Llangennech and Carmont

A closer look at two recent mishaps

From time to time, staff at Christow read railway accident reports, either in brief or in detail, as these not only cover actual circumstances and events, they also provide a useful portrayal of modern developments and practices, and reveal much about the state of the system.

Those mishaps that result from simple human error, or design or procedural failure, are the easiest to read, as the report can often only recommend tighter observance of existing rules, or minor changes to equipment or systems.

Some, though, expose huge and fundamental shortcomings or weaknesses which have crept in over the years or have come about as a result of a shrinking and less purposeful railway.

Two recent reports have excited the General Office; one because it brought home how unseen trains can be and the second because of lost versatility.

Llangennech

The derailment at Morlais Junction, near LLangennech in South Wales, on 26th August, 2020, involved a train of loaded fuel tanks. The cause was brake failure, which led to a wheelset locking up and being dragged for around 13 miles.

With each wheel imposing nearly 13 tons on the rail, large flats were formed which became a cup profile with a so-called "false flange." This eventually caused the wheels to derail on a trailing crossover situated in rear of the junction.

The train came to a stand on the junction with ten wagons derailed. Some ruptured and the fuel oil caught fire. About a quarter of the 100,000 gallons spilled was burnt off. The rest caused severe pollution to the Loughor Estuary, a conservation area, and 120 miles of coastline were contaminated. Thousands of birds were killed and the shellfisheries were closed. Nearby residents were evacuated and roads closed until the immediate emergency was over. The *Heart of Wales* line was closed for over six months. Track was extensively damaged and 30,000 tons of soil had to be dug out and sent to a licensed tip. The clean-up operation was estimated to have cost £60-million. Beaching the 62,000-tonne M.S.C. *Napoli* on the South Devon coast in 2007 cost £120-million.

It was very fortunate that the fuel was not more volatile and that the derailment occurred away from built-up areas, but the event was still an appalling environmental catastrophe.

The train, 6A11, the 2152 Robeston to Theale, weighed 2,672 tonnes and carried around half a million gallons of diesel and gas oil in 25 bogie tank wagons. Improper maintenance caused the brake to be applied on the third wagon from the engine. Three sets of wheels continued to turn, or intermittently skid, but one became at some point permanently seized. At speeds approaching 60 m.p.h. in places, the train ran through the darkness. Six manual signal boxes controlled its path. At Penn-y-bed Crossing, equipped with half-barriers, 11½ miles from Morlais Junction, a camera recorded sparks coming from the defective wagon as the train passed at 2246. The signalman at Kidwelly, 2½ miles in rear of the crossing, testified that the train was in order when it passed.

At Pembrey & Burry Port Station, it is assumed that passengers were waiting for the 2108 Cardiff to Milford Haven, the 2251 departure. The report states that "Members of the public reported hearing an unusual 'metal on metal' sound as the train passed through Pembrey station." The signalman heard and saw nothing untoward.

The Hot Axle Box Detector at Pembrey, 8½ miles from Morlais, was not designed to send an alarm to Port Talbot Panel Signal Box, in whose area the train was now running. The extract from the report explains why.

At 2253, when the train passed Llanelli, it is unlikely that there was anyone on the platforms as the Down train from Cardiff had departed. Cameras captured the heavy sparking.

The train diverged at Llandeilo Junction onto the Llanelly (*Heart of Wales*) Line, but came to grief where the Swansea District Line has its junction (The report refers to the Swansea District Line starting at Llandeilo Junction but historically it diverged *from* the Llanelly Line at Morlais).

To start with, the scribe sent some thoughts about the incident and the subsequent report to old railwaymen.

> In the summary of the R.A.I.B. report, mention is made of how far the train ran with a wagon brake hard on and I am reminded again of what a lifeless place the railway has become, especially after dark. Once, there would have been many eyes along the route, but now even Llanelli is deserted. I don't know whether the investigators commented on this in the full report.
>
> The need, or requirement, for *all* staff to observe the passage of trains I would have thought went back to the beginning, but I can find nothing in the 1890, 1933 and 1950 rule books. It is not until 1972 that, under "General," is B.5.5 "Observation of trains," and 5.5.2 states that "All staff must, whenever practicable, notice each train as it passes. If they observe anything unusual (such as signals of alarm, goods falling off, a vehicle on fire, hot axle-box or other mishap, or a train without a tail lamp, or a train divided) they must at once advise the nearest

signal box or next station. If the circumstances require it, they must take action immediately to stop any train on the opposite or parallel line(s)."

Whether this has been carried on in the current rule book, I don't know, but I can imagine the change from the general purpose railway of 1972 to the guided busway of today has rendered it obsolete. For there to be any purpose in observing trains, including those, God forbid, of another company, staff would have to have some experience to draw upon; which I suspect is almost entirely lacking in new people, most having not developed practical skills, or even common sense, at home or at work. It's hardly likely that anyone would think a 100-tonne tank screeching past in a shower of sparks was normal, but much would escape the attention of people engrossed in their phones or otherwise uninterested in their surroundings.

There would also once have been a guard in the rear cab of the loco, who would surely have been alerted to the defective wagon when the train was on a curve; with the window open, he would probably have heard the screeching above the noise of the engine, even if he had not seen the sparks.

The driving desk of the Class 60 is next to the window, but drivers are not required to look back as they once did, on starting and while underway; indeed, the desk of modern locos is set away from the side window. Some 66s were fitted with rear-view mirrors in the American fashion. Surely these, or cameras, should be standard on single-manned freight trains; there is room within the loading gauge. Again, I don't know if there was any talk of this in the full report.

If the driver had looked back, or glanced in the mirror, he would surely have seen the sparks only three wagons behind his engine over a distance of 11 miles. It shows the power of these diesels and the lack of sensitivity of the driver to his train, that a pair of wheels carrying 25 tonnes could be dragged so far.

The Westbury cement at Cogload and the Waterston tanks at Bradford would have been stopped before derailing, had there been anyone to observe their passage.

Unsurprisingly, there was once more to Morlais Junction.

The report refers to the *Heart of Wales* line diverging at Morlais Junction, but historically it was the Swansea District Line (going east) which diverged. The other two junctions are Morlais East and Hendy.

This was a case where reading the synopsis was not enough and the printer at Christow was soon spewing the full report.

After flipping through it, the scribe was moved to fire off another memo to cronies.

Not being able to resist looking to see whether there was any mention in the full report of the lack of observation of trains and the need for mirrors or cameras on locomotives, I have just scanned the 91-pages and found an awful lot about the design and maintenance of brake gear but not a word about what I consider to be important considerations.

Imagine my surprise when I read in paragraph 22 under "Staff Involved," " ... At the time of the accident, a fitter was travelling in the rear cab of the locomotive, but he played no part in the operation of the train."

It could be said that the only permissible question here is: "Did the driver or fitter look back?" Drivers are not any longer required to look back; it may be that they are not allowed to look out of the cab window. And it was not the fitter's job. Then it was not the business of the enquiry.

