



DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

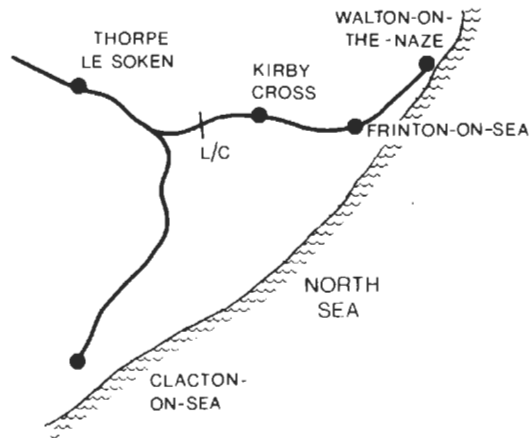
Report on the Collision that occurred on 5th April 1981 at Kirby Cross

IN THE
EASTERN REGION
BRITISH RAILWAYS

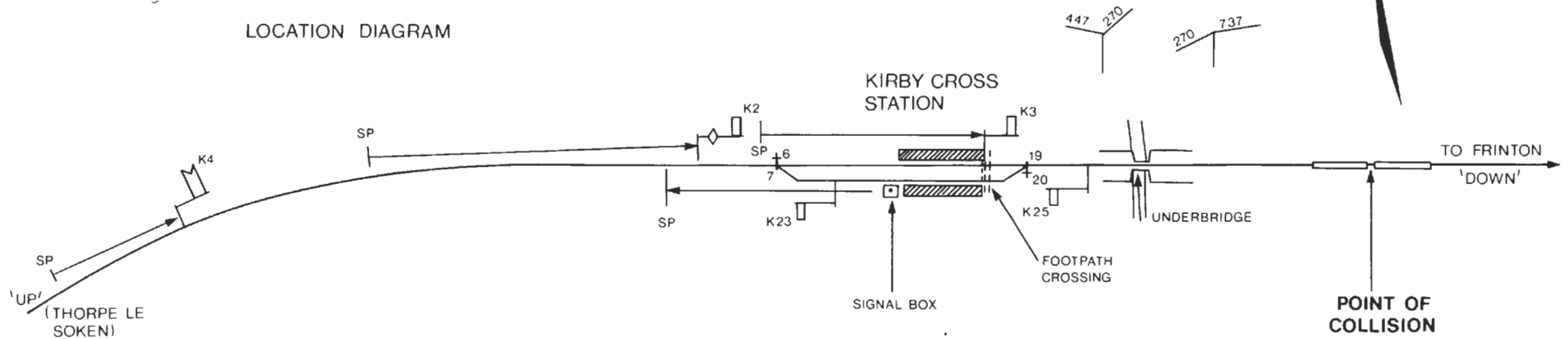
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COLLISION - 5th APRIL 1981



LOCATION DIAGRAM



SIR,

I have the honour to report, for the information of the Secretary of State for Transport, in accordance with the Direction dated 14th April 1981, the result of my Inquiry into the head-on collision at low speed that occurred at 18.54 on Sunday, 5th April 1981, between an empty coaching stock train and a passenger train on the single line between Kirby Cross and Walton-on-Naze in the Eastern Region of British Railways.

The empty stock train was the 18.30 train from Colchester to Walton-on-Naze and consisted of a 4-car electric multiple-unit. It was driven through Kirby Cross at about 40 mile/h and past the semaphore Section signal at Danger, through the trailing points which were set for the movement of a similar 4-car train which was approaching from the other direction, and onto the single line. The drivers of both trains saw the other coming and made emergency brake applications, but in spite of this a collision occurred at a closing speed of some 10 mile/h. Local residents telephoned for the emergency services who arrived shortly after the accident. The passenger train was carrying some 20 passengers of whom 7 were injured; 5 were taken to hospital but were discharged after treatment. The driver of the empty stock train suffered severe shock and was detained in hospital for several days. His guard was only bruised.

It was still light at the time of the accident on a fine, clear, cold evening.

DESCRIPTION

The Site and Signalling

1. The Walton-on-Naze single branch line diverges from the Colchester to Clacton-on-Sea double branch line some 8 chains east of Thorpe-le-Soken and some 13½ miles from Colchester. The only passing loop on the 5-mile long Walton-on-Naze branch is at Kirby Cross about 2½ miles beyond the junction. Both lines are electrified on the 25 kV AC overhead system. Signalling on the Clacton line is track-circuit block with mainly search-light type colour-light signals, but the Walton branch line is worked by the direction lever method between signal boxes using track circuits to prove the line is clear, with semaphore signals. The Thorpe-le-Soken branch section signal is a colour-light. After passing over Pork Lane automatic half-barrier level crossing the line curves right-handed on the approach to Kirby Cross at a radius of 720 m and on a falling gradient of 1 in 447.

