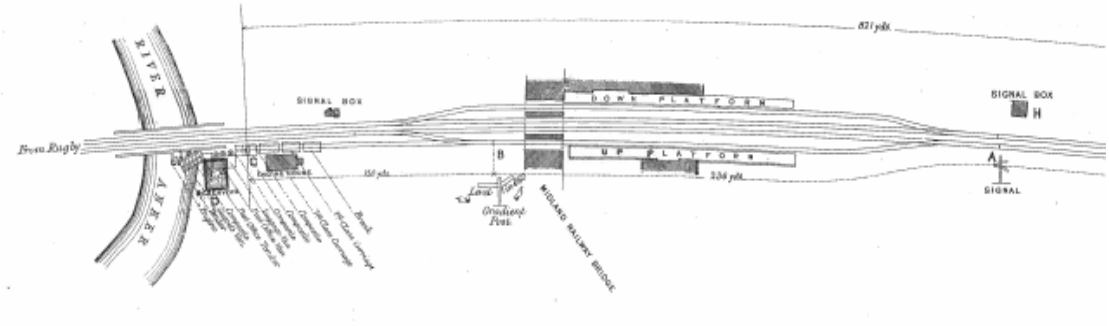
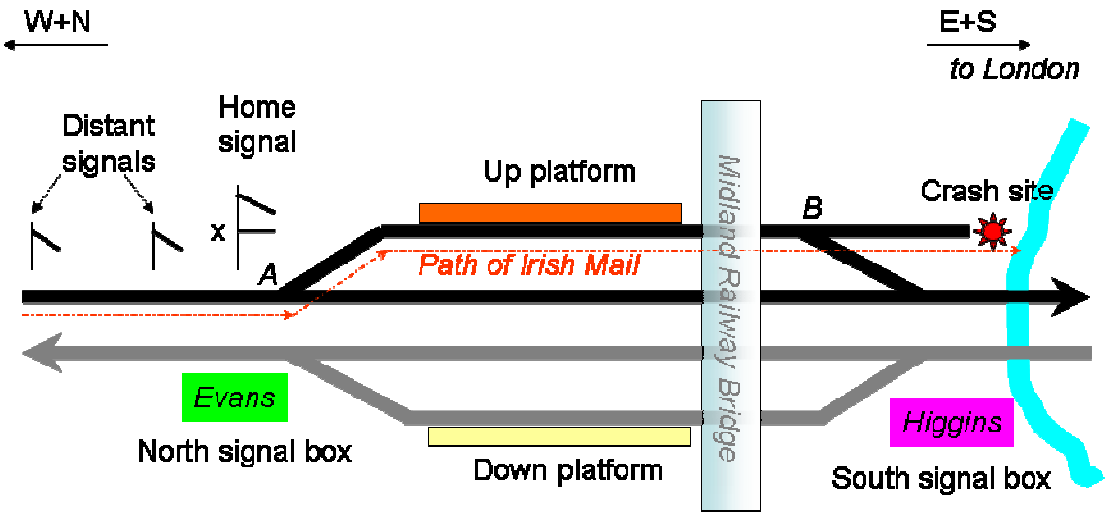
Tamworth **September 4th 1870**

The station layout at Tamworth in 1870 was shown in the Board of Trade report thus:



For the purposes of explaining the circumstances of the accident, the following diagrammatic representation may be more helpful. It involves a reorientation that brings the location of key features into line with a modern map of Tamworth. The station itself is oriented from west to east, with track turning away to the north to the west and to the south in the east.



The speculative account of the accident that occurred on September 4th 1870 that follows is based on trying to read between the lines of the Board of Trade report, in which some prerequisite knowledge of the technologies of the time is implicit. It is not always entirely clear whether my interpretation of the situation and practices is correct – something that might be itself a motivation for developing an EM construal. I have also simplified the terminology – e.g. the report refers to distant, intermediate and home signals, but the intermediate signal is here being classified as distant.