Paragraph 30 under "Events during the accident" states: "The train's journey was initially

> uneventful. The signallers at Clarbeston Road, Whitland, Carmarthen Junction, Ferryside and Kidwelly signal boxes did not report anything untoward as the train passed them."
>
> Pen-y-bed Crossing, where the cameras recorded severe sparking from the locked wheels, is 2½ miles beyond Kidwelly. The enquiry seems to accept that the signalman properly observed the train from his window and saw nothing.
>
> Members of the public reported hearing an unusual sound as the train passed Pembrey Station.
>
> The fitter was six old wagon lengths from the wheels which were screeching and giving off sparks. Though no strict responsibility of his, knowing that half a million gallons of diesel was rolling along behind him might have kept him from nodding off or endlessly trawling the worldwide cesspit on his phone.
>
> Honestly, I do take issue with these R.A.I.B. people. Their definition of the Absolute Block System is: "A method of signalling which aims to prevent more than one train being in a section on the same line at the same time, and requires manual confirmation of the passage of complete trains." I've never heard "*aims* to prevent" before.

One recipient responded with a link to the case of a train driver who had been convicted after crashing his train into the blocks at a terminus, seconds after fiddling with his phone and being distracted by *WhatsApp.*

https://www.btp.police.uk/news/btp/news/in-the-courts/train-driver-convicted-after-crashing-train-at-nearly-three-times-speed-limit---merseyside/

The scribe replied:

> *Miss App*, more like. I don't think I will ever understand the *walkie-talkie* revolution. I read that wired phone use expanded over 90 years but never achieved anything like saturation, whereas the wireless curse has achieved 98% ownership in each of four very short-lived generations.
>
> When "T" and I joined B.R., very few staff had telephones or bank accounts.

Of course, this had no relevance to Llangennech and was merely an aside about the inexplicable irresistibility of modern personal control screens, the like of which George Orwell could not have imagined for his dystopian *1984*.

To see whether R.A.I.B. would comment on what had been written privately, the memos were sent verbatim, headed by these opening remarks.

> Dear Accident Investigators,
>
> There must be many retired railwaymen who, in the course of maintaining an interest in the old firm, read some of your reports. Mostly, I read the summaries but occasionally delve into the full reports in search of more detail.
>
> For "Hixon—fifty years on," which I published on my web pages, I read the 1968 report in its entirety, painful as it was.
>
> My thoughts on Llangennech I sent to a circle of old chums. I have copied what was said unaltered and wonder if you may like to respond.

Less than 15 hours later the same day came this reply:

> Thank you for your interest in the work of RAIB. I am sure you would not expect us to respond to everything in your message to your friends, so I hope you will forgive me if I have missed anything important.
>
> It is true that there are no longer as many staff as there used to be who are in a position to observe the passage of trains. The introduction in the 1972 Rule Book of a general duty for all staff to notice each train was a reaction to the changing nature of the railway (and also, if I remember Fiennes correctly, an attempt to allocate duties and responsibilities to people, rather than them being abstract concepts). The duty still exists, and in module G1 of today's Rule Book all concerned are required to check moving trains for anything that looks unsafe, including a vehicle on fire or a hot axle box. However, as far as we have been able to establish there were no members of staff, apart from the signallers, who would have been in a position to notice the passage of train 6A11 on the night of 26 August 2020. It would not be reasonable to expect additional staff to be on duty just for this purpose, and in the report and recommendations we have concentrated on measures that should make it less likely that

wagons will develop defects during their journey.

Rule Book module TW1 section 18 requires that, when starting away, drivers must look out to make sure everything is in order. When working freight trains drivers must, if it is safe and practicable to do so, look out from time to time to make sure the train is following in a safe and correct way. Our investigations have found that drivers normally do this when trains are negotiating tight curves, as this is when it is easiest to see the length of the train. The latter part of the journey from Robeston to Morlais Junction, in the dark, does not provide many such opportunities, and the evidence from the lineside cameras and other sources suggest that the sparking from the wheels of the third wagon only developed in the last few miles. The fitter who was travelling in the rear cab of the locomotive would have been unable to see or hear what was happening at the third wagon unless he had put his head out of the cab window, which he had no reason to do.

As regards the report's definition of the Absolute Block system, we would be happy to consider alternatives: the point is that any signalling system can only aim to prevent two trains being in the same section. It cannot absolutely prevent it, as so many accidents over the years have shown.

I hope this is helpful.

Yours sincerely,

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Mr. Johnson's statement that "the evidence from the lineside cameras and other sources suggest that the sparking from the wheels of the third wagon only developed in the last few miles" is inconsistent with the report. Sparks can be seen in the camera footage from Pen-y-bedd Crossing, 11½ miles from Morlais, and from Llanelli, 5¼ miles away.

But the scribe was mistaken, too: drivers *are* still required by the Rule Book to look out.

Wishing to press the matter of rearview observation, the scribe replied:

Dear Mr. Johnson,

Thank you for being decent enough to reply and being so prompt with it.

A man who remembers Fiennes—or Fiennes's writings—gives away his seniority, in rank and years. I was immediately humbled.

Yes, I had half concluded that, having not found any mention in earlier rule books, the need to observe trains was an assumption, and that the 1972 rule was introduced because staff was then thinner on the ground.

As the driver's desk is positioned away from the window in modern locomotives, I had taken it that drivers were not required, or meant, to lean out. In any case, the driver could not observe his train from the right.

You did not comment on mirrors but the 2005 report on Hatherley had this to say:

Other Factors for consideration

154 Is it possible that the problem with the handbrake could have been detected before derailment occurred? The train locomotive, 66221, was equipped with a 'rear view' mirror. In May 2004, EWS had taken the decision to equip its Class 66 fleet with mirrors to enable the driver to detect incidents such as shifted loads, dragging wheels or hot axle boxes. Their original plan was to brief all drivers in the use of these mirrors in January 2006 following an update of the EWS Traincrew Manual. However, because of delays in printing the Manual, EWS issued a Traction Digest Advice to its drivers on 3 March 2006, stating:

'Rear view mirrors must be used to observe the passage of your train to make sure that it is following in a safe and correct way when:

- *leaving a Yard or terminal;*
- *leaving any point en route when your train has been brought to a stand;*
- *negotiating curves.*

You should also make use of them to increase your awareness of other persons working or walking in engineering worksites or sidings.'

155 The driver of train 6V19 stated that he did not use the mirror during the journey and was unaware of its presence. In October 2005, EWS drivers had not been briefed on the use of the mirrors. The driver reported seeing sparks when he looked back through his side window as he approached signal G50 (paragraph 42).

The Great Western definition, the same as the later B.R. one, is naturally preferred: "The object of absolute block signalling is to prevent more than one train being in a block section between two signal boxes on the same line at the same time." I can imagine an old Great Western D.I. exclaiming, "Aims? 'Aims' suggest sloppiness. We didn't go 18 years without a single passenger fatality by being sloppy." Seriously, I was nitpicking; it is not important.

Mr. Johnson replied:

Thank you for reminding me of the Hatherley report. I have consulted my colleagues, who have in turn made enquiries with the successors to EWS, regarding mirrors on locomotives.

It appears that they were fitted when EWS came under American ownership in the 1990s, as US locos have mirrors fitted, so the new owners thought EWS locos should as well. Class 66 were fitted, but classes 60 and 67 were not as mirrors would not fit within gauge—the locomotive on the Robeston tanks at Llangennech was a class 60.

Mirrors are considered to be a supplementary aid for drivers to use to look back down the train during a journey. It is to help them look back safely at locations where it is not safe to put their head out of the cab window to look back. It is optional for drivers to use them, and there are no restrictions placed on the use of the locomotive if the mirrors are missing (most are lost in yards and sidings when wagons are left just beyond the fouling point). None of the other freight operating companies have locos fitted with mirrors.

