



York: a 21st-century control centre

The latest generation of control centres are a world away from the mechanical and electrical installations they are replacing. DAVID ALLEN visits one of Network Rail's largest to grasp the full extent of the operation.

RAIL photography: DAVID ALLEN

For someone who has always thought that heaven was a mechanical signalbox in a sylvan setting similar to that found at Greenloaning in Scotland, it was difficult to understand the adrenalin 'rush' experienced during my eye-opening visit to the York Integrated Electronic Control Centre.

But, after my behind-the-scenes look

at this complex IECC, I now want to see more of these fascinating centres in operation.

The centre, commissioned in May 1989, is responsible for the busiest lines in North and West Yorkshire.

History and development

For a short time, the IECC just replaced York Yard North, York Yard South (on

the station avoiding lines) and Skelton Junction signalboxes. As an interim measure, for several months, the new IECC and old York panel box coexisted. The latter retained to control the 1983 'Selby Diversion'.

The largest of the boxes replaced by the original IECC was the 1951 York power box. When commissioned it was reputedly the largest OCS (One Control

A link with the past, a block bell in an IECC! This is used as the emergency communication from Low Gates box and is tested daily. On this occasion, signaller Nigel Blake is confirming it is working. The York North Workstation is nearest the entrance and displays two important notices. Firstly, not only visitors but also non-signalling staff must not pass that point without permission of the Duty Manager. Also, it is a safety critical environment and noise is to be kept to a minimum.

Switch) installation in the world. It, in turn, replaced seven mechanical boxes boasting a total of 868 levers. (The largest was Locomotive Yard with 295 levers. This, also, was a world record for a lever frame in one row.)

The 1951 panel - in four sections - was more than 43ft long and controlled 294 signals and 330 sets of points. Compared with the large control areas of today, however, it supervised quite a small layout. Besides the station it only controlled as far as the former Chaloner's Whin Junction. But at the time, there was speculation that it was too large!

The old York panel box was finally decommissioned in September 1989 when the route between Colton Junction and Temple Hirst Junction was added to the IECC. Attention was then switched to the route north of York. The power boxes at Tollerton, Thirsk and Northallerton were then abolished in stages and by April 1990 the existing control area boundaries beyond Northallerton were established.

On completion, the fringes to the original IECC were Bedale (on the Wensleydale line), Darlington, Low Gates (originally intended that fringe would be Bowesfield), Strensall (which had taken over many new crossings before commissioning of IECC), Poppleton, Doncaster power signalbox, Gascoigne Wood, Church Fenton and Selby (via Temple Hirst and Hambleton).

