

MAIN AND  
INSET: First  
class on the  
UK's new  
intercity train

# Uniting the Kingdom

Hitachi faced a formidable design challenge with the UK's new intercity train - to create a modern but timeless interior to serve until 2050 on lines connecting major cities

The UK's Intercity Express Program (IEP) involves creating a fleet of 122 trains to run on the Great Western Main Line from 2017, and the East Coast Main Line from 2018. These are long-distance routes, linking England's capital (London) with cities including the capitals of Scotland and Wales (Edinburgh and Cardiff).

Running on such vital routes, and costing £5.7bn (US\$9.7bn), the project is certainly high profile. The trains are also expected to run for at least 30 years, so will have to look smart for at least that length of time. In 2012, the contract to build the trains was awarded to a consortium led by Hitachi.

Heading up the design of these 'super express' trains is Hitachi's Carl Harvey, interior





## ◀ HANG YOUR BIKE

The train's solution for transporting bicycles is a self-contained compartment that enables two bikes to be hung side by side. The unit can be shut with the palm of the hand. After much experimentation with different ways of hooking up the bikes, Hitachi opted for them to be attached by the front wheel.

A padded steel arm keeps the bikes separate, to prevent, for example, a lycra-clad racer's all-carbon machine from being scratched (or worse) by a rusty old wreck. The sliding door is a masterstroke that keeps the bicycles out of passengers' way.

The decision on whether to charge for use of the space will be up to the operator. The space could also be used to store other awkward items – such as skis and tents – that don't fit into overhead storage racks easily.

Hitachi and DCA are still fine-tuning some of the details for this space, but the overall concept has been signed off.

LEFT AND RIGHT:  
The IEP's bike-hanging compartment, which can also be used to store big bags, skis and other items



## ◀ CAPITAL GAINS

The new trains will be used on the UK's East Coast Main Line and Great Western Main Line, both long-distance intercity routes.

The East Coast Main Line links the English and Scottish capitals (London and Edinburgh), via several major northern cities, including Leeds, York and Newcastle.

The Great Western Main Line links London with the Welsh capital (Cardiff) and the west of England. Key destinations include Reading, Bristol and Swansea.

Now all that's needed is a tunnel to Belfast in Northern Ireland!

## IEP IN NUMBERS

866 carriages ordered

£5.7bn  
(US\$9.7bn)  
investment in the program

30 years' expected service

26m carriage length

2 classes of travel – standard and first

£82m  
(US\$140bn)  
cost for Hitachi's new rail vehicle manufacturing facility in County Durham, UK

design and mock-up manager. He was confronted with a contradictory brief that demanded a contemporary look and endurance, ruggedness and comfort, stylishness and practicality. In effect he, and contracted designers DCA Design International, had to predict what passengers will still like right up to 2050.

"We were looking for the right visual brand language that reflected what people want to see in a rail carriage," comments Harvey. "Soft or hard curves, waves or lines – everything was up for consideration."

Harvey had been in this position before. Before joining Hitachi Rail Europe in 2013, this 30-year veteran of the rail industry had headed up the ongoing Tyne & Wear metro refurbishment project contracted to Wabtec Rail. He also has broad experience in train building, refurbishment and fleet operations at Bombardier and Chiltern Railways, giving him practical insights to feed into the interior design.

### Considered opinion

The design of the interiors was a long time in gestation. In 2010, the UK's Department for Transport (DfT) began proceedings by inviting the public to contribute ideas for the color scheme



LEFT AND ABOVE: Standard class

BELOW: The custom-designed toilet

### Dark materials

The group was willing to experiment. As well as the recommended blues and other sober hues, it tested out some funkier combinations. “We went through a number of iterations,” says Paul Rutter, DCA’s head of transport design, a veteran of large-scale rail projects. Eventually, the stakeholders rejected blue in favor of gray. It will be used for the seats, carpets and walls. “We opted for a warm gray palette, a comfortable backdrop for rail travel,” says Rutter.

Harvey adds that the stakeholders’ group also dropped the idea of direct lighting, which was in the department’s style guide, on the basis that reflected lighting produced a warmer look.

The design of the interior was heavily influenced by regulations. A complex set of EU-wide standards specifies everything from the clearances for all seats and the width of the aisle to the size of the baby-changing table in the toilet and the length of the seatback’s fold-down tables.

At 26m, the carriages will be 3m longer than any others running on the UK network. This means that the sides of the carriages have to be tapered at the ends instead of being of uniform dimensions throughout. For the interior designers, the main impact of this is that elements placed at the ends of carriages, such as luggage stacks and toilets, had to be custom-designed.

All the main elements have now been agreed, although a few details are still to be finalized, such as the spaces for bicycles.

Seat information is conveyed by what Hitachi calls a comms band – a strip running below

## The interior had to be a balance of compliance with the contract specification, standards, what our stakeholders want and the dictates of the space envelope

Carl Harvey, interior design and mock-up manager, Hitachi



and other elements online. Having processed the respondents’ preferences, the department produced a brief. This defined the desired aesthetic as modern and timeless, and specified a palette based on blue. The department also expressly ruled out any kind of fashion statement.