These limitations (particularly in respect of gauging) mean that we (RAIB) have never recommended extension of the use of mirrors on freight locomotives. Bodyside cameras are now used extensively on passenger trains to enable drivers to observe the doors during the train despatch process, and it may be that in future their use will be extended to freight locomotives, if it appears beneficial and reasonably practicable to do so.

With another brief reply, the scribe let the matter rest, but wished he could have taken it much further.

Thank you for going to further trouble and filling me in with regard to loco mirrors.

Like many a schoolboy enthusiast, I devoured *Red for Danger*, but the stories seemed remote and were historical. I was quickly acquainted with the awful reality of railway accidents not long after joining B.R. in 1974, when I eavesdropped on a telephone call from an on-call manager at Bridgwater and heard him say that the guard, a man I knew, had been pronounced dead. I had turned seventeen the day before. News and reports of mishaps always upset me.

https://www.railwaysarchive.co.uk/docsummary.php?docID=737

English, Welsh & Scottish Railway was created by its American owners in 1996; they had acquired most freight operations at denationalization the previous year. The scribe, who sees the span of railway history back to the beginning, and who sees its place in the vastness of human history, not for the first time was surprised to hear someone in a senior position referring to events in the 1990s as if they were distant.

Incidents of varying severity were common in the days of steam, when the railway carried multifarious commodities, often in crude, unbraked wagons. Today's trains are by comparison highly sophisticated, but they run much faster, for longer, and often impose the maximum weight the track will bear on every pair of wheels. It could be said that there will always be failure at these extremes. The need, therefore, is to spot or detect the warning signs before failure leads to disaster.

The signal box at Kidwelly, on the Downside, about 14 miles from the mishap site, controls an adjacent level crossing, which would have been brightly illuminated. Whether the signalman properly observed the train here is perhaps immaterial, because it is not certain that the wagon defect would have been obvious.

At 2246, two and a half miles further on, the C.C.T.V. camera at Penn-y-bed Automatic Half Barrier Crossing recorded sparking from the wheels of the defective wagon. It is unlikely that a motorist was held at the crossing or that anyone saw the train here.

Kidwelly Signal Box.

The camera appears to be fixed to the wall of the cabin at Pann-y-bed Crossing, left.

The train rumbled on through the darkness, passing houses in Pembrey on the Upside at between 50 and 55 m.p.h. No one on a residential street or in his garden would have taken much notice of a regular freight train and there would have been little chance of the defect being spotted; in any case, with linesides overgrown or afforested, there is often a poor or non-existent view of the railway, even from the boundary fence.

If there had been passengers waiting for the Down train at Pembrey and Burry Port (the station's complete name), they could have had a full view of the tanker train as it passed on the pair of rails away from the platform; that is, if the train from Cardiff had not arrived. The report states that "Members of the public reported hearing an unusual 'metal on metal' sound as the train passed through Pembrey station." "Members of the public" implies people not having any business with the railway, in their homes or on nearby streets, rather than passengers. Even so, it must be assumed that there were passengers waiting and that one or more were found by the investigators and gave testimony.

The 2108 Cardiff was due away from Pembrey at 2251, so the two trains must have passed at or near the station; the passenger train may have been at the platform at the time, in which case passengers would have taken no notice of the freight train, regardless of their usual preoccupations.

It is frequently commented upon by those less prone to addiction that there must not now be a spectacle that is sufficiently stunning, or scenic splendour breathtaking enough, to draw passengers' attention from their *telescreens*. Any observer of human behaviours will see passengers on a train passing along the Exe Estuary and the sea wall from the Warren not even glancing out of the window at the Powderham deer park, or the gatherings of wading birds, or waves crashing onto the shore, preferring instead to text endless inanities or play puerile games on the diminutive devices in their hands.

Would a re-enactment of Agincourt or Waterloo, or the parting of the Red Sea, or an erupting volcano, or any wonder created by man or nature, be enough to cause someone gormlessly gawping at some trifling subject on his screen, just for a moment, to take notice of his surroundings and the real world?

This being said, a freight train passing through Pembrey and Burry Port Station would surely have been ignored, even if it were a routine sight, just as the passengers, had they been waiting at a bus stop, would have ignored the traffic. And it may be that people have always warded off boredom by detaching themselves and would once have been just as absorbed, say, in a book or crossword.

But, supposing there had been a more senior, attentive, interested passenger who had some practical knowledge and he had been alarmed by what he saw or heard as the train passed: would he have known what to do? On bridges, there is an identification plate with an emergency telephone number which would put anyone seeing or causing danger to trains in touch with the "Rail Authority."

An observant fellow's first thought might have been to telephone 999, or get another passenger to do so. But would this have been the best course? He would have looked in vain for a member of station staff (By day, there is a ticket office, "The Ticket Hut," staffed by an agent). Even if there had been a solitary railwayman, he would have been uninterested in freight trains; in the insular, fragmented, modern organization, staff no longer see the railway as an operational whole.

An off duty or retired railwayman would have looked for a signal box or a signal post telephone, but Pembrey Box is over a quarter of a mile away from the station.

However, it is certain that, with today's telecommunications, if someone had been alarmed enough to take action, a call of some sort would have been made, it would have reached the "rail authority" and the imperilled tanker train would have been stopped long before it derailed.

Had the passenger train been in the platform, the driver could have stabbed the "Stop All Trains" button on his *GSM-R* device, which would immediately have alerted the driver of 6A11. But above the noise of his own train, the driver of the passenger train would not have heard much from the wagons, or been able to distinguish any sound that may on its own have caused concern. His unit's headlamps would also have "flooded" any sparks.

Pembrey Box, formerly Pembrey East, lying on the Up side, has lost its large layout with two junctions and now there are only five semaphore levers left in its 83-lever frame. It also controls a level crossing, not brightly lit after dark by the streetlamps on either side.

Pembrey (formerly Pembrey East) Signal Box.

Signalmen are required by the Absolute Block Signalling Regulations to observe trains as they pass to ensure that they are safe and complete. In order properly to observe the passage of a train, particularly a freight train, the signalman would have to go to the window, preferably sliding it open, the better clearly to see and hear. His job is not that of a Carriage & Wagon Examiner: a signalman can only look out for strikingly obvious wrongs.

Whatever else he has to do, a signalman must see the tail lamp and, in most cases, see that it is lit. The tail lamp by definition marks the end of the train and tells the signalman that it is complete; it was once the only proof that the whole train had cleared the Absolute Block Section in rear and is still the last line of defence if all else has failed. Seeing the tail lamp allows the signalman to send "Train Out of Section" to the box in rear.

Former signalmen at Pembrey East would have been very experienced. Thirty years ago, all would have been familiar with, if not any longer accustomed to seeing, partially fitted or unfitted freight trains, composed of simple, even antiquated, wagons, mostly with short wheelbases, carrying all manner of goods on plain bearings. Heavy mineral trains might have depended on the braking power of the engine and van. Though the elaborate "Incline Instructions" were intended to stop trains getting out of control, signalmen on steeply-graded routes may have heard the driver hanging on the whistle, warning that the approaching train was running away, requiring the signalman to set the road at the far end of a loop or into the section in advance.