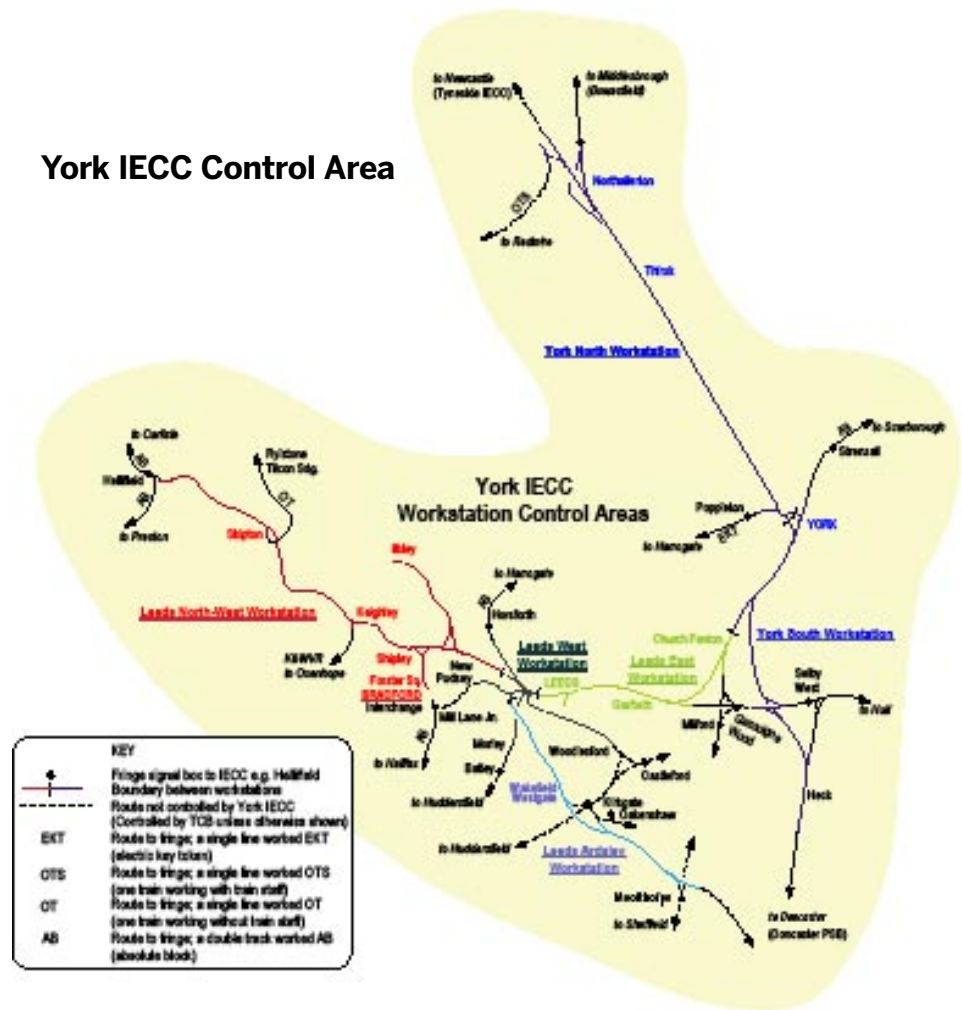
This, of course, was not the end of the story. Between 2000 and 2002 the IECC more than doubled in size. Leeds PSB, already more than 30 years old, was nearly life-expired and Railtrack decided to transfer supervision to York. This coincided with an exciting time for railways in West Yorkshire with the 'Leeds 1st Project' set to transform the railway infrastructure in the area.

Traffic using the station had grown to such an extent the track layout couldn't cope. Many alterations were made to improve flows at the west end of the station. Pivotal to this was the provision of two extra lines between the station and Whitehall Junction. This made a total of six lines and all were made bi-directional.

In the station, four new bays were developed on the site of the redundant parcels area. Also, a new through island platform (Nos. 16/17) was made on the site of the former Goods Lines.

The run-down of Leeds PSB began in December 2000. The first section to be transferred was that from Neville Hill West to Garforth. However, Leeds PSB lingered

York IECC Control Area



on for over two more years. Final closure didn't take place until 2002 when control of the route between Copley Hill and South Elmsall was moved to the IECC.

Leeds PSB had an interesting history. Like the 1951 York power box, it was elevated in the station buildings. Leeds PSB dated from 1967 and was associated with the closure of Leeds Central station and the concentration of all services on Leeds City. The new PSB replaced 18 signalboxes, controlled 18 route miles and fringed with seven boxes. Five of these closed before the end of 1969 as the box extended its control. The longest of the earlier extensions concluded in 1971 when the former GN route through Wakefield Westgate was controlled as far as South Elmsall (later established as the fringe with Doncaster PSB).

The last of the original fringes to close was Kirkstall Junction signalbox when, in 1994, 13 boxes were abolished under the Leeds North West resignalling and electrification. To control these lines, a new panel was commissioned inside Leeds PSB.

Shortly before the final demise of Leeds PSB, the box at Church Fenton was abolished. This was significant for it gave a direct link between 'Leeds' and 'York' areas in the IECC. Church Fenton

had undergone many changes over recent decades. One recent development was the addition of Peckfield's control area in 1997. Incidentally, Peckfield was the first casualty of the Railtrack LNE 'Project EROS' programme.

After this there was only the addition of Stourton's control area. This small portable structure had replaced three mechanical cabins in 1981 on the former Midland route towards Normanton.

The increase in York IECC's control area between 2000 and 2002 was accompanied by an extension to the building. At the time Railtrack was seriously tackling the deficiencies in many boxes and a massive refurbishment programme was under way. At York, the opportunity was taken to redesign the workstations ergonomically. After all, it's in everyone's best interests to have the signaller in a position to respond speedily and efficiently.

