MINISTRY OF TRANSPORT AND
CIVIL AVIATION

RAILWAY ACCIDENTS

REPORT ON THE COLLISION

which occurred on

9th February 1957

at

CHAPEL-EN-LE-FRITH (South)

in the

LONDON MIDLAND REGION
BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE
1957
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MINISTRY OF TRANSPORT AND CIVIL AVIATION,
BERKELEY SQUARE HOUSE,
LONDON, W.1.

10th July 1957.

SIR,

I have the honour to report for the information of the Minister of Transport and Civil Aviation, in accordance with the Order dated 11th February 1957, the result of my Inquiry into the collision which occurred at about 11.21 a.m. on Saturday 9th February 1957 at Chapel-en-le-Frith (South) on the Buxton to Manchester double line in the Western Division of the London Midland Region, British Railways.

The 11.5 a.m. freight train from Buxton to Arpley (Warrington), comprising 33 loaded wagons and a brake van, got out of control as it was descending a steep incline on the Down line. It gathered speed rapidly, and overtook and collided violently with the rear of the 8.45 a.m. freight train from Rowsley to Edgeley (Stockport), comprising 37 wagons and a brake van which was passing through Chapel-en-le-Frith station at about 20 m.p.h.

The initial cause of the accident was the failure of a joint in the pipe leading to the driver's steam brake valve of the Buxton to Arpley train engine. This occurred about one and a half miles from Buxton and not far from the place where the driver would have stopped to pin down wagon brakes before descending the incline to Chapel-en-le-Frith and Whaley Bridge. The fracture not only put the braking system on the engine out of action but also filled the cab with scalding steam. With great bravery and determination the enginemen, after repeated efforts, managed to get the regulator partly closed and to apply the hand brake on the tender, but by this time the front of the train had reached the summit and it could not be stopped. Driver Axon, who was in charge, told his fireman to jump clear and apply the wagon brakes, but in spite of this prompt action the train gathered speed. Driver Axon, however, remained at his post to give warning to the signalman that the train was running away, and in the hope of regaining control on a more favourable gradient. Before this was reached the collision occurred, and I regret to report that Driver Axon and the guard of the Rowsley freight train were killed; the enginemen of this train and the guard of the Buxton train, although badly shaken, were uninjured.

The brake van and the three rear wagons of the Rowsley train were destroyed, and the shock wave through the train derailed four wagons near the front. The engine of the Buxton train fell on its right hand side against the Up platform wall, and its tender struck and demolished the signal box, from which the signalman escaped with a shaking. The leading 30 wagons were piled on top of the rear vehicles of the train in front and formed a mass of debris 25 ft. high which blocked both the lines at the Buxton end of the platform. Two of the three remaining vehicles were derailed, leaving only the rear wagon and the brake van undamaged and still on the rails.

The 10.20 a.m. two-coach diesel passenger train from Manchester (London Road) to Buxton, which was standing at the Chapel-en-le-Frith Up platform, was struck by the derailed engine, and the front end of the leading coach was damaged. Fortunately the approach of the runaway train was noticed by the staff in sufficient time for most of the passengers to be detrained, and none of them was injured. These passengers continued their journey by road about an hour later, and the damaged diesel train was eventually worked back to Longsight Depot under its own power.

The track was badly damaged for more than a quarter of a mile, and the signal box and all its equipment was destroyed. The block and telephone communications from this box were severed, but the telephone from the stationmaster's office was not affected, and he promptly sent calls for ambulances, doctors, fire services and the police, all of whom reached the scene without delay and rendered valuable assistance.

Breakdown trains from Derby and Crewe arrived during the afternoon, but the debris, which included over 150 tons of loose coal, was so exceptional that traffic through the station could not be restored until the morning of Tuesday 12th February after an interruption of nearly three days. During this time, passenger trains on the Manchester-Buxton line were terminated at Whaley Bridge, and a bus service was introduced between this station and Buxton. Local freight trains were cancelled and through freight trains were diverted to other routes.