2. As indicated on the plan, the signalling and other items are then as follows:—

<i>Worked by lever</i>		<i>First seen from</i>	
Down Distant Signal	K4	212 m	— 767 m to
Down Home Signal	K2	490 m	— 128 m to
Loop Up trailing points	K7		— 184 m to
Platforms and signal box			— 108 m to
Down Section Signal	K3	346 m	— 73 m to
Loop Up facing points	K19		— 165 m to
A rail-over-road bridge			— 346 m to
Point of contact			

The Down Distant signal, K4, has an AWS magnet 184 m before it. The signal box is situated on the western end of the Up platform, and the signalman standing at lever No. 2 can see an approaching Down train when it is about 46 m from the Home signal, although if he stands on the frame by levers 8 to 18 this distance is somewhat increased. The Down section signal, K3, has a co-acting detonator plater at the signal and there is a pedestrian crossing giving access to the Up platform immediately beyond it. The line gradient changes from 1 in 447 falling to 1 in 270 rising some 62 m beyond points No. 19, and to 1 in 737 rising some 144 m further on; the line is straight to the point of collision. The maximum permitted line speed is 50 mile/h which extends through Kirby Cross on the Down line, but on the Up loop line it is limited to 20 mile/h, which is the speed through the turnout.

3. The signal box has a 26-lever frame of which levers 8 to 18 are spare. Levers 1 and 26 are the Direction levers for accepting trains from Thorpe-le-Soken and Walton-on-Naze respectively. After a signalman at either of these boxes has offered a train to Kirby Cross and the bell signal has been acknowledged, the offering signalman holds in a button which releases the appropriate Direction lever in Kirby Cross box. Once this is pulled no other train can be signalled into section. Lever No. 1 locks the Up section

signal, K23, Normal. Lever No. 4 requires both levers 3 and 2 pulled, and the facing point lock lever 20 at points No. 19 cannot be released unless both Down Home and Section signals are normal.

4. At the time of the accident the line was worked under the Regulations for Train Signalling on Single Lines by the Track-Circuit Block system. These Regulations included the following:

“Fixed signals must be cleared in sufficient time to prevent trains being delayed subject to the provisions of the Rule Book, Section C, Clause 4.6, if applicable.” This rule reads:

“Where a signalman is not in a position to clear a stop signal he must not clear the stop signal in rear of it until the train has been stopped or brought nearly to a stand at such signal.” (There are some exceptions which do not apply in this case.)

The signal box instructions, however, contain the following additional instructions:

“When trains which have to cross each other are approaching from opposite directions, the signals in both directions must be kept at Danger, and when the train which has first to be allowed to draw forward has been stopped, the Home signal applicable to such train may be cleared to allow it to draw forward to the station or to the next signal. After it has again stopped and the signalman has ascertained that the line on which the other train will arrive is clear, the necessary signals for that train may also be cleared”.

The effect of this instruction is to remove the option allowed under the rule of clearing a Home signal when a train has been brought ‘nearly to a stand’ if one is approaching from the other direction.

The Trains

5. The two trains were the 18.30 ‘ECS’ Colchester to Walton-on-Naze and the 18.49 Walton-on-Naze to Thorpe-le-Soken passenger trains. Both trains consisted of a 4-car electric multiple-unit of Class 312/1 built in 1975. They consist of a Driving Trailer Open Second, a non-Driving Motor Open Brake Second, a Trailer Open Second, and a Driving Trailer Open Composite. The units weigh 150 tonnes and are 80 m long overall. A full-width driving cab is provided behind which there is a cross passage with inward opening doors for the driver’s use. Both trains were fitted with AWS. The normal stopping distance from 40 mile/h on the level on dry rails for this stock is about 90 m, and from 45 mile/h, 112 m.

Accident Damage

6. The Loop Up facing points, K19, had been run through in the Down direction when locked, and had been badly damaged. The drophead buckeye couplers and pusher plate housings of the front cars of both trains were slightly damaged and there was slight damage to the front ends of both cars. The fire extinguishers in both trains were torn from their mountings and one hit a passenger who was injured by it. One sliding door in the leading car of the passenger train was split but otherwise damage was minimal.

