



# Erring on the side of caution



How the *Illustrated London News* in 1874 covered the head-on crash between Norwich and Brundall stations, in which 25 people died.

**Past accidents have brought about a culture that ensures failed equipment will not compromise safety.**

John Glover **explains**

All systems can fail, and the results can be anything from merely inconvenient to downright disastrous in terms of loss of life and damage to property. The railway is no exception to this, but 200 years of experience have resulted in a system in which accident levels are low and still falling.

Those systems which concern the construction, operation and maintenance of trains and the infrastructure on which they run are critical to ensuring a safe railway. To this must be added the training of railway staff and contractors in methods and

procedures, and their correct execution.

## LESSONS OF THE PAST

None of this happens by chance, and experience can be a hard taskmaster. Thus at Norwich Thorpe in 1874, the staff sent two trains to a head-on collision on a single line.

Similarly, the brakes failing to hold a divided passenger train on a steep gradient at Armagh in Northern Ireland in 1889, so that a major collision with the train following resulted, was another dreadful incident. Together, they claimed the lives of 105 people.

The causes were misuse of inadequate signalling equipment at Thorpe, and the shortcomings of the non-automatic vacuum brake at Armagh. These, and other accidents of the period, resulted in the swift parliamentary passage of what became the Regulation of the Railways Act, 1889.

Under this most significant piece of legislation, the following

were imposed where they were not already in force:

- The use of the block system of signalling on all passenger lines;
- The interlocking of points and signals on passenger lines; and
- The fitting and use of the continuous automatic brake on all passenger trains.

In each case, the principle was that of safer systems, but also those that, if they failed, would not compromise the safety of the railway.

Thus, in a very basic sense, the block system enforces no more than one train, on one section of line, at any one time; interlocking ensures that points and signals cannot give contrary indications; while the automatic brake is self applying if there is a change in the air pressure in the system.

## FAIL SAFE

The principles of the 1889 Act remain in force today, together with the underlying concept of fail safe. This is an engineering term, meaning that any system failure should not compromise safety – a right side failure. Thus:

- The driver's safety device activates the train's brakes if the driver fails to register his or her presence at intervals due;
- The train protection warning device detects overspeeding on the approach to signals or termini, and applies the brakes;
- Colour light signals have two filaments; failure of one sets off a warning that it needs to be replaced, but the signal still shows the correct aspects;
- A signal displaying no aspect is treated as if it is at danger;
- Points are detected to prove that they are set correctly and not prevented from being closed

properly, due to an obstruction for instance. If such detection cannot be obtained, the signal in rear cannot be cleared;

- A track circuit which indicates that a section of track is occupied for no apparent reason is treated as such until formally examined, and not as a failure; and
- An underbridge strike by a heavy goods vehicle is treated as an obstruction danger, until the scene is examined by a qualified person for any damage.

## WRONG SIDE

So far, so good, but what if the system 'fails dangerous' rather than safe? This would be the situation if trains had been allowed to continue in any of the situations described above.

That is not to say that an accident would automatically have resulted, but it would have been a possibility.

Thus a bridge strike may well do no more than superficial damage. However, if the force had been sufficient to cause displacement of the structure, a train might become derailed.

A sad instance of wrong side failures was the incorrect wiring of signals by the engineers entrusted to do the job properly, as happened with the Clapham Junction collisions of 1989. In essence, a wire which should have been cut back was not, and later formed a rogue connection which caused signal WF138 to give a wrong indications to drivers. As a result, 35 people died and nearly 500 more were injured, 69 of them seriously.

It is worth recalling some of the remarks made by Anthony Hidden QC in his report summing up:

17.2 The problem with expressions of concern for safety (by witnesses) was that the evidence demonstrated beyond doubt two things:

a) There was total sincerity on the part of all who spoke of safety ... but nevertheless

b) there was failure to carry those beliefs through from thought into deed

17.3 The appearance was not the reality. The concern for safety was permitted to co-exist with working practices which ... were positively dangerous. This unhappy co-existence was never detected by management and so the bad practices were never eradicated. The best of intentions regarding safe working practices was permitted to go hand in hand with the worst of inaction.

#### TODAY'S SCENE

The 1988 Clapham Junction accident was essentially an infrastructure problem, but it might not have been. The scope for being caught out is always there, and managers need constantly to be on the look out.

New equipment and new methods, both of which the industry needs, bring about new risks. As one student wrote in an examination paper marked by the present author: 'If you think safety is expensive, try having an accident.' So true!

Let us take comfort, however, from the conclusions reached on rail safety in 2005 by Prof Andrew Evans of Imperial College, London.

The mean frequency of fatal collisions, derailments and overruns last year was slightly down on 2004, as was the mean number of fatalities.

There was no change in the mean frequency of fatal collisions between trains and road motor vehicles which are, one might feel, another story.