The weather was fine and clear, and the rails were dry.

THE SITE

1. With reference to Figs. 6 and 7 of the accompanying drawings, the Down line from Buxton rises for nearly two miles at 1 in 66 to a summit at Bibbington's Sidings, whence it descends for seven miles to Whaley Bridge at 1 in 58 to 1 in 70, except for easements to 1 in 150 through Dove Holes and Chapel-en-le-Frith stations. Beyond Whaley Bridge the line undulates for 4½ miles to Disley, and then descends at 1 in 60 for 3¼ miles to Hazel Grove, after which there are easy gradients to Stockport (Edgeley), where the Buxton line joins the main line to Manchester (London Road).

Curvature is continuous for most of the way to Whaley Bridge. After running generally in a northerly direction from Buxton to Dove Holes, the line swings to the left through a series of curves to Chapel-en-le-Frith where it is running almost due west; it then swings to the right until it is again running north at Whaley Bridge. There are two short tunnels between Dove Holes and Chapel-en-le-Frith, the second of which is known as Eaves tunnel.

2. Freight trains from Buxton are usually banked as far as Bibbington's Sidings where unfitted trains are required to stop for wagon brakes to be pinned down. Notice boards to indicate where the banking and train engines must stop are fixed on the left hand side of the Down line as shown on Fig. 1. The first board is about 400 yards short of the summit, and the second board is nearly 100 yards beyond it.

3. Between Bibbington's Sidings and Dove Holes station there is a Down goods loop with a clear length of about ½ mile; the entrance and exit are controlled from Bibbington's Sidings and Dove Holes signal boxes respectively. Dove Holes signal box is on the Down side at the Buxton end of the platform, and it is directly in line with the loop trap siding which ends at the box. Chapel-en-le-Frith signal box and station buildings are on the Up side.

4. Normal block working is in force on the line, and there is nothing in the signalling arrangements which calls for comment.

Table of Distances

5. The relevant distances are:—

		Point to point distance.		*Distance from point of collision.*		
		Miles	Yards	Miles	Yards	
Buxton	Down sidings exit			4	1520	South
		1½	—			
Bibbington's Sidings	Distant signal			3	640	,,
		—	230			
	Banking engine stop board			3	410	,,
		—	400			
	Summit			3	10	,,
		—	85			
	Train engine stop board			2	1685	,,
		—	220			
	Signal box			2	1465	,,
		—	120			
Dove Holes	Entrance to Down loop			2	1345	,,
		—	705			
	No. 78 underbridge			2	640	,,
		—	55			
	Down Goods home signal			2	585	,,
		—	35			
	Down Goods loop exit points			2	550	,,
		—	65			
	Signal box			2	485	,,
		1½	—			
Chapel-en-le-Frith	North end of Eaves Tunnel			—	1365	,,
		—	1365			
	POINT OF COLLISION					
		—	70			
	Signal box			—	70	North
		—	30			
	Front end of Up passenger train			—	100	,,
		—	440			
	Front end of Rowsley freight train after collision			—	540	,,
		3½	—			
Whaley Bridge	Station			3¾	—	,,
		4½	—			
Disley	Summit			8¼	—	,,
		3¼	—			
Hazel Grove	Station			11½	—	,,
		2¾	—			
Stockport	Edgeley Station			14¼	—	,,
		5¾	—			
Manchester	London Road Station			20	—	,,

THE TRAINS

6. The 11.5 a.m. freight train from Buxton (the Buxton train) was hauled by a 2-8-0 type tender engine of the 8 F class driven from the left hand side, and it comprised 24 wagons of coal, 5 wagons of freight, 2 empty tank wagons and 2 loaded flat wagons, with a 20-ton brake van at the rear. The engine weighed 125 tons, and the load behind the tender was approximately 650 tons, giving a total weight of 775 tons. The total length of the train was approximately 255 yards. The steam brake operated on the coupled and tender wheels of the engine and gave a brake power of 76.6 tons; the hand brake, which is worked by a wheel on the right hand side of the tender, applied a pressure of about 8 tons to the tender wheels; the pressure of the brake in the guard's van was about 16 tons.