EVIDENCE

7. The driver of the Up passenger train was *Driver W. Howe* of Colchester. He had left Walton-on-Naze at the correct time and, after stopping at Frinton, left there at 18.52. As he approached the Kirby Cross Up Distant signal, which was ON, at 50 mile/h he could see a Down train which he thought was standing in the platform waiting for his train to pass, but when he was about half a mile from Kirby he saw that the train had passed Kirby and was approaching him on the single line. He made a full brake application and released his Driver’s Safety Device (DSD). When the two trains struck each other his train had virtually stopped and he stepped out. He went forward and met the signalman walking towards him, who confirmed that he had summoned the emergency services. He had worked on the branch as driver and fireman since 1936 and over the whole of that period when the Distant signal was ON, the Home signal had been cleared when the train was 50 to 100 m from it and travelling at some 15 mile/h. Since the accident however trains had been stopped.

8. The driver of the Down empty coaching stock train was *Driver A. M. Brown* of Colchester. It left Colchester on time at 18.30 and arrived at Thorpe-le-Soken at 18.45 where the train was split, and he and his guard took over the leading unit. On leaving Thorpe-le-Soken he drove at 50 mile/h until he saw the Down Distant signal at Caution when he cut off power and the train’s speed reduced to some 40 mile/h. On passing the Distant signal he could see the Down home signal ahead which was OFF. He therefore assumed that he was being signalled straight through to Walton-on-Naze and that the Up train must be late departing from Walton. He admitted that he had not noticed the aspect of the Down Section signal because three people were crossing over the pedestrian crossing just beyond it. He thought that his train was still travelling at 40 mile/h when he passed the Section signal but he heard no detonator being fired when he did so. His first indication that something was wrong was when he noticed that the points were set against him and he looked up to see the approaching train. He admitted that he was considerably shocked and “froze for a moment” before making a full emergency brake application, but he stayed in his cab and did not release his DSD.

9. Driver Brown was aged 23, and had been based at Colchester as a Second Man from 1974 to 1978. He was transferred to Stratford for training as a driver on 16th October 1978 and passed his technical examination on 8th August 1979. He had twice failed his examination on the Rules and Regulations in August and November 1979 but finally passed them on 1st April 1980. He was route learning with another driver from 12th August 1980 until 2nd March 1981 when he signed his route card and took over his first train the following day. During this six-month period he had spent one week route-learning on the Walton-on-Naze branch line. Although he told me that he had never driven a train on the Walton-on-Naze branch on his own before, he had in fact driven the 10.51 Colchester to Walton and the 11.47 Walton to Colchester trains on 4th, 5th and 6th March 1981. He also told me that during his week's instruction he could not remember having been stopped at a Home signal at Kirby. He could not remember if he had ever been signalled directly up to the Section signal at Danger because all the passenger trains he had driven had stopped there in any case; nor had he driven a non-stopping empty coaching stock train on the line before.

10. Driver Brown told me that on 5th April, he had lunched with his father in Colchester between 12.15 and 13.00 and had drunk two pints of beer. He took over his train some three hours later and assured me that he was completely sober, and a test made after the accident confirmed that this was so. He had not been taking any drugs and had no problems on his mind such as have sometimes caused drivers to miss signals. He knew that the maximum line speed through Kirby Cross on the Down line was 50 mile/h. Although he regularly drove on semaphore signalling, he knew of no other passing place similar to Kirby on any other single line.

11. His guard, *Guard R. C. Sargent*, confirmed that they had left Colchester on time at 18.30 and that they had carried out a satisfactory brake test before leaving. He had recorded their arrival at Thorpe-le-Soken at 18.45 and their departure at 18.49, and he saw the Section signal displaying a green aspect. He thought that they were travelling at between 40 and 45 mile/h through Kirby and assumed that they had been signalled through to Walton-on-Naze but as they were going over a bridge some 260 yards past the Section signal there was a sudden brake application and he noticed that the main brake reservoir gauge was showing only 10 lb. of air pressure. He had just risen from his seat when a terrific impact threw him against some cabinets and onto the floor. He made his way forward and found his driver standing on the ground by his cab. He said to him "Did you pass any signals at red?", to which he replied "The Distant signal was against us and I knew that something was wrong because we have run through the points." He then helped the guard of the other train to look after his passengers. They bandaged a young lad who had a bad cut on the side of his head, and one lady had a large bruise on her forehead, and a middle-aged man had hurt his back. Others were suffering from shock.