### Group effort

“The interior had to be a balance of compliance with the contract specification, standards, what our stakeholders want and the dictates of the

space envelope,” says Harvey. With the guidelines before them, the stakeholders – Hitachi, DCA, current franchise holders Great Western and East Coast, the DfT and other interested parties – organized a kind of council to meet on a regular basis. Both Hitachi and DCA welcomed this deep involvement, on the basis that all the parties will know exactly what’s happening. Indeed, the group had to sign off on the final mock-up. “Throughout these meetings, the group was aiming for visual consistency,” says Harvey.

## IEP TIMELINE

Project initiated by DfT	Hitachi and John Laing (the Agility Trains consortium) announced as preferred bidder to build the trains	DfT invites public feedback on interior preferences	Agility Trains contracted to build 596 carriages, an order worth £4.5bn (US\$7.7bn)	A further order made for 270 more carriages, at a cost of £1.2bn (US\$2.1bn)	Hitachi begins work on £82m (US\$140m) rail vehicle manufacturing facility in County Durham, UK	Hitachi Rail Global relocates its headquarters from Japan to London	Trains due to begin service on the Great Western Main Line	Trains due to begin service on the East Coast Main Line
<b>November 2005</b>	<b>February 2009</b>	<b>2010</b>	<b>July 2012</b>	<b>July 2013</b>	<b>November 2013</b>	<b>March 2014</b>	<b>2017</b>	<b>2018</b>

## TOILET DESIGN

Because the carriages have tapered ends, Hitachi's existing toilets could not be shoehorned into the space, so bespoke designs were needed.

DCA's rail team came up with various concepts that were subjected to the inspection of around 200 groups, including one representing the interests of persons with reduced mobility (PRM).

The standard 'Space Saver' – a brightly lit and compact cubicle – fits neatly in the tapered end. Meanwhile, the separate universal access toilet – an EU recommendation as part of Brussels' determination to make travel easier for PRMs – is a particular triumph. The paneling makes it look less utilitarian and there is ample room for parents to change babies on a fold-down table, and for wheelchairs to be parked and turned.

From the outset, Hitachi and the other stakeholders agreed on the need for a higher-quality unit than before. Thus the toilet is "of hotel quality" and instead of the usual fiber glass, plastic and rubber, DCA has used wooden laminate in the cubicle to produce a more stylish aesthetic. There is even a full-length mirror.

Attention to detail extends to the door-locking system, which is activated by large levers rather than the usual buttons that users sometimes forget to push. The system is also designed to prevent miscreants pressing the lock button and then slipping out before the door closes, which can make the toilet appear occupied for the entire journey.

the luggage rack that tells passengers the seat number and its status, using LED lighting. A green light means the seat is free, red means booked and amber is for seats that will be occupied for part of the journey. In short – universal signage that can be read at a glance.

### Shape shifting

As well as the luggage stacks at the ends of compartments, there is above-seat storage that is big enough to take an outsize suitcase, and especially generous in terms of height. Luggage racks and luggage stacks on the Great Western Main Line trains will be supplied by Lordgate Engineering (a contract for the East Coast Main Line trains is pending).

Because Hitachi and the operators are looking 30 years ahead, the carriage has a modular design that will enable extra stacks to be installed,



LEFT AND BELOW: The universal access toilet, featuring a full-length mirror



## Nothing is fixed permanently; everything can be changed according to demand

Carl Harvey, interior design and mock-up manager, Hitachi



for example in the middle of the carriage. Hitachi wants to be ready if passengers start bringing more luggage.

"The interior is modular," says Harvey. "Nothing is fixed permanently and everything can be changed according to demand." For example, the seats are mounted on pedestals fixed to rails and the internal partition panels can be shifted back and forth to reconfigure the seating.

The train's carpets produced some of the biggest challenges because of the heavy use they will have to withstand. The solution was to install hard-wearing materials in the highest-traffic areas (such as the vestibules), a lighter, textured carpet in the aisles and another heavy-duty material under the tables and seats.

Other key features of the finished interior include pull-down blinds for the windows and partitions finished in a light-oak laminate.

Draft layouts published in August 2012 detail a five-carriage train with 315 seats (45 in first class and 270 in standard class) plus space for two wheelchair users. The eight-carriage train will accommodate 539 seats (101 in first and 438 in standard) and four wheelchair spaces. Finally, a nine-carriage train can seat 627 (101 seats in first and 627 in standard) and has room for four wheelchair users.

### Modern Pullman

From the outset the operators wanted extremely strong visual differentiation between first and standard class, to encourage passengers to upgrade. First-class passengers will all have tables, and the seats will be bigger, deeper and have a greater pitch. The dominant color will be a dark gray with head cushions in purple.

The designers describe the effect they were going for as "modern Pullman" – that is, an updated version of the luxury offered by Pullman trains. Luxury automobiles were another influence. Apparently, first-class passengers have grown so accustomed to the décor of their automobiles that they like the transition from road to rail transport to be aesthetically seamless.

With the modern Pullman, Harvey and his team hope they have captured the challenging 'modern and timeless' brief requested by the people that will use these trains until as far ahead as 2050. Time will tell. ☒