About 16 wagon brakes would have been applied to control the train on the steep falling gradient to Chapel-en-le-Frith, and these would have given an additional retarding force of approximately 71 tons. Thus, the brake power available under varying conditions would have been: —

Brakes	*Brake power tons*	*% of the total weight of the engine and train*
Engine and tender steam brake	77	10
Engine and tender steam brake and guard's hand brake	93	12
Engine and tender steam brake and guard's hand brake, plus 16 wagon brakes	164	21
Tender hand brake and guard's hand brake	24	3

7. The 8.45 a.m. freight train from Rowsley (the Rowsley train) was also hauled by a Class 8 F engine with left hand drive, and the load comprised 34 loaded goods and mineral wagons, 3 empty conflats, and a 20-ton brake van. The engine weighed 125 tons and the rest of the train weighed approximately 750 tons, giving a total weight of 875 tons. The total length of the train was approximately 275 yards.

8. The 10.20 a.m. passenger train from Manchester to Buxton consisted of a diesel motor coach in the rear with a driving trailer in front. It weighed 48 tons and was 40 yards long.

The Buxton Train Engine

General description

9. The Buxton train engine was No. 48188, stationed at Warrington Motive Power Depot. It was built by the North British Locomotive Company in 1942 and it had run 392,100 miles since it was put into service, and 38,200 miles since its last heavy intermediate repairs at Horwich in April 1955; before that it had received its last general repair at Crewe in January 1953.

The coupled wheels are 4 ft. 8½ ins. in diameter, and the tractive effort from two 18½ ins. x 28 ins. cylinders is 32,438 lbs. at 85% of the boiler pressure of 225 lbs. per square inch. The total length of the engine and tender is 63 ft. 1 in. and its total weight is 125 tons 15 cwts. with 9 tons of coal and 4,000 gallons of water in the tender.

The driver's steam brake

10. The driver's brake valve is mounted on the left hand side of the firebox back plate and it is to the right of and above the reversing gear (see Fig. 3). Steam is supplied from the steam manifold at the top of the back plate through the combined ejector steam valve casting which is mounted above and slightly to the left of the brake valve. The steam supply to both the large and small ejectors and the brake valve can be turned off by a stop valve at the left hand side of the steam manifold; in addition a main stop valve for the complete manifold is provided at its centre. The connection to the brake valve from the combined ejector and steam valve casting is made by a copper pipe of 1⅛ ins. internal diameter with a coned joint at the upper end and a butted joint at the lower end where it is connected to the brake valve casting (points A and B in Figs. 3 and 4). The lower joint B which was the one that failed is made by inserting an impregnated asbestos ("walkerite") packing between a collar brazed on the end of the pipe and the screwed end of the brake valve casting; the union nut is then screwed up until the joint is steam tight. The other joint is made by brazing on to the end of the pipe a turned brass cone which fits into the coned mouth of the connection on the combined ejector steam valve casting, and it is also tightened by a union nut.

Leaks at these joints occur from time to time due primarily to the vibration on the footplate which slightly loosens the nuts so that steam escapes past the packing in the lower joint or between the cone faces of the upper joint. The leaks are usually stopped by tightening the nut although sometimes the packing of the butted joint requires renewal. Very occasionally a blow occurs through a defect in the brazing. This can be detected easily in the coned joint because the brazing at the end of the cone is exposed to view, but a leak through the brazing of a butted joint cannot be seen because the nut covers the end of the collar, and consequently it can only be detected by removing the nut; this is not normally done unless tightening the nut has failed to stop the leak.

Examination of the engine after the accident

11. An examination of engine No. 48188 two hours after the accident showed that the reversing gear was in the full forward position and the regulator lever was shut. The tender hand brake was fully applied. The steam pipe leading to the driver's brake valve had broken away, and there was a gap of about two inches between it and the brake valve fitting. It was found that the collar at this joint had broken away from the copper pipe and it had jammed in the union nut.