12. *Rest Day Relief Signalman E. Marsh* took duty in Kirby Cross Signal Box at 15.50 on the day of the accident. At 18.41 he accepted the 18.49 Walton to Liverpool Street train and received the Train Entering Section signal for it at 18.49. At 18.45 he accepted the 19.01 empty coaching stock train from Thorpe and received the Train Entering Section signal for it also at 18.49.

13. He told me "I brought the 19.01 ECS nearly to a stand at the Down Home signal in accordance with Section C of the Rule Book, paragraph 4.6". He was standing at lever No. 2. He continued: "After clearing the Down Home signal the train seemed to gather speed through the Down platform and failed to stop at the Down Section signal, exploding the detonator, and ran through the points which were set and locked for the passage of the 18.49 ex Walton to come into the Up platform." He then sent the 'Obstruction Danger' signal to Walton hoping the crossing keeper at Frinton would hear it and stop the latter train, but it had evidently already left Frinton. He was talking over the telephone to the Walton signalman when he heard a bump outside his box and the lever in the box rattled.

14. When I put it to him that his evidence was quite contrary to the driver's version of what happened he replied that he "didn't think so". He said that he could see the train for about 50 yards before the signal and thought it was travelling at about 10-15 mile/h when he first saw it. He had never checked the operation of the detonator placer with the track chameleon and had never had occasion to call the signalling technician to adjust it.

15. Signalman Marsh was 22½ years old. He had attended a 6-weeks course at the signalling school at Ilford and had then worked under supervision for three weeks at Kirby and Walton-on-Naze Signal Boxes. He began full-time work as a signalman in these boxes in December 1978 and had, therefore, had over two years' experience of the Kirby signalling.

16. *Trackman B. O'Neill* had patrolled the branch on the Monday, Wednesday and Friday of the week prior to the accident. He was required to check that detonators were present and he carried spare detonators for replacement purposes. On Friday, 3rd April, they were in place and he did not talk to the signalman in passing.

17. *Signalling and Telecommunications Supervisor C. Smith* of Colchester arrived at Kirby Cross at 20.30, about one and a half hours after the accident. He found levers No. 1, 20, 7 and 26 in the reversed position and all other levers normal. (This indicated that both trains had been accepted and that points

No. 19 had been locked for the arrival of the Walton train. Lever 7 had been pulled because a train had been shunted over the points after the accident.) He spot tested the lever frame, noted that Signals K2, K23 and K25 were all ON, and then examined No. 19 points which had been run through. Signal K4 was ON, and a test of its AWS showed that it was working. He then dismantled No. 19 points and clipped them in the Normal position. In passing he felt the detonators in place at No. 19 points, for it was dark at the time, and found that they were flat, from which he assumed that they had been exploded. He confirmed that the machine was maintained at monthly intervals and had last been maintained on 11th March. He also said that there was no detonator placer at the Walton-on-Naze Section signal, nor any at either of the Section signals at a similar passing place at Farnbridge on the Wickford to Southminster line.

18. *The Area Signalling Inspector Colchester, Mr. D. Keegan*, visited Kirby Cross at about 11.20 on Monday, 6th April, and found that the detonator placing machine at the Down Section signal was out of adjustment. With the signal lever pulled it was possible to rotate the machine's axle so that detonators were moved back about an inch so that they no longer lay on the head of the rail. He found two detonators lying nearby; although they had been run over across one edge, they were unexploded. He could not say when he had last inspected the detonator placers.

19. He was responsible for checking the work of signalmen and had "reclassified" three signal boxes, including Kirby Cross, three weeks previously. He agreed that it was contrary to the signal box instructions for a signalman to apply Rule C.4.6 and bring a train nearly to a stand at a Home signal if a train was approaching in the other direction, but he had not been aware of the practice during his visits to the box. He normally visited the box once a month but the signalman usually became aware, one way or another, that he was on his rounds in the area before he arrived.

20. Nor had the *Area Operations Manager, Mr. G. C. Eccles*, ever been made aware that trains were not being signalled correctly at Kirby. The Station Manager at Colchester visited the box and he, Eccles, had two Area Inspectors under him and the box had been visited during the previous week. Nor had he ever had any complaints from drivers. He thought the level of supervision was quite adequate.