*John Glover FCILT MIRO MPWI is a board member of the Institution of Railway Operators.*

## DIARY OF EVENTS

### SCOTTISH AND IRISH AREA

For information on all Scottish events and matters, please contact [scottish@railwayoperators.org](mailto:scottish@railwayoperators.org) or call acting chairman Jim Summers on 01324 625284

### MIDLANDS AREA

Forthcoming events: **Monday 25 September:** Central Trains' Soho Depot in Birmingham. **Monday 30 October:** To be confirmed. **Monday 27 November:** Visit to Midlands Metro. To contact the Midlands Area, call Julia Stanyard on 0121 345 5030 or email: [midlands@railwayoperators.org](mailto:midlands@railwayoperators.org)

### NORTH EAST AREA

All North East Area meetings normally take place at 17:30 for 18:00, at York. For further news on the IRO in the North East email [northeast@railwayoperators.org](mailto:northeast@railwayoperators.org)

### NORTH WEST AREA

**Friday 21 July:** Visit to the new Ardwick Depot. To contact the North West area on any matter, please contact Clive Evans on 01270 629009 or email [Northwest@railwayoperators.org](mailto:Northwest@railwayoperators.org)

### SOUTH WEST AREA

The summer social event takes place on **Saturday 15 July** to include the Bodmin and Wenford Railway in Cornwall, followed by dinner and overnight in a hotel. Full details available shortly. Our thanks to Roger Webster, general manager of the Bodmin and Wenford Railway, for his offer of

free travel on his railway and a tour of the facilities there.

For information on all other South West events and matters, contact Lawrie Hall on 01453 822150 or email [southwest@railwayoperators.org](mailto:southwest@railwayoperators.org)

### SOUTH EAST AREA

**Monday 10 July:** Basic Signalling Operations master class. **Monday 18 September:** Speaker (TBA). **Monday 20 November:** Track for Operators operations master class. All South East Area meetings take place at the Union Jack Club, Sandell Street, Waterloo. Doors open at 18:00 and the talks commence at 18:30. Contact the South East area at [southeast@railwayoperators.org](mailto:southeast@railwayoperators.org)

### YOUNG PROFESSIONALS

IRO Young Professionals was established this year to provide a forum for younger managers in the industry to develop their knowledge and career prospects and help deliver tomorrow's railway.

There are monthly events in and around London, with recent speakers including Mark Hopwood (managing director of LondonLines) and David Reynolds (chief signalling inspector, Network Rail), in addition to field visits to the Eurostar simulator at Waterloo and a trip on the new measurement train on the Midland Main Line.

Young Professionals members have the opportunity to develop a

broad understanding of railway operations through the events and can put questions to senior managers. Members are able to network with similarly minded professionals and build contacts within other companies, as well as access to general career advice.

Chris Green, non-executive director of Network Rail, says: 'The future of the rail industry is in the hands of our young operators. It is you who will lead us to new heights of professional excellence and performance in the next decade. I therefore warmly welcome the creation of the Young Professionals.'

As part of the IRO's south east branch, Young Professionals welcomes applications from anyone who is a new or aspiring manager within the industry. Members are also encouraged to join from other IRO branches.

For more information, see the Young Professionals website at [www.iroyoungprofessionals.org.uk](http://www.iroyoungprofessionals.org.uk)

### FORTHCOMING YOUNG PROFESSIONALS EVENTS

**Monday 10 July:** Andrew Haines speaks about his career and leading FirstGroup's UK Rail division, followed by the Signalling Masterclass of IRO South East.

**Monday 31 July:** Afternoon visit to the SWT driver simulator at Basingstoke, limited places available – see the website for more details. Use the online booking form at [www.iroyoungprofessionals.org.uk](http://www.iroyoungprofessionals.org.uk)

### 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 • First ScotRail • First Great Western • One • Railnews • Iamród Éireann (Irish Rail) • EWS Railway • Northern Ireland Railways • Central Trains • Virgin West Coast • Virgin Cross-Country • First Transpennine Express • Southern • Corus Rail Consultancy • London Underground Ltd • Docklands Light Railway • Transport for London • Stagecoach Rail • South West Trains • Sheffield Supertram • Arriva Trains Wales • South Eastern Railway • Island Line • London Lines • Silverlink Trains • c2c Rail • Gatwick Express • RWA Rail • Midland Mainline.

We are delighted to welcome RWA as our latest Corporate Member company.

Those with full membership will continue to pay their subscription personally, irrespective of whether they can subsequently claim it back. Please note that, as the IRO's subscriptions are tax-deductible, a receipt will be issued for all payments, whether by cheque, standing order or internet payment.

If your company would like to explore the benefits of corporate membership of the institution, please contact us. We welcome applications from all industry companies, suppliers and associations – please contact Chris Daughton on 01444 248931 or [admin@railwayoperators.org](mailto:admin@railwayoperators.org)