It has been a very long time since any signalman has had to deal with an elephant putting its foot through the floor of a circus train wagon, or an inside connecting rod from a loco coming up through the floor of a carriage, or white metal issuing from a smoking axlebox; and, with all trains being class six or higher, signalmen who have never known anything else may have become slack and may not bother sliding the window open or paying any heed to the running. If anything is wrong with a class six, surely it will stop; if it is still moving it must be complete.

It is always with unease that the actions of railwaymen under these circumstances are questioned. Without any accusation, all that will be asked here is: was there old-fashioned observation, as described, or had it long been good enough just to glimpse from a distance the flashing-red tail lamp through the window glass?

Even a signalling inspector (or "Competence Manager"), responsible for passing out and periodically examining signalmen, may have had a less than rigorous approach to observing trains, because they are now so reliable and trouble free. He may never have been inspecting at a box when a freight train passed.

If the train's passage past his box had caused the signalman concern, his immediate move once, if there were time, would have been to have thrown his advanced starter to danger. This would have been followed by the bell signal, "Stop and Examine," being sent to the box in advance. This would have been the start of a well-practised emergency procedure.

This was not applicable because Pembrey is a "fringe" box and the train was entering the area controlled by Port Talbot Panel box. Up trains from Pembrey occupy a Track Circuit Block Section after being "described" so that the train reporting number appears on the panel. The box must be equipped with a *GSM-R* device and this would surely have been the most expeditious means of stopping 6A11. A call to the panel or some other procedure would have ensured that the train had been stopped at the first signal over which the signalman at Port Talbot had control.

As it was, according to R.A.I.B., the signalman "did not report anything unusual about the train" and it rumbled on, the locomotive overcoming not just the weight of the train, but the retarding effect of a 102-tonne bogie tank wagon with its brake fully applied and one pair of wheels skidding.

A "TEA" tank wagon generates about 58 tonnes of brake force when fully loaded; the loco can exert 74 tonnes. A guard could once have attracted the driver's attention by repeatedly applying the brake on his twenty-ton van, but yesteryear's train would not have had anything like the weight of 6A11.

The report had only this to say: "The signallers at Ferryside, Kidwelly and Pembrey signal boxes were all certificated as competent in accordance with Network Rail's competence management system."

Not much further on, the train passed a Hot Axle Box Detector, which recorded hot spots. The passage below from the report explains why this was not enough to trigger an alarm.

> 139 The Pembrey HABD is the only example of equipment for detecting heated axleboxes on the route of train 6A11 between Robeston and Morlais Junction. The HABD equipment located at Pembrey was connected to Port Talbot signal box (rather than the signal box at Pembrey). When train 6A11 passed over it the temperature threshold for the hot axle was not met and so no alarm was sent in real time to the signaller. High temperatures at the wheel and rail were recorded for wagon GERS 89005 (see figures 27 to 30) but because there had been no business case to support the provision of the wheelset detection software and the necessary data link within the HABD system these temperatures did not trigger any alarms to the signaller, and the data was only identified after the accident. Consequently, if an incident involving high wheel temperatures occurred, showing a dragging brake or locked wheel event, the equipment did not transmit an alarm but captured and stored the data, which could be accessed remotely and downloaded after an event.

Within a few minutes the train passed Llanelli, where no one was about. A security camera recorded the train passing, sparks evident under the leading wheels of the third wagon. Hereafter there was no observation or detection. The seized wheels slid through ten sets of points, facing and trailing, a diamond crossing, and some level crossings and road-rail access pads; but the wheel profiles were so distorted by the time the train reached the approach to Morlais Junction that derailment occurred.

Another possibility could have averted disaster. A fitter was travelling in the rear cab of the locomotive; it must have been established that this is where he rode. In the words of the report: "At the time of the accident, a fitter was travelling in the rear cab of the locomotive, but he played no part in the operation of the train." It should be remembered that this is where the guard would have ridden, before the introduction of single-manned freight trains.

In considering the fitter's position, thoughts of the great excitement that would be felt by a boyish railwayman given the opportunity to ride in a locomotive should be set aside. On an August evening, warm or not, the "boy" would have had the window open, at least part of the time, and would surely have turned his head to look forward, taken side views of places being passed and, with his back to the engine and resting his arm, would have peered along the following train, very mindful of its weight and the commodity being carried. Alternating between the seats on either side, he would now and again have glanced at the speedometer, ammeter and pressure gauges; "boys of all ages" once watched the gauges over a driver's shoulder in first generation D.M.U's.

The scribe has ridden in the rear cab of a loco hauling a tanker train but thought it best not to look out as he was an unauthorized passenger.

There is no telling for certain that the brake defect on the third wagon would have been seen or heard, even with an "enthusiastic" level of observation. On curves, sparks at rail level would have been easier to see further back in the train. If the train were at any time in complete darkness, the sparks may have caused reflections. Even powered down, the engine would have tended to drown other sounds.

But to a man with no broad interest in the railway, merely taking advantage of the train for transport, riding on the locomotive would not have been the experience it would have been for just about anyone for whom it was far from routine. On another occasion, the fitter may have taken the firm's van or a taxi, as freight companies' staff have no duty-travel facility, even if they were inclined to use the railway's passenger services or if these were convenient.

Even though the fitter had no strict role and even if he were not on duty, it would have been reasonable to place upon him the general responsibility that any ordinary railwayman would once have felt for his occupation. Mr. Johnson referred to the Rule Book's requirement for "all concerned to check moving trains for anything that looks unsafe ... " This would be rather an academic expectation of a great many staff members, who would have no experience or practical knowledge to draw upon, but a fitter putting his head out of a cab window and hearing an irregular noise or seeing sparks, *would* have known that the running was amiss.

The derailment caused the train to divide behind the second wagon. The front portion came to a stand about 200 yards away, whereupon the driver looked back and saw that a wagon was on fire. He closed the brake pipe cock (the report uses "valve") at the rear of the two wagons and drew them so that they were about a quarter of a mile away (The distances stated in the report were 180 and 400 metres; it is quite likely that the driver gave Imperial measures in his statement).

The fitter may have been of assistance at this point but it is not stated in the report. In the circumstances, any member of staff could have been called upon—if he did not immediately volunteer—to assist as far as his abilities allowed.

The last hope may have been that the driver, in looking back at opportune times, would have seen a worrying sign that would have led him to stop the train. While the train would have been in darkness for much of the time, there must have been curves in the track in areas where streetlamps or floodlights allowed a view of the driver's side. Sparking, of course, would not have been obvious.

The fitting of rear view mirrors to the Class 66 must have been specified by Wisconsin Central, or fitted as standard, when the American railroad took over much of the freight business at denationalization and introduced this powerful and reliable workhorse. Mirrors were never fitted to British locos built for the national system and, as Mr. Johnson stated, many of those on the Class 66s have been lost.

Mr. Johnson states that the loading gauge would not accommodate mirrors fitted to Class 60 locomotives, but these are the same width as the Class 66. Even if there were no space within the gauge for mirrors, the fitting of rear view cameras, like those in use on driver-only passenger trains, would be possible.

A rear-view mirror of a Class 66 seen from within the cab.

The scribe, wrongly, had said in his original message that " ... drivers are not required to look back as they once did ... " because naturally he had thought that it was considered too unsafe; the freedom ceased for passengers in 2019, the cause of much sadness at Christow, if nowhere else.