21. *Mr. E. W. Birchler, Area Maintenance Engineer (Electric Traction) at Ilford*, described the accident damage given in paragraph 6. He confirmed that the brakes, AWS, windscreen wipers, horns, and Driver's Safety Device (DSD) on the leading coach, No. 76986, of the empty coaching stock train, unit No. 312792, were all working correctly. He considered that the degree of damage indicated that the closing speed of the two trains had been about 14 mile/h.

CONCLUSIONS

22. There can be no doubt that Driver Brown drove the empty coaching stock train past Signal K3 at Danger and ran through the trailing points onto the single line. From his own and his guard's evidence, having slowed from 50 mile/h on passing the Distant signal, K4, he had driven at a steady 40 to 45 mile/h speed through the station and certainly had not slowed to 10 to 15 mile/h at the Home signal, K2, as claimed by Signalman Marsh. Even at 45 mile/h the Home signal would have been in view for 25 seconds, but I do not believe that Driver Brown failed to see it during this time and that it was other than OFF for most of that time.

23. The arm of the Section signal, K3, is 27 ft. above rail level and appears amongst insulators and stanchions supporting the overhead line equipment. Driver Brown's concentration was on pedestrians crossing between platforms and his attention was diverted from the signal which was in view for at least 17 seconds. Not having been halted at the Home signal he had every right to assume that the Section signal was OFF. He had no right at all however, as a driver, not to take a careful look at the Section signal which was his only authority to enter the single line, and for this failure he must bear full responsibility. Having run through the points, moreover, he must have 'frozen' for at least 15 seconds before starting to brake his train. Assuming he was travelling at 40 mile/h and that the train decelerated at 7%g, he would have slowed to 10 mile/h in about 240 yards. This conclusion is confirmed by the guard's evidence that the brakes were first applied when the train was over the bridge. (From the accident damage, I believe that the final collision speed must have been somewhat less than 10 mile/h and not the 14 mile/h as suggested by Mr. Birchler). Driver Brown must also be held responsible for not braking his train immediately he saw the points were not set for his train. Had he done so the collision would have been avoided.

24. By his own evidence Signalman Marsh failed to work to his signal box instructions and, instead, cleared his Home signals when he thought that trains had slowed to 10 to 15 mile/h, under Rule C.4.6. Even this speed can hardly be said to be "Nearly at a stand". Furthermore, I believe that he cleared the signal much sooner and, by so doing, misled the driver which directly led to the accident occurring. From Driver Howe's evidence I believe that it has been the practice to work to the Rule rather than to the special signal box instruction, for many years.

25. The detonator placer at the Up Section signal, K23, is of a sliding type and in good working order, but that at the Down signal, K3, is of an earlier rotating design and too badly worn to be effective. The slack in the locking bolt was so bad that it was beyond repair, and this should have been noted during inspection. In any case, even had the detonators fired, the driver would only have had an additional 3 seconds warning before the train ran through the trailing points and could not possibly have prevented it entering the single line. On the other hand, they might have caused the driver to apply the emergency brakes earlier and thus prevented the collision.

RECOMMENDATIONS

26. Because of the signalman's limited view of a train approaching the Down Home signal, K2, and the 50 mile/h line speed, I recommend that, if lever No. 26 is reversed to accept an Up train, lever No. 2 should be electrically locked until a Down train has occupied a berth track circuit long enough to ensure that the train has come virtually to a stand at the signal.

27. From his own evidence it appears that signalman Marsh had become accustomed to applying Rule C.4.6 even when two trains were approaching each other, instead of the signal box instructions to stop both trains and, it seems, that the line had been worked thus for many years. I find it surprising, therefore, that it had never come to light during the regular visits to the box by Area Managers and Inspectors. The quantity of supervision of the signalmen was clearly adequate, but if what I have concluded was true, its effectiveness was not.

28. A head-on collision on a single line is the most dangerous of all collisions and the best possible protection against one is the provision of facing trap points at each entrance to the line. Serious damage and the inevitable casualties were avoided in this case because of the limited line speed, and the alertness and quick reaction of Driver Howe who virtually stopped his train before the impact. The number of signals passed at danger is generally decreasing year by year; in 1966 they averaged 6.4 per year per one hundred million track-miles operated, whereas in 1977 the figure was 5.3, and head-on collisions are extremely rare. I consider, therefore, that with the AWS provided, coupled with the control I have recommended and the limited line speed, the line as presently signalled should be adequately safe for the future.

I have the honour to be,

Sir,

Your obedient Servant

A. G. TOWNSEND-ROSE,
Lieutenant Colonel

The Permanent Secretary,
Department of Transport.