Metallurgical examination of the defective steam pipe joint

12. The defective steam pipe joint which is illustrated by Fig. 5 was sent for metallurgical examination, and a study of the report leads to the following conclusions: —

(a) The nut had been appreciably distorted at the end where the copper pipe emerged.
(b) The collar had been machined from a very porous casting, and it would distort easily under pressure.
(c) The collar was not solidly brazed to the copper pipe, and the brazed joint, such as it was at the time of the failure, was not a good one. As can be seen from the drawing, some of

the brazing metal had overflowed on to the face of the collar, which was thicker on one side than the other.

(d) The pressure produced by tightening the nut in order to get a steam tight joint had distorted the collar and recessed the face of the nut, the top of which was distorted sufficiently to cause a small crack to develop in the internal angle, as illustrated.

(e) The collar had jammed against the inside of the nut, and some of the material of the impregnated asbestos packing had become embedded in the second and third screw threads.

(f) The copper pipe and the brazed collar had been annealed at least once during their period of service, and the initial straining of the collar and the brazing metal had occurred some time before the collar had last been annealed.

(g) The joint had finally failed through the disintegration of the brazing under stress, and eventually the collar began to turn around the pipe when it was tightened, until it became so loose that the end of the pipe blew out.

History of the driver's steam brake valve

13. So far as can be ascertained from the available records, the steam brake pipe of engine 48188 had not been removed since the engine returned to service on 30th April 1955 after its last heavy intermediate repairs at Horwich. Before this the engine had received its last general overhaul at Crewe in January 1953. It is the regular practice at the Horwich workshops to examine, repair and anneal the copper steam pipes which are removed when the footplate fittings are taken down for repair during an intermediate overhaul. It can therefore be concluded that the defective steam pipe on this engine was last annealed at Horwich in April 1955. It is not possible to say whether this pipe was on the engine before it was repaired at Horwich because annealed pipes are not always replaced on the engines from which they had been removed, and no record is kept.

14. Unfortunately some of the Warrington Motive Power papers were lost during an office removal and these included the repair cards for engine 48188 for the period May to August 1955. Since then the brake steam pipe on this engine has been reported as blowing on the following occasions:—

Date	*Booked at*	*Defects as booked by the driver*	*Time spent on repairs*
12.11.55	Warrington	Steam brake steam supply nut blowing.	15 minutes
12. 4.56	Warrington	Brake steam supply nut blowing.	No record
15. 5.56	Farnley Jn.	Brake combination steam pipe nut blowing.	15 minutes
17. 7.56	Warrington	Brake steam connecting pipe nut blowing.	15 ,,
28. 8.56	Farnley Jn.	Brake combination steam pipe nut blowing.	15 ,,
31. 8.56	Warrington	Steam brake supply pipe nut blowing.	30 ,,
1. 9.56	Warrington	Steam supply pipe nut side of air valve blows bad. (Noted by the fitter on the 'X' day examination repair card).	15 ,,
23.11.56	Stockport	Steam brake elbow pipe bottom nut blowing.	30 ,,
8. 2.57	Warrington	Brake steam pipe blowing (reported verbally).	15 ,,
9. 2.57	Buxton	Brake steam pipe to disc valve nut blowing.	15 ,,

There is no record of the pipe having been taken down for annealing or detailed examination during this period and most of the fitters who stopped the leaks could not recollect what action they had taken. It seems probable, however, that the blowing was stopped by tightening the union nut as was done on the last three occasions by the fitters whose evidence is recorded later in this report.

15. In order to obtain a comparison, the drivers' reports on 18 similar engines based at four other depots in the Western Division of the London Midland Region have been examined, but it has not been possible to identify from the wording in every case the particular steam brake pipe or nut which was reported as blowing. Based on the total number of reports the rate for the 18 engines is only one report per engine every 5.2 months compared with one every 1.8 months for engine No. 48188, after excluding the report of 1st September 1956 which was made by a fitter at an 'X' day examination.