When underway, there would be no need to look back if the driver could do as the good road motorist does and glance alternately, although not as frequently, at the rear view mirrors. Screens placed to one side, or both sides, of the control desk would display the cameras' images, if cameras were fitted.

A driver at the controls of a Class 66.

There was no mention in the report of freight train drivers' rearward observation. Mr. Johnson had to be reminded that he had not mentioned mirrors in his reply. In his second reply he stated that "we (RAIB) have never recommended extension of the use of mirrors on freight locomotives." On the matter of bodyside cameras, he stated: " ... it may be that in future their use will be extended to freight locomotives, if it appears beneficial and reasonably practicable to do so."

The moving object, weighing over two and a half thousand tonnes, capable, as was so amply demonstrated, of doing enormous damage, rolled through part of South Wales gradually preparing itself for disaster, yet the signs it was showing of being in trouble were seen by no human eyes, and the electronic ones belonged only to bystanders. It is planned to extend Track Circuit Block along the South Wales Main Line in 2023; when the mechanical signal boxes go, there will be even less observation.

The report exhaustively examined vehicle maintenance and the design of brake parts, and nearly all the recommendations, not for the first time, were aimed at improving wagon workshop performance and holding owners and maintainers to their duties. One recommendation concerned measures which could stop trains in future before great damage is done.

GERS 89005 TEA

The wagon which derailed had had a brake defect for some time. In October, 2019, there was concern about its rate of brake block wear. It is possible that the wheelset which eventually became seized had been briefly sliding on many occasions, without perceptible flats being caused.

7 *The intent of this recommendation is to reduce the risk that wagons will continue to run with undetected dragging brakes or locked wheelsets.*

Network Rail in conjunction with RSSB and the National Freight Safety Group should review the technology and systems currently being used in the UK and other European countries to identify how improvements can be made to the railway's ability to alert a train driver, signaller or control room to a wagon defect that may lead to a derailment, such as dragging brakes or an axle bearing failure. This review should include consideration of::

- the use of existing or new trackside equipment that is designed to detect overheated wheels and transmit an alarm; and
- equipment installed on wagons that is capable of detecting a safety critical fault and transmitting an alarm.

A risk-based plan should be formulated for the introduction of such improved systems, that accounts for the likelihood and consequences of a dangerous goods train derailment (paragraph 213b).

On 19th October, 2022, the derailment in Carlisle of a cement train resulted from a "false flange." Lines were blocked, wagons fell into a river, severely damaging a bridge, and there followed a complicated and very costly recovery operation. Disruption continued for nearly seven weeks.

No doubt R.A.I.B. will, in due course, make more recommendations to complement those made twice before Llangennech, which were not fully acted upon, and those made after Llangennech.

Right: A wheel with a "false flange," much like the ones found at Morlais Junction. From the R.A.I.B. preliminary investigation into the derailment of a freight train at Petterill Bridge Junction, Carlisle. *Crown copyright*.

Carmont

While Llangennech was a colossal environmental disaster, equivalent in scale to one of the lesser maritime oil slicks, no one, by the grace of God, was hurt.

The crash at Carmont, however, which occurred a fortnight earlier, was the most appalling disaster because human lives were lost.

Briefly, the crash occurred when a four-car H.S.T. was derailed by washout from a newly-installed drain. The train had been terminated because of another slip beyond Carmont and it was eventually crossed over and sent back to Stonehaven.

The Carmont report was issued two months after the Llangennech report. The scribe flung a message in the direction of his old chums.

> Although I'd borrowed the 300-page accident report, it wasn't likely that I would get around to reading much—or any—of it. But a piece in *Railnews* grabbed my attention: the two and a half hours it took to send 1T08 back to Stonehaven. This was caused by the signal box not being equipped with clips and scotches and the signalman anyway not being qualified to apply them, thus necessitating a M.O.M. to motor from afar.
>
> From the report:
>
> 55 There was no requirement for clamps and scotches to be held at Carmont signal box and the signaller was neither trained, nor expected by Network Rail, to apply them (this differs from some historical practice). Therefore, a Network Rail mobile operations manager (MOM) was tasked (at 07:40 hrs) to travel to Carmont with the equipment for temporarily securing the crossover to allow the passage of train 1T08. The MOM, who was based in Aberdeen, experienced considerable difficulty in reaching Carmont because of the many flooded roads in the area, and eventually arrived there at approximately 08:55 hrs. Because the MOM was delayed, Network Rail's local operations manager (LOM) arranged with another MOM at 08:35 hrs that they would both drive separately to Carmont, in case they could secure the crossover sooner than the original MOM. Witness evidence indicates that the second MOM arrived at Carmont signal box at 09:30 hrs, and the LOM at 09:40 hrs.
>
> 56 ... By 09:17 hrs, the necessary clamps and scotches had been fitted to the crossover points at Carmont. At 09:20 hrs, the driver of train 1T08, which was still standing between Carmont signal box and Ironies Bridge, advised the Carmont signaller that he had changed ends and was ready to depart in the down (northward) direction.
>
> Several thoughts came to my mind immediately. Clipping points would once have been routine for a signalman and any box with a crossover not fitted with F.P.Ls. would normally have been equipped for those occasions when a passenger train would need to move over it. The washout occurred much later that fateful morning; had 1T08 been turned around swiftly, it would almost certainly have passed the slip site in safety. Had there been the facility to let it return to Stonehaven wrong line, then it would have passed the slip site in safety, even after the slip had occurred. There was a strong possibility that the slip would have been spotted by the driver of an Up train or by the driver of a train sent to examine the line.
>
> The rule requiring points to be locked when passenger trains pass over them in the facing direction is founded on an absolute safety principle: there is a very remote chance that a train's wheels might cause the point rails to open under the train, leading to its derailment.

Just as unlikely would be the signalman pulling the lever in the box. In this case, nine people waited two and a half hours for this very extreme safety precaution to be effected, only for three of them to die and six be seriously injured minutes after crossing over. It's a good thing we don't know our fates.

A recommendation that clips and scotches be kept in signal boxes where appropriate, and signalmen trained in their use, is not one of the 20 recommendations of the report. I have serious concerns about the competency of accident investigators.

One recipient responded: "Was Carmont never used for planned or emergency S.L.W.? One would have expected clips and scotches to be kept there. I bet they were once."

Within minutes, the scribe had added:

Under "Staff Involved:"

32 The signaller at Carmont at the time of the accident had worked on the railways for 19 years. For most of that time he had been a signaller in the Aberdeen area, covering four signal boxes including Carmont (paragraph 22). He held all the necessary competency certifications required for his role.

39 Carillion staff involved in the Carmont project included the following:

- The site agent (manager) involved with the Carmont project from 2009 until mid-2012 was experienced in the site agent role, had a degree in civil engineering and was a chartered civil engineer. He had worked in the civil engineering industry since 2003.
- The site engineer who worked on the drainage elements of the Carmont project in 2011 was also involved in planning, but not construction, of the drainage work done in autumn 2012. He had joined Carillion in 2008 and held a degree in civil engineering.
- The site engineer who supervised the drainage elements of the Carmont project on a visiting basis after work restarted in October 2012 held a degree in structural engineering and had joined Carillion in 2009.
- The site foreman who worked on the drainage elements of the Carmont project from 2010 until completion in late 2012 had worked on rail projects since 2003 and had joined Carillion in 2006.