The present fringes are Tyneside IECC, Low Gates, Strensall, Poppleton, Selby (via Temple Hirst and Hambleton), Doncaster PSB (via ECML and South Elmsall), Gascoigne Wood (via Peckfield and Hambleton), Milford, Castleford, Wakefield Kirkgate, Oakenshaw, Moorthorpe, Batley, Mill Lane Junction (Bradford Interchange), Horseforth and Hellfield. »

» Workstations in detail

The original York IECC featured just two workstations: York South and York North. They met at Clifton (north of York station) on the Fast lines and York Yard North on the station avoiding Slow lines. Even with the recent extension, this remains the case.

The recent additions are Leeds East, Leeds East Assist, Leeds West, Leeds North West and Leeds Ardsley. Leeds East Assist is a duplicate of Leeds East and the signaller helps out with the large number of telephone calls associated with set swaps and other moves. This might require platform changes and stock movements to/from Neville Hill or further afield. Such last-minute alterations are unlikely to be ARS (Automatic Route Setting - see panel) and so routes have to be set manually. Unlike the other workstations, Leeds East Assist doesn't need to be continuously staffed.

Individual workstations show the signaller what is happening in the area being supervised and at the same time allow them to control operations. A number of VDUs are mounted at the rear of the workstation. One or more VDUs provide an overview showing the track layout and main running signals. However, you need to go to a detail view to see, ground shunting signals, track circuits and all signal numbers.

A separate workstation is provided for the supervisor. The VDUs show the overview for all the IECC's workstations. The supervisor, however, cannot directly control movements but he/she can communicate with the individual signallers.

The overview and detail screens show the progress of individual trains. Those

controlled by ARS are shown in cyan (light blue). Non-ARS services are shown pink while contingency or special timing workings are stone coloured (brown).

Another screen is the General Purpose Display used to provide, in text form, messages in response to the signaller's actions, as well as alarms relating to systems in their control. A relatively recent addition is the CCF screen (Control Centre of the Future). This also displays the location of the trains but, by means of a colour code, indicates the punctuality. A signaller wants to see the trains in 'green' because that means they are running to time.

A tracker-ball, mounted in the desk, is used to move the cursor around the signalling display screens. When the cursor is in place, the signaller can initiate commands using the push-buttons. The keyboard has a similar function

Just one minute...

At 1036 on Tuesday May 15, the control centre was supervising 65 workings. By far, the busiest workstations were Leeds East and Leeds North West with 18 trains and 17 trains respectively.

Whereas at Leeds East nearly all trains were in Leeds station, the North West workstation was dominated by services in transit. Twelve of the trains were normal passenger workings, four were freight and one was an engineers' special. The 0040 Hunterston-Drax (6E77) was held to the north of Skipton while the 0942 from Bradford Forster Square crossed over to the Up Bay. In addition to the local service out of Leeds, there are also those linking Bradford with Skipton and Ilkley.

» BACKGROUND TO THE IECCS

The first IECCs were commissioned in 1989. Originally it was planned that Yoker would be the pilot but in the event Liverpool Street had the honour. The resignalling of the London terminus was needed to accommodate property developments.

York IECC was 'fast-tracked' because of resignalling north of Doncaster associated with the electrification of the ECML beyond Hitchin. Liverpool Street opened in March, York in May and Yoker in July.

The IECCs were a new generation of control centres where VDU workstations replaced panels and tracker-balls replaced switches and buttons. The term derived from the fact that train control and describers were integrated.

In addition, though ARS (Automatic Route Setting) had been piloted in Three Bridges PSB since 1983, it was the first time it was used as normal on all routes. ARS involves very sophisticated computer programmes to regulate services even during disruption. It has had a two-fold effect. Train running is more efficient because routes are set up as soon as become available and staffing levels are reduced by the automation of day-to-day tasks. Without ARS it would be physically impossible to handle the amount of traffic on many workstations. Signalboxes tend to control small areas whereas an IECC can monitor a large one.

