundary path in the heart of the forest.

The hilly terrain means that about half the line runs either in tunnel or across viaducts — there are 22 tunnels with a combined length of 41 km and 29 bridges and viaducts with a total length of 12 km. The last of the 27 tunnels between München and Berlin was holed through in 2012; some tunnels have special portal structures to mitigate the sonic boom effect of trains passing through at 300 km/h.

The 8314 m Bleßberg tunnel is the longest of the 27 bores, while the longest viaduct is the 8600 m Saale-Elster viaduct forming part of the 123 km Erfurt – Halle/Leipzig line further north; this structure also incorporates the junction where the route divides to serve Halle and Leipzig.

The spectacular 798 m Froschgrundsee viaduct and the 1100 m Grümpental viaduct jointly hold the European record for the longest reinforced concrete span on a railway bridge, an astonishing 270 m.

The alignment includes overtaking loops at 20 km intervals, which would become necessary when, or if, the line is used for freight traffic.

DB inaugurated the Erfurt – Halle/Leipzig line with due ceremony on December 9 2015 (RG 1.16 p21), and passenger services started on December 13. Former DB Chairman Rüdiger Grube and other board members were joined for the celebrations by Chancellor Angela Merkel and the then Federal Transport Minister Alexander Dobrindt, as well as the Presidents of Sachsen, Sachsen-Anhalt und Thüringen. If all goes to plan, current DB Chairman Richard Lutz will again host



Numerous viaducts were required to cross the valleys in the Thüringer Wald; two of them have a maximum span of 270 m.

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Angela Merkel, now in her fourth term as Chancellor, as the principal guest at the Ebensfeld – Erfurt opening event on December 8.

North of Nürnberg the existing line is being upgraded over the 82 km as far as Ebensfeld, one objective being to separate long-distance trains from S-Bahn services in the busy Nürnberg suburbs. Four tracks are available as far as Fürth, but north of there and in the Bamberg area it is not clear when plans to complete quadrupling will be implemented.

DB wants to reroute the S-Bahn service north of Nürnberg and to build a 13 km freight bypass, of which 7 km will run in tunnel below Nürnberg and Fürth, but funding for these projects is not yet secured and local authorities have contested the plans. Only when these additions have been completed will VDE8 be truly finished.

### Timetable rewritten

Nevertheless, the opening of the Erfurt – Ebensfeld high speed line has triggered what DB describes as the 'biggest improvement in services in the history of Deutsche Bahn', with timetables changing on many routes across Germany. These will affect one-third of all long-distance trains.

Other changes include the introduction of ICE4 trainsets on the Hamburg – Stuttgart and Hamburg – München routes — pre-series ICE4 sets have been running extended tests in passenger service on the Hamburg – München corridor over the last 12 months. More ICE services will be introduced between Berlin and Frankfurt, running alternately via Braunschweig and Erfurt.

Erfurt is set to become a major hub for long-distance trains, with up to



Photo: Deutsche Bahn AG

Some tunnel portals are designed to mitigate the sonic boom effect of trains travelling through the bore at 300 km/h.

Test trains have been running on the line for many months to check the performance of track, train control and power supplies.

80 ICE services calling there each day. There will be hourly ICE departures in four directions, with a direct train to Berlin every 30 min.

Three Berlin – München ICEs per day will deviate from the Erfurt – Ebensfeld line to call at Coburg, which will also benefit from a two-hourly regional express service linking Sonneberg with Nürnberg. Branded as *Franken-Thüringen-Express* and worked by pairs of Class 193 Vectron locomotives with double-deck coaches, this will offer a fastest timing between Coburg and Nürnberg of 68 min.

### Test phase complete

After months of testing, final preparations for opening of the Ebensfeld – Erfurt line are in hand. DB

Systemtechnik's ICE-S test train and other specialist vehicles have been used to check the performance of track, power supplies, radio networks and signalling. During these tests, the ICE-S attained a maximum speed of 330 km/h on the new line in October 2016.

The line is equipped with ETCS Level 2 without lineside signals, which restricts the type of train that can operate over it. ICE3, ICE4 and ICE-T trainsets have been authorised to use the route, together with locomotives of Classes 193, 245 and 285 and several types of maintenance vehicle.

Regular shadow services to check the performance of the train control system began in August, and ICE3 trainsets have been making regular runs over the route since October. Driver training and route knowledge trips were due to be finished last month.

Numerous emergency drills have been staged in the tunnels; the last of these was due to take place in November, with the evacuation of a train in the 7391 m long Silberberg tunnel. Safety measures in the long tunnels include emergency exits at 1000 m intervals, access shafts, reservoirs and prominent signage. As with recently-built tunnels elsewhere in Germany, the use of slab track means that it is easy to walk through the tunnel or drive rescue vehicles into the bores if necessary. ■

#### Previous articles in Railway Gazette International about the VDE8 project:

Two lines will add 400 km to Germany's high speed network	RG 11.96 p731
Nürnberg – Ingolstadt opens at 300 km/h	RG 6.06 p395
Berlin – München in 4 h	RG 11.07 p721
Further and faster	RG 1.16 p21



Photo: Christian Gloel