Evidence

Summary

16. The Rowsley train left Buxton at 10.47 a.m., and, after stopping to pin down brakes at Bibbington's Sidings, it entered the Dove Holes loop where it was held to allow a Down passenger train to pass through on the main line. It followed this train from Dove Holes and travelled slowly through the section to Chapel-en-le-Frith.

The Buxton train left Buxton on time, but as it was ascending the steep incline to Bibbington's Sidings the steam brake valve joint blew out. This put the power brake on the engine out of action and in consequence the crew were not able to stop the train which passed Bibbington's Sidings box at about 20 m.p.h. and then entered the Dove Holes loop where the signalman had intended to hold it pending the arrival of another Down passenger train. The signalman, however, on seeing the freight train approach-

ing at a much higher speed than usual with steam pouring from the cab and the driver waving violently, decided to set the points from the loop to the main line so as to give the driver a chance of getting the train under control. The driver was unable to stop owing to the failure of the brake, and the train ran out on to the main line and down the gradient at ever increasing speed.

The Dove Holes signalman immediately sent warning to Chapel-en-le-Frith, where an Up diesel passenger train had recently arrived and was awaiting "Line Clear" for the section ahead. The staff had time to get most of the passengers out of this train and also to shout warnings to the enginemen of the Rowsley train which was just passing through the station. Before these men realised what had happened, the collision occurred a few yards on the Buxton side of the signal box.

Enginemen of the Rowsley freight train

17. Driver G. L. Butler, who was in charge of the Rowsley freight engine, said that after pinning down brakes at Bibbington's Sidings, the train entered the Dove Holes loop where it was held for some minutes to allow a diesel passenger train to pass on the Down main. He started again at 11.12 a.m. and after passing through Dove Holes station at about 10 m.p.h., he gradually increased the speed down the incline till it was about 20 m.p.h. at Chapel-en-le-Frith. Butler said he was driving from the left hand side and he did not see anyone waving to him from the platform, but just after the engine had passed the station his fireman called to him to look back. He saw a wagon oscillating and then a "belch of smoke" followed by the impact of the collision. The engine and the front part of the train was driven forward about 200 to 300 yards before he could stop it. He thought that if he had received earlier warning he would have "gathered the train" and opened the regulator, but he would not have been able to accelerate quickly with so many wagon brakes pinned down.

18. Fireman D. Bradshaw, of the Rowsley freight engine, said that as the train passed through Chapel-en-le-Frith station at about 25 m.p.h. he saw on the Up platform a number of people who were shouting and pointing backwards. He noticed nothing unusual when he looked back but the men on the platform continued to shout and wave the train on. Bradshaw did not know what was the matter as he had not yet seen the runaway train, but he told the driver there was "something going on" and they both looked back just in time to watch the collision. After the accident Bradshaw protected the Up line and then returned to the station where a Fire Service officer asked him to shut off steam on the overturned engine. He climbed on to the cab and turned off the left hand water gauge cock but he did not notice the position of the regulator.

Signalmen

19. Signalman D. Bowyer, who was on duty in Bibbington's Sidings signal box, said that he had worked there for 10 months and was quite familiar with the arrangements. On the morning of the accident the Rowsley freight train arrived from Buxton at 10.47 a.m., and after stopping for the brakes to be pinned down in the ordinary way, it passed the box at 10.55 a.m. and entered the Dove Holes Down loop. The banking engine then returned to Buxton, after which he accepted the 10.54 a.m. diesel passenger train from Buxton to Manchester. This train passed on the Down main at 11.2 a.m. and cleared the section ahead at 11.9 a.m. Bowyer accepted the Buxton freight train at 11.3 a.m. and at 11.12 a.m. he obtained "Line Clear" for it to enter the Dove Holes loop. Four minutes later the train passed the box without stopping, and he noticed that it was travelling faster than usual.