ARS doesn't have to be switched on or off for the whole IECC. Each workstation has several ARS sub-areas. For example, York

York South Workstation was handling 12 workings. Like Leeds East, most were in the station. York North, Leeds West and Leeds Ardsley featured the fewest services



South has, among others, sub-areas for 'York Up', 'York Down' and 'Holgate'. If, and when, required they can be switched off and the trains run in manual route-setting mode. At York something like 40% of trains run non-ARS for at least part of their journey

There are 14 situations when the ARS needs to be switched off. Not surprisingly, a work station cannot be left unsupervised. You cannot leave ARS switched on and not have a supervising signaller. (There are signallers who 'rotate' between work stations to give breaks to colleagues.) ARS is also switched off when some engineering operations have to be carried out. Likewise, manual mode is selected when the Royal Train is due to pass.

IECCs use SSI (Solid State Interlocking). The first application was at Leamington Spa in the since-superseded 1985 PSB. SSI uses microcomputers rather than relays. Whereas SSI can be housed in the parent control structure, large power schemes using conventional relays are associated with many isolated relay rooms at remote locations

During the early 1980s, the development of electronic signalling - in particular SSI - was very much the joint effort of BR, GEC and Westinghouse. For the development of IECC, BR decided it would be more desirable to develop a contract with a software company (SEMA Group). As such the intellectual rights of the IECC system and software were owned exclusively by BR, later Railtrack and now Network Rail.

The Leeds East and the Leeds East Assist Workstations (unmanned) at 1150. To the left is the overview for Leeds West. Though not controlled by Leeds East, it enables the Leeds East signaller to know what is approaching.

- seven, six and five respectively.

It might come as a surprise that Leeds West has so few trains considering it is the traffic of this workstation that defines the Grade 9 status for the signallers. Remember it only covers a small route mileage but this contains the convergence of all the busy routes to the west of Leeds station. It's paramount that traffic flows freely along these lines. Leeds East, Leeds East Assist and York South are the other Grade 9 positions. This represents the highest scale of signaller on Network Rail. Nationally, other Grade 9s are found at locations like London Bridge, London Liverpool Street and Birmingham New Street.

Leeds station

At 1035 the station hosted 12 trains, two of which had the routes set up for departure. The slightly delayed 1032 to Ilkley (2V22) was leaving Platform 1 and taking 'B' Line. Also, the 1037 to Manchester Victoria (2M22) was ready to depart from Platform 12c via the Through Road to 'D' Line. There was only one through working, the 0829 Blackpool North-York on Platform 11d (1B21).

Some empty stock was at Marsh Lane en route to Neville Hill depot. This contingency working was not running under ARS and the reporting number - 5L51 - appeared on the screen 'stone' (brown) coloured. All other workings were under normal ARS control.

An hour later, at 1135, all eight trains in the station were stationary. The only route set was for the 1132 departure for Ilkley. There were no through services. In addition to the six trains occupying bay platforms,

the originating services - the 1205 to King's Cross (1A25, in Platform 8) and the 1137 to Manchester Victoria (2M26, in Platform 12d) - were occupying through platforms.

At 1235, nine trains were in or approaching the station. The 1232 to Ilkley was departing along 'B' Line while the 1114 from Sheffield (2Y22) was approaching a red signal at Leeds West Junction on 'C' Line. 2Y22 was running six minutes late and the signaller had switched off the ARS to maximise the PPM (Public Performance Measure). The slightly delayed 1144 from Selby to Wakefield (2W73) was being given preference. The route set for the latter - via the Through Road - conflicted with the entrance to Platform 10b - and so 2Y22 would have to wait. Besides 2W73, the only other through working was the 1104 Manchester Airport-Newcastle (1P28) which occupied Platform 15.

All trains during the three periods of observation - irrespective of whether or not they were running ARS - were using their timetabled platforms.

As traffic centres, Leeds and York differ in many ways. Leeds is dominated by local terminating/originating trains arriving/departing via the West Junction. Only 20% of the workings are through trains whereas the equivalent for York is 60%.

Around York...

At 1039 the scene was very interesting. There were three northbound Fast line services in the area. As the Birmingham-Edinburgh (1S41) was accelerating past Skelton Bridge Junction on the Down Fast, the route at Skelton Junction was reset to allow the Leeds-York (2C18) to come off the»





This is a 'detail' view of part of the York North Workstation. It covers less of the route compared to the 'overview' but shows features that are not always needed such as signal numbers, track circuit identification and point numbers. 1V57, the 0900 Glasgow-Penzance is being diverted along the Up Slow between Longlands Junction and Thirsk due to work being carried out on the Up Fast line.