40 Arup staff involved in the Carmont project included the following:

- A geotechnical engineer with a master's degree in soil mechanics and over 10 years' experience in this role who undertook both geotechnical design work and the role of lead designer.
- A drainage engineer with a Master of Science degree in engineering and five years' experience in this role.
- An experienced design manager who led the design team and was a chartered civil engineer with a degree in applied geology.

Is everyone now just *too* qualified?

By midnight, the scribe had read more of the report.

Had 1T08 been turned back in reasonable time, it would have reached Stonehaven safely.

S27 The train involved in the accident, train 1T08, was the 06:38 hrs service timetabled to run from Aberdeen to Glasgow Queen Street. On the morning of 12 August 2020, it was planned to terminate train 1T08 at Dundee because of obstructions on the line ahead. However, at about 07:01 hrs, just after passing the signal box at Carmont, train 1T08 was instructed to stop due to a landslip obstructing the line ahead that had been reported by the driver of another train.

S31 The last train to pass the site of the accident was train 2B13, the 06:39 hrs service from Montrose to Inverurie, at about 07:07 hrs. The driver saw nothing of concern on the journey. Modelling of water flows indicates that the washout probably occurred between 08:15 hrs and 09:00 hrs.

Of course, there is no telling that another train would have been derailed instead.

The March-April edition of *Rail Engineer,* received at Christow on 7th May, carried two articles covering the crash.

In "Carmont: So Much to Learn," David Shirres examined R.A.I.B's. final report on the derailment and considered its findings and recommendations. In part two, "Carmont: The Age of the Train," Mr. Shirres considered what the branch had said about the design and condition of the elderly train.

"So Much to Learn" stirred the scribe to write:

> Part One of this piece in *Rail Engineer* has got me worked up again. An in-depth analysis of the engineering failings completely misses two points.
>
> If the bobby at Carmont had clipped the crossover straight away, after 1T08 had been stopped short of a slip obstructing the Up road and it had been decided to send the train back, then it would most likely have returned safely to Stonehaven. And it's quite possible that the slip which blocked the Down road would have been spotted in time to prevent derailment of a later train.
>
> Regardless of whether a blanket emergency speed restriction had been imposed, it was the driver's right to proceed cautiously if he was personally unhappy with the conditions. But does modern, performance-driven training ever make clear to new drivers that they have this prerogative. In my reading of the story of how Automatic Half Barrier Crossings were implemented, I discovered that drivers routinely slowed for the new crossings because they were not confident in them being clear. A driver should no more be made to go at line speed if he has doubts about the state of the line, than he should be forced to take a full load if he doesn't feel his engine is up to it.
>
> My recommendations would be: get every box where reversing moves can be made over unlocked facing points equipped with clips and scotches; make sure that every signalman is capable of doing what any railwayman would once have been able to do; and let drivers know that they can decide for themselves in adverse conditions how to proceed.

The Caledonian Railway signal box at Carmont. The station, closed in 1956, lay beyond the box.

Parts of southern Scotland had been deluged on 11th August, causing huge disruption to train services. It had been dry in Carmont but the following morning it rained near-continually in the area for around three hours.

The 0619 Aberdeen to Montrose was the third train to run normally on the Up past Carmont. The next train was No. 1T08, the 0638 Aberdeen to Glasgow (Queen Street), which it had been decided was to terminate at Dundee, as south of Perth there were many floods, landslips and signal failures.

The first Down train of the day had run through floodwater north of Stonehaven, resulting in the line being closed.

The driver of the next Down train saw a landslip south of Carmont. Sounding the horn and flashing the tail lamps on the front of the train as he approached, he stopped to inform the signalman. As he was doing so, 1T08 passed on the Up. The signalman hastily made a radio emergency call and 1T08, which had been running at 66 m.p.h., was brought to a stand around 600 yards short of the slip.

Left and right: Carmont operates as level crossings did in the beginning: the barriers are only opened when demanded by a road user, in this case a pedestrian and her dog. There are no wicket gates and no flashing stop lights.

The Down train continued to Stonehaven, where it was terminated.

Control quickly decided that 1T08 would have to return to Stonehaven and the signalman at Carmont was ordered to arrange this move.

There is a trailing crossover at Carmont just for this sort of eventuality but it is not equipped with facing point locks.* If there were F.P.Ls, there would be ground signals and one of these could only be cleared when the points were locked. Without these mechanisms, there is the danger of point blades moving under the train or the signalman inadvertently reversing the point lever, which would not be interlocked when set for crossing over; clearing either Up or Down home signals *would* lock the point lever and reversing the crossover would lock the signals. A train derailing, even at low speed, could cause injury to passengers and so clipping and scotching the points has for a very long time been required for any train carrying passengers who are not staff. It has to be said that not having, or dispensing with, F.P.Ls. and groundsignals saves the cost of their maintenance and renewal.

All signalmen and a great many other railwaymen would once have been accustomed to applying clips and scotches, and boxes controlling even simple layouts would be appropriately equipped. But the signalman at Carmont, despite his 19 years' service, was not qualified to clip and scotch the crossover and anyway the equipment was not held at his box.

So a Mobile Operations Manager was promptly despatched from Aberdeen, over 20 miles away. He encountered flooded roads and took well over an hour to reach Carmont, in which time two more operations managers had set off for Carmont (from where is not stated) in separate motor cars in case the first one got stuck.

A former signalman, now a Network Rail supplier, with whom the scribe discussed this, stated that if the signalman had been trained in the use of clips and scotches, he would then have to have been periodically tested and if the equipment were held in the box it would have to be registered and examined and all of this for the rare occasions that points needed clipping and scotching at Carmont was an avoidable burden and expense.

The result of this petty saving at Carmont was that a trio of highly paid managers were driving some of Network Rail's near-10,000 motor vehicles in atrocious conditions to reach the remote box, when the industry admits that its staff is far and away most at risk on the road system even when the weather is fine.

It can be seen from the level crossing that the points of the trailing crossover have no facing point locks. Further, the points on the Down line (right) appear to have no rod connection, suggesting that they are sprung. An instruction stuck to the diagram in the box prohibits the crossover being used from this direction.

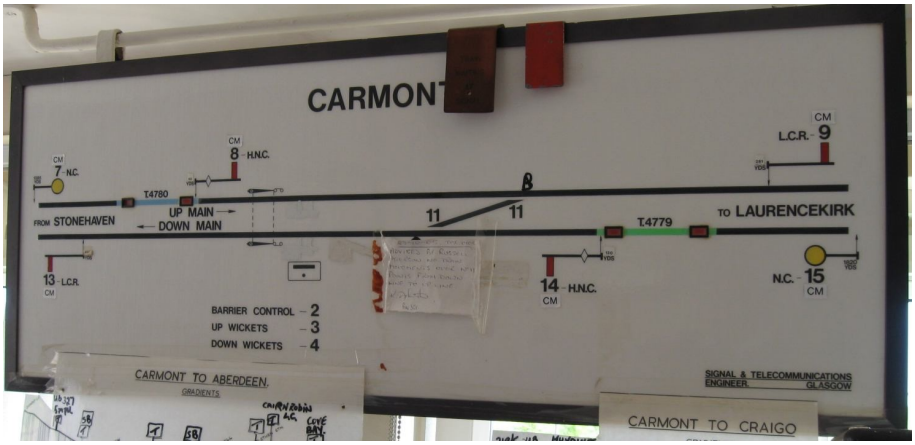
There are adjustment switches on either side of the points on each line. These take up movement of the continuously welded rail and avoid any disturbance of the pointwork.