Bowyer said that he was not alarmed because it was quite usual for freight trains to go straight into the loop without stopping to pin down brakes. On this occasion there was a lot of steam coming from the engine but he did not think it was anything out of the ordinary. He did not see the guard, but as there was no tail lamp he sent the 9 bells signal, "Train passed without tail lamp". He did not realise the train was running away until the fireman arrived a few minutes later and told him what had happened.

20. Signalman E. Fox, who was on duty at Dove Holes signal box, said that he accepted the Rowsley freight train at 10.31 a.m. and held it in the Down loop in order to give the diesel passenger train a clear run. This train departed from the station at 11.5 a.m. and cleared the section ahead at 11.9 a.m., after which Fox obtained "Line Clear" for the Rowsley train. He set the route from the loop and lowered the home and starting signals. The train started slowly and took about three minutes to clear the points, after which he reset them for the trap siding and accepted the Buxton train also into the loop because he thought he might have to hold it there until the next Down passenger train had passed. He received the "Train entering section" signal at 11.16 a.m. and this was followed by the 9 bells signal.

At about the same time another freight train which was entering the Up loop attracted Fox's attention so that he did not see the approaching Buxton train until it was near the Down loop home signal. He then saw the driver leaning out from the right hand side of the cab and waving his arm as if he wanted the points set for the Main line. There was a lot of steam pouring out of the cab and Fox realised that the train could not stop at the end of the loop. He had only an instant in which to make up his mind what to do because he first noticed the engine near Bridge 78 which was only 150 yards from the box and 80 yards from the loop exit. He decided to set the route for the Main line to give the driver a chance to regain control of his engine, although he knew that the Rowsley train had not cleared the section ahead. He thought, however, it must have nearly reached the next station and he hoped it would get sufficiently far ahead to avoid an accident. He just had time to unlock and reverse the loop points, before the Buxton train passed through them at what he thought was a high speed. He did not send the 4-5-5 "Train running away on right line" signal but he telephoned at once to the Chapel-en-le-Frith signalman and told him what had happened.

He explained that if he had not let the train on to the Main line it would have run through the trap siding into the signal box and then into the end of the platform wall with serious results. He thought, therefore, it was better to give the driver a chance of stopping on the Main line.

21. Signalman G. E. Howe, who was on duty in Chapel-en-le-Frith signal box, said that the 10.54 a.m. diesel train from Buxton left his station at 11.9 a.m. and he immediately accepted the Rowsley freight train from Dove Holes. Six minutes later he obtained "Line Clear" from Whaley Bridge and lowered all the Down line signals. At about 11.17 a.m. an Up diesel passenger train from Manchester arrived but he had to hold it in the station awaiting clearance of a freight train ahead. About two minutes later the Dove Holes signalman telephoned to say that a train was running away on the Down line. The guard of the diesel train was in the box at this time carrying out Rule 55, so Howe told him to warn his passengers because he was not sure what would happen since the Rowsley train was only just approaching the signal box. The railway staff on the platform responded quickly, and in addition to getting the passengers out of the train they signalled to the driver of the Rowsley train to accelerate. Meanwhile Howe saw the runaway train approaching at high speed and realised there would be an accident. He just had time to send the 4-5-5 signal to Whaley Bridge before the collision occurred a few yards from his box. He saw the runaway engine plough into the back of the other train, and then the signal box was struck and he was thrown out on to the sidings below.