This 'overview' indicates how the ECML south of York is represented on the York South Workstation. In the top left corner, 4R15 from Drax to Immingham has left York's control area near Heck and is now under the supervision of Doncaster PSB. The middle of the screen shows the ECML between Temple Hirst and Hambleton Junctions'. At first it is difficult to reconcile the screen view with the layout on the ground.



This was Leeds station at 1035 (see text). For terminating services the arriving and departure codes are shown. For example 1A22, 1240 to King's Cross is at platform 6; this had arrived as 1D23, 0935 from King's Cross. The complexity of the west end greatly contrasts with that to the east. It is interesting to see what routes are available from various signals.



York station is very busy at 1038. To maximise clarity of the station, the route south of Holgate Junction is shown separately in the bottom left-hand corner. The avoiding lines (Slow Lines) don't pass quite so closely to the station and the Scarborough line and ECML are not really parallel.

» Harrogate line. This meant the King's Cross-Newcastle (1N03) was unable able to get anything better than a 'double yellow' as it waited to leave Platform 11. Once the junction was 'normalised', 1N03 was able to gain speed and the route was set for the Bristol-Newcastle (1E36) to follow. The Humber-Jarrow (6N10), which had avoided the station and was waiting its booked path, was now able to proceed along the Down Slow line.

Back in the station, the Scarborough-Liverpool (1F64) had the route set to depart Platform 4 via Platform 3 before crossing to the Up Leeds line at Holgate Junction. Meanwhile, at Platform 9, the Dundee-Birmingham (1M49) was ready to follow 1F64 along the Up Leeds. Platforms 9 and 10 are the preferred ones for services off the ECML continuing via Church Fenton. The through services from Scarborough only have access to Platforms 3, 4 and 5. For these, Platform 4 is particularly useful as ECML trains can 'leapfrog' them.

Stabled in Platform 7 was light locomotive 0S07 and 5F69, a DMU to form the 1505 to Leeds. Another light locomotive, 0G01, was in Holgate Reception Sidings waiting to leave for (Leeds) Midland Road.

The only train not in the usual platform was the 1109 for Blackpool North (1B28). In common with the other trains on this route, it usually departs from bay Platform 6 but on this occasion it was in bay Platform 1.

The track layout at York was severely 'pruned' when resignalled. Since BR carried out this work, traffic has grown to make the southern approach a bottleneck. To ease congestion NR proposes to reinstate a fourth track between the station and

Holgate Junction. Another upgrade affects signal Y227 at the north end of Platform 9. Currently, because of the overlap, a train entering this platform locks up the routes at the north end. (The overlap is the distance beyond a signal which must be clear before the previous signal can show a proceed aspect.)

To help the signallers make pathing decisions, the signals with short overlaps display yellow triangles on the VDUs. These include the signals at the north end of Platforms 5, 10 and 11. Unsurprisingly, these platforms account for 95% of northbound ECML departures. Platform 9, with no facility for short overlap, only has four scheduled northbound passenger services daily.

If there is no conflicting move, trains can enter the station more rapidly when the signaller chooses the long overlap (around 200 yards). When the short overlap option is taken by the signaller, the train must be brought almost to a stand before the signal will clear (known as a 'delayed' yellow).

Leeds North West

During my all-too-brief time in the IECC, I found the Leeds North West workstation the most entertaining, if I'm allowed to use that word! Superimposed on the local traffic between Leeds and Skipton are the semi-fast trains to Carlisle and Lancaster as well as a regular flow of freight. For example, at 1032 there four Class 6 freight trains between Skipton and Kirkstall Loops!

In addition to the main line there are the busy routes to Bradford and Ilkley. Both termini serve two destinations and the trains join the main line via triangular





A simulator room is used for training purposes. All signallers will spend time here. The controller, in this instance Ray Scott, can input all sorts of situations to Paul MacMillan to sort out. This way, only a relatively short time is needed to experience most eventualities.

junctions. This all makes the Shipley area very interesting with lots of conflicting movements.

Though most freight traverses the Settle-Carlisle, a regular flow originates from Rylstone. However, these trains only become the responsibility of the IECC when they reach the signal protecting Skipton Middle Junction.