Carmont Signal Box's lever frame could not be much simpler. The yellow levers are the Up and Down colour light distant signals. The red levers are the Up and Down homes. The red and white levers work the starters. The black lever would normally work both switches of the crossover but it appears only to work the Up line points. The brown levers are gate locks, interlocked with the signals. The brown and blue lever is marked "Power Control." Levers with their handles cut short merely act as electrical switches and remind the signalman not to exert any effort. White levers are redundant.

Commenting on the lack of versatility that was once commonplace and the railway now "book-keeping" a man's general abilities instead of letting him pick up correct practice from seniors and operational experience and use his natural acumen the way a self-employed person does, is more than notional, for in this case the delay in clipping the points proved fatal for three men.

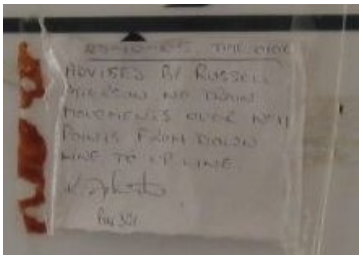
What once would have been done briskly was a drawn out procedure on 12th August. Train 1T08 had come to a stand on the Up line at around 0701. After the signalman made arrangements with the driver by radio and the points were clipped, it was gone 0930 before the train crossed to the Down and passed the box. There is no mention of the train being given a special reporting number.

* Methods of securing points are illustrated in Appendix 1.



The signal box diagram has an instruction stuck next to No. 11 crossover points.

"Advised by Russell (surname) no train movements over No. 11 points from Down line to Up line."



The train was to terminate at Stonehaven, six miles away. The guard had announced that only the leading door of the front coach would be opened and he had gone to the vestibule there. Given that the final stop was only minutes away, the six passengers and a guard travelling as a passenger may have made their way to the front of the train. It is fortunate that they did not, for the final stop came quicker than anyone could have thought.

In Paragraph 58 of the report, it is stated that the guard had advised passengers who wished to leave the train at Stonehaven to move to Coach "D." But the train was to terminate there and blockages in either direction would ensure that there would be no further movement for quite some time.

This clause summarizes part of the contact the signalman and driver had before 1T08 was reversed:

> 255 ... During this conversation, the driver queried whether there was any speed restriction to Stonehaven; the signaller replied that the line was fine between Carmont and Stonehaven, and that the driver could proceed at normal speed. In response the driver said that he would be in no rush to get there.

It is not clear what the driver meant by being "in no rush to get there." It did *not* mean that he would proceed with caution, for the 3,500 h.p. at his disposal accelerated the light train to very nearly line speed in the next mile and a half; and this included the running brake test required after changing direction.

In his memo to friends, the scribe stated that "it was the driver's right to proceed cautiously if he was personally unhappy with the conditions." This is not officially true, but a driver running his train at reduced speed under conditions which had already caused multiple blockages of lines, would hardly find himself on the carpet for not adhering to the rule; which is to run at line speed if possible, unless otherwise instructed.

The scribe had in mind a clause from the old B.R. Working Manual and, without thinking, had extended it to other situations, such as a driver whose loco or unit had an intermittent fault or was under-power or had poor braking.

> **Under Assessing the Train in the B.R. Working Manual for Rail Staff**
>
> **Duties of the Driver**
>
> B1/19. If because of adverse weather conditions he considers that the train cannot be worked satisfactorily, he should inform the guard of the reduction in load or increase in brake-power he considers necessary, and the guard should ask the person in charge of the yard or station to adjust the train accordingly. ...

A driver would continue with a load or at a speed that he was satisfied with to avoid failing the power or refusing the train. Mention has been made of the drivers lacking confidence in half barrier crossings when they were introduced, which for the first time removed the certainty of the line being clear enshrined in the Absolute Block System.

The journey time to Stonehaven would have been six or seven minutes at normal line speed, or ten or eleven minutes if the driver had chosen to run at a speed which would have enabled him to stop short of an obstruction, if one were seen. No one after the event would have noticed the difference and asked for an explanation.

But did the driver feel that he could decide for himself how fast to go? With their every move being watched, by camera or Event Recorder, are drivers afraid, or have they forgotten how, to use their judgement? The driver of 1T08 was not remotely at fault: he followed the rule and his driving was perfectly in order. And it cost him his life, for a mile and a half along the line, out of sight around a curve until the last seconds, lay a washout which had covered the nearside rail in six inches of gravelly material.

The report studies in great detail, as it should, the reaction of the train after it made contact with the obstruction. Looking at the photographs taken after the crash, it is hard to see how even the heaviest pair of wheels could have displaced enough material to stay on the rails. Lifeguards are designed to sweep away objects that may go under the wheels; they cannot scrape the rail. Lifeguards and object deflectors have to be over two inches above the rail to allow for suspension travel. Small objects or granular obstructions that lift the leading

pair of wheels will lift the framing to which the lifeguards or deflectors are fastened. Only an extremely heavy axleload may have crushed its way through the obstruction at Carmont.

At Polmont in 1984, it was thought that a cow's leg bone caused the derailment of the Driving Van Trailer, whose train was being propelled by a locomotive. The leading axleload would have been less than 10 tonnes, whereas an H.S.T. power car's axleload is 17.5 tonnes. A recommendation after Polmont was that object deflectors should be fitted to leading vehicles with an axleload less than 16 tonnes.

Not far beyond the washout lay Bridge 325 carrying the railway over Carron Water and this is where the derailed power car hit the dwarf parapet and tumbled down the embankment, killing the driver. The guard died in the leading vestibule, which was destroyed. A passenger in the second coach was killed. Only the rear power car remained upright, although it was derailed by the road spreading.

Quite remarkably, a gang was working on a scour protection contract forty feet beneath the bridge. It was from here that a "999" call was made, seven minutes after the train had left Carmont. The site was 100 yards from the washout. It is an awful pity that there was no reason for anyone to climb to track level. A certificate of commendation would surely have gone to the man who had run along the line to warn an approaching train.

Mercifully, the crash occurred while the country was in the grip of plague and while Aberdeen was under a government-imposed curfew, meaning that trains were carrying very many fewer passengers. Under normal conditions, 25-50 passengers could have been aboard. It is also fortunate that no passengers, given the short journey time and their likely eagerness to alight, had gone forward to join the guard in the leading vestibule.

The order to return 1T08 to Stonehaven came from control at 0718. It would be reasonable to assert that if the signalman had been able to clip the crossover points and handsignal the train from the Up to the Down, it would have been away from Carmont by 0750 at the latest and would, in all probability, have reached Stonehaven without incident.

Clause H25 differs from S31, which puts the times at 08:15 and 09:00.

> H25 ... RAIB considers it most likely that the washout affected the railway between approximately 08:30 hrs and 09:00 hrs.

Instead, three men spent the last 2½ hours of their lives stranded on a train, waiting for an operations manager to effect an extreme safety precaution. Quick thinking staff had averted a possible derailment and collision with the masonry of an overbridge but it seemed that fate was set on taking lives.

It would have been better if the train had traversed unclipped points at 5 m.p.h.; or if the passengers had clambered down while the crossover move was made; or if the train had run wrong road to Stonehaven (involving another convoluted procedure). But no one knew what danger lay ahead and in any case no one would dare ignore the rules or attempt to detrain the passengers without authority.