The station catered for express trains (or more generally "through trains") that didn't stop, but the points could also be set so that trains stopped at the platforms. Through trains passed through the station on the up and down main lines, and stopping trains visited the up and down platform lines. The points at the North (respectively South) end of the platform were controlled from the North (respectively South) signal box. The points at the South were interlocked so that when the points on the main line were set for a through train the points on the platform line (at B) were automatically set for

the siding that led to a dead end near the engine house (not depicted, but adjacent to the crash site in the diagram). This siding was only used exceptionally and in typical operation (as recommended in a memorandum issued on the 9th November 1869) the points would be set in such a way that a stopping train that overshot the platform would be directed back on to the main line.

Principles of interlocking were used in communicating information about the status of the points to train drivers (via signals). For instance, the mechanism of the home signal was such that (e.g.) the signal for the main line at A could only be lowered (to indicate that a train could pass through the station on the main line) if the points were first set to the main line. When the signal was then lowered, the points would be locked to the main line. Because of this locking, in order to reset the points at A, it was first necessary to set the corresponding signal to danger by raising it, then to adjust the points, and then to reset the signal.

There were two signal boxes at Tamworth station; on the day of the accident the South was being manned by Higgins and the North by Evans. H and E could not see each other because of the station buildings and the Midland railway bridge crossing above the line at right angles. A telegraph had just been installed but was not yet in operation, so that H and E still using the previous technology for communicating about approaching trains.

It would appear from the description in the Board of Trade report that communicating information about the status of the points from one signal box to the other made use of discs that were based on interlocking mechanism similar to those associated with signals. For instance, when the signalman at the South box had set the South points in readiness for a through train, he was then able to change the position of a disc in the North cabin by operating a lever. Whilst this disc remained in this position, it gave the signalman in the North box necessary information about the current status of the South points, together with the reassurance that the South points were then locked to the main line.

Discs were used in conjunction with a gong mechanism. The signalman at one signal box could pull a lever to sound a gong in the other. For instance, when the signalman at the North box wished to inform the signalman at the South box about the pending arrival of a through train (respectively stopping train) on the up line, they pulled the lever to ring the gong once (respectively twice). The train would then only be allowed to proceed (through appropriate setting of the signals) when the disc in the North cabin indicated that the South points had been appropriately set.

A train that approached the station on the up line (from the North) passed signals on three occasions, first at the distant signals, then at the pair of home signals indicated (see the diagram). Notice that only the home signals were interlocked with the points, so that it was possible (as in the diagram) for a through train to encounter distant signals set to clear even though the points were set for the platform line, and the home signal for the main line was accordingly set to danger (as marked with an ‘x’ in the diagram). The enquiry highlighted the absence of other interlocking mechanisms such as would have prevented the points at A and B being configured in what the accident revealed to be such a potentially dangerous state.

The accident

The accident occurred in the middle of the night. At 3.53 a.m., the signalling arrangements for the arrival of the next train were put in place. H in the South Box, was expecting the late running Irish Mail train. H set the South points to the main line to prepare for the Mail to pass through without stopping. Because his watch had stopped, E was confused about the train schedule, and expected a stopping goods train that would call at the up platform. E set the points at A for the loop line, so that the loop signal was set to clear and the main signal to danger on the home signal.

The Mail arrived at speed at 4.09 a.m., thirteen minutes late. It came in to the station at speed after passing the distant signals at clear, then rocked across the points at B, and thundered past the up platform. At this point, H might still have been able to redirect the Mail to the up main line by moving back the lever that operated the disc in the North box cabin and switching the points at B, but his view was obstructed at that moment by a goods train passing his box on the other line. In the event, the Mail crashed through the stop block at the end of the siding into the middle of the River Tame. The driver, fireman and one passenger were killed in the accident.

Some issues to reflect on:

a. analyse the perceptions and privileges of the agents
b. what role does time play in the accident?
c. where is knowledge (interpreted perception) involved?
d. what are the most significant environmental factors?
e. what interlocking would have helped?
f. had there been a telegraph, what communication was necessary?
g. what assumptions about scheduling could have guaranteed safety?
h. would you hold anyone responsible for the accident?

Can you devise an LSD account for the signalmen agents?
Can you model the interlocking arrangements as dependencies in EDEN?

References

L.T.C. Rolt, *Red for Danger*
http://www.railwaysarchive.co.uk/documents/BoT_Tamworth1870.pdf