The operation of the two CCTV level crossings at Cononley and Kildwick is also worth watching. Unlike some IECCs, such as Merseyside, there is no need for a separate Level Crossings workstation at York.

Engineering work

Staff frequently need to go trackside while trains are moving. Around midday on May 15, maintenance was carried out near



Otterington. Ideally the time of the work will be fixed in advance and arranged to cause the least disruption to traffic. Before the 'possession' of the Up Fast line could be taken, precise details were agreed between the people trackside and the signaller at York North workstation.

During the work, all trains that normally used the Up Fast line were diverted along the Up Slow between Longlands Junction (Northallerton) and Thirsk.

Two of the trains diverted were the 1130 Newcastle-King's Cross (1A26) and the 0900 Glasgow-Penzance (1V57). Despite only being on the Slow line for eight miles, the trains suffered a slight delay. Both were about six minutes late passing Thirsk. Whereas the maximum speed on the Fast line is 125mph, the Slow line has a maximum of 90mph. Additionally, the Up Slow has a 40mph restriction through Thirsk station and a limit of 50mph on the crossover between the Slow and Fast lines.

The next service along the Up Slow was the 1200 Middlesbrough-Manchester Airport (1P37). Since this stops at Thirsk, it is always routed along the Up Slow from Northallerton.

Signs of the times

The walls show the usual special instructions: safety bulletins; SPAD alerts etc. The Terence Cuneo picture 'On Early Shift' is often seen in large signalling centres. Are the IECC signallers remembering those 'happy' days pulling levers?

Next to this poster is a notice: '6S62 and 6E93: Beware these trains are usually electrically hauled!'

No doubt it would be easy to route the Mossend-Belmont Yard (6S62) along the Up Normanton line at Colton Junction if there was a problem on the ECML. Also,

185103 approaches Leeds with a Liverpool to Middlesbrough First TransPennine Express service on November 7. This train will be controlled by York IECC and must be fitted in among not only local services to and from Leeds, but also the many freight trains which run along the approaches to the busy station. RON COVER.

if for some reason, these trains needed to be temporarily stabled, neither York Yard North nor the South sidings are electrified.

More intriguing is the message glued to the Leeds East workstation:

'1K no later than 24 at HAMB(leton) EAST (Junction).

THEN REGULATE 1B at MICK(lefield Junction). BEWARE 1K09 and 1B26'

This regulation notice had been agreed by the TOCs. It refers to two services (1K approaching from Church Fenton and 1B approaching from Selby) which share the same route beyond Micklefield. In particular, reference is made to the 0941 Hull-Manchester Piccadilly (1K09) and the 1011 York-Blackpool North (1B26). (The computer cannot differentiate between two Class 1 services when one acts like a Class 2 for just a part of the journey!)

Though 1K09 is due to pass Hambleton East Junction at 1017, the signallers will give it precedence over 1B26 at Micklefield Junction as long as it passes Hambleton Junction no more than seven minutes late (ie 1024). If running seven minutes late, it would pass Micklefield at 1032. This would mean that if 1B26 was running on time, it would be held at Micklefield Junction. This will delay 1B26 but since it stops at all stations, it will allow the non-stop 1K09 to continue through to Leeds unimpeded. In other words, the guidance will once again tend to help the signallers maximise the PPM.

Overall view

A couple of hours' visit isn't sufficient to do justice to such an important Control Centre. If experienced signallers take many hours familiarising themselves with the layout and operations, what hope is there for me?

Leeds station alone handles around 1,000 workings each day, a sizeable proportion of which are empty stock to/from Neville Hill. The bulk of the rest are passenger services. Of the total of 859, 191 are through workings, 337 terminating and 331 originating. Though very healthy traffic levels are recorded throughout the day, 68 trains are handled between 0800 and 0859 - more than one a minute! Fortunately the station 'throat' at the west end is able to well handle parallel movements.

On a 'normal' day, York handles less than half the number of trains that Leeds does. Around 420 services converge on York. About 80% are passenger or empty stock but a sizeable proportion are freight. Not all freight avoids the station. For example, when freight trains approach along the Up Slow, it might be less disruptive to traffic to give them a path through the station, and over 25% are directed this way. ■

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