It is entirely conjecture, saying that if 1T08 had been sent back to Stonehaven without delay, three men would still be alive. The washout could have occurred earlier than the modelling showed and enough material may have accumulated to derail the train. On another occasion, delay could be a saviour.

Much less likely is that if 1T08 had not crashed, a later Down train would have run into the obstruction. With the railway at a standstill in both directions, before normal service was resumed, the next train surely would have been a "route prover," run at reduced speed with a Permanent Way supervisor in the driving cab.

As with the subject of wagon maintenance after Llangennech, the investigators at Carmont concentrated upon the failures that led to the drains overflowing at Carmont. Infrastructure, control arrangements during bad weather, design features of the train and all the usual major and minor details were covered, as would be expected, by the report's near-300 pages.

Six of the 20 recommendations concerned the weaknesses of the train, the only effect of which will be to hasten the withdrawal of the class.

The scribe will not comment on any more aspects of the disaster, except to say that the drainage works entrusted to the now collapsed and disgraced Carillion would once have been done by the railway's Civil Engineering Department and would have been inspected and maintained by the local ganger, who would have been familiar with how the drainage performed. In a storm, the gang would quite likely have been watching the drains, or would have done so on other occasions.

The circumstances and events before the crashes are what interest the scribe most and these have been looked at more closely than did the investigators, it being somewhat beyond their remit. They must not be critical or political; it is not their purpose, in the words that preface their reports, "to assign fault or blame, or determine liability."

The scribe does not find fault with individuals but is free to refer to the shortcomings of modern practice and the effect of the profound changes in the railway's position and importance which have led to network contraction, reduced staffing, deskilling, excessive "outsourcing" and the rest, all made worse by the atomized organization which sprang from denationalization.

Whenever there is a beano or an awards do or a trade fair, every place is taken and the onlooker is aghast at the number of management grades, decision makers, procurers, "stakeholders," camp followers and floozies an industry which has at best a 10% market share can field; yet at the "customer interface," where staff is wanted by passengers, it is too mean to pay people the minimum wage. And the railway is stinting over a small piece of equipment and the incremental cost of training a man to use it. And the H.A.B.D. at Pembrey, which could have sent a warning to Port Talbot, did not because the cost of the link had been saved.

As at so many small stations, a man at Carmont would once have issued tickets, attended to trains, booked parcels, answered enquiries, seen to the goods traffic and been the railway's representative. Such stations, where men got used to doing a variety of work, often acted as the railway's training ground and classroom, the very best practical introduction for a new entrant and the foundation for many who sought promotion. The work at Carmont would not have been onerous but it would have required a versatility that is now vanished; to such an extent that the signalman is not even allowed to clip a set of points.

Pervading these reports is the idea that railways can be made safe, or very much safer, by continuing to refine technology, and improve management and accountability, much of which merely lengthens and complicates already overweight documentation.

In the days of B.S. 5750, the mark of quality assurance, a sticker at Christow read: "We produce crap, but we do it consistently." Prior to Hatfield, track was covered in sprayed markings; the system was working because the faults had been logged. That the "quality" was mediocre and disintegrating rails were not being changed was of less importance than the correctness of the "paper trail."

Any one of the small, human interventions which could have been made in these two cases would most likely have saved the trains and, at Carmont, lives. The crashes were not decided by one roll of the dice and the question of "what if?" was not some single, remote possibility that was always unlikely to happen.

Of course, technology should be advanced and oversight kept on its toes, but even the most automated or foolproof or thoroughly-tested systems go wrong. In a transport undertaking whose rolling stock is highly resilient, but also vulnerable because of its dependence on a perfect guided way, and with such a large and aged infrastructure exposed to worsening weather, multiple, old-fashioned safeguards arguably are as necessary as ever.

At Llangennech and Carmont, they were woefully absent. It must be hoped that the families of the men who died at Carmont never fully comprehend what happened there.

N.B. In August, 2022, Scottish police concluded their "complex investigation" of the case and submitted a report to the Procurator Fiscal.

Derailment and fire involving a tanker train at Llangennech, Carmarthenshire 26 August 2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1054062/R012022_220113_Llangennech.pdf

Derailment of a passenger train at Carmont, Aberdeenshire 12 August 2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1059412/R022022_220310_Carmont.pdf

The Glossary of Terms in the Carmont report defines Absolute Block as: "A form of signalling that only allows one train on each track between each signal box." The railway was not the cause of this variation.

Christow Station
January, 2023

Appendix 1: **The most basic form of railway, a two-foot tram line, is here used to illustrate the methods of holding and locking point rails, which are, in principle, much the same as those found on a larger scale.**

In the simplest form of switch, the point rails are free to move and can be "trailed"—passed through by vehicles coming towards the camera from either direction.

If the point rails moved like this beneath a train travelling in the facing direction, it is possible that following wheels would find their way onto the other line.

The point rails of a narrow gauge switch like this can be kicked over; heavier rails would require a lever.

A rudimentary lock ensures that there is no movement of the point rails under traffic. This would derail a vehicle trailing the switch from the wrong direction.

The wagon's wheels have been made to take different courses in a greatly exaggerated demonstration of what may happen in the most unlikely event.

This switch has a sprung mechanism that holds the point rails in one position or the other. The switch can still be trailed from either direction.

Here the simplest form of switch has been secured, very much like a standard gauge one made of much heavier material.

One point rail is clipped to the stock rail and the other point rail is held away from the stock rail by a scotch. This would derail a vehicle trailing the switch in the wrong direction.

The leading wheels have taken the correct course but the point rails have opened sufficiently for the trailing wheels to have gone the other way. Derailment will follow.

Of course, larger vehicles, with long fixed wheelbases or bogies, coupled to others, would behave quite differently.

Appendix 2: This message was sent to a driver in the hope that he would impart his knowledge and experience, if only off the record. He replied that he would answer when he was less busy, but nothing more was heard. Freight train drivers are a rare breed in the West Country.

> Earlier this year, I had correspondence with R.A.I.B. about the derailment at Llangennech in 2020. The mishap brought home how lifeless the railway can be, especially after dark.
>
> On the general subject of observation of trains, the inspector advised me that it was still a requirement for drivers to look back on starting and en route, where possible. I had thought that, with modern locos having driving desks set away from the side window, drivers were now discouraged from looking out, if not barred from doing so.
>
> Mistakenly, I think, I had said in my message to the Branch that the driving desk of a Class 60 was next to the window; I've since realized that the 60 is not much different to the 66, and that the driver is slightly further from the side window than he used to be.
>
> My question: is it still easy to look out of these locos on the move, in the way the drivers used to do?
>
> Were desks moved, I wonder, to help prevent more of those ghastly incidents of decapitation? I imagine that the newest locos, with the driving desk positioned more centrally, have no opening windows.
>
> May I also ask you for your opinion about the usefulness of rear-view mirrors or cameras? Do you think that one or other may have enabled the driver of the train which came off the road at Llangennech to have seen that all was not well?
>
> If you feel uncomfortable being approached like this, I will understand. I am writing a bit about Llangennech and Carmont for my web pages. If you cared to give me your view as a freight train driver, it would be from an anonymous source or not repeated at all, if you chose.

A modern road sign points to a station that was closed in 1956.