Evidence of the railway staff at Chapel-en-le-Frith

22. Driver A. Robinson, who was travelling as a passenger in the Manchester to Buxton diesel train, said that he was sitting in the leading coach when the train stopped at Chapel-en-le-Frith station. The starting signal was at danger and he saw the guard go to the signal box to carry out Rule 55. Shortly after this he saw the Rowsley train approaching, and a few moments later he noticed steam pouring out of the tunnel and he was sure there was another train coming. He and his mate got the passengers out of the coach and clear of the station before the collision occurred. The whole area was covered with a cloud of lime and coal dust, and when this had cleared he saw that the signal box was demolished and all the signals in the vicinity were held "off" by the tightened wires. He collected detonators and flags from the brake van and, with the aid of another man, he cut the wires to get the signals back to danger, after which he protected the Down line. On his return he looked inside the cab of the overturned engine and saw that the steam pipe had broken away from the driver's brake valve and that a lot of steam was still coming from it. He did not, however, see the position of the regulator.

23. Guard H. Dutton, of the Manchester to Buxton diesel passenger train, said that it arrived at Chapel-en-le-Frith station at about 11.17 a.m., and about a minute later he went to the signal box to carry out Rule 55 because the starting signal was still at danger. The signalman told him that the Up line was not yet clear and that a train was running away on the Down line. He explained that it was not the one which was just approaching the station but another which was following behind it. Dutton ran back and shouted a warning to his driver, and both of them tried to attract the attention of the enginemen on the first freight train but it had not cleared the station before the collision occurred.

24. Driver L. Sinnor, who was in charge of the diesel passenger train, said that he saw the runaway train approaching in a cloud of steam, and he signalled to the fireman of the Rowsley train by shouting, waving his arm and pointing backwards, but the collision occurred before anything could be done. He thought that the Rowsley train was travelling at about 15 m.p.h. and the Buxton train about 45 to 50 m.p.h.

Crew of the Buxton freight train

25. Fireman R. Scanlon, who was the fireman of the Buxton freight engine, said that he and his mate, the late Driver J. Axon, signed on duty at 5.30 a.m. on the morning of the accident, and first of all they took an Up train of 23 wagons with engine No. 48188 from Adswood to Buxton. The engine, which had been prepared for them, was steaming well and appeared to be in good order, except that the regulator was rather stiff. The steam brake worked satisfactorily when it was applied on the falling gradient to Buxton but they noticed for the first time a "wisp of steam" coming from the union nut between the steam pipe and the driver's brake valve. On arrival at the Buxton shed they tested the brake again, and as it was still blowing Axon made out a repair card, and Scanlon took it to the foreman fitter. A fitter arrived in due course and stopped the leak by tightening the nut a quarter of a turn.

Scanlon stated that at 10.15 a.m. they left the shed for the goods sidings where they made up the freight train from Buxton to Edgeley. Up till then the steam brake had not given any more trouble, but shortly after they started at 11.5 a.m. the "wisp of steam" began to blow again. They wrapped two rags around the joint and tied them tightly, but the leak got worse and the steam came out in a cloud. By this time they were near the Bibbington's Sidings distant signal and Driver Axon had said, "We will make it to Bibbington's loop and see if we can get assistance", but just as they reached the signal there was a "terrific bang" and the cab was filled with scalding steam which drove both men back to the tender. After recovering from the first shock they screwed down the tender hand brake and tried to close the regulator. Scanlon said that they made repeated efforts but the blow of steam was so intense they were driven back. He then wrapped his driver's coat around him and tried again without success. With the aid of a fire iron he at last managed to close the regulator partly, but as some steam was still coming from the chimney he wrapped his overall round his head and tried again.

Scanlon said that by then the engine had nearly reached the summit where they had to stop and pin down brakes, but as the speed had not been reduced, Axon told him to jump out and apply the wagon

brakes. He managed to drop six or seven brake handles but the train was travelling too fast for him to pin them down. Realising that the wagon brakes were having no effect he ran back and shouted to the guard to apply the hand brake in the van. This also appeared to have no effect, and the train ran past the stop board and down the incline at ever increasing speed. Scanlon could do nothing more so he went back to the banking engine and told the driver what had happened.

26. Guard A. Ball, of the Buxton freight train, said that he examined the train in Buxton sidings and told the driver that the load was 33 wagons. The train started on time and climbed the incline from Buxton at about 15 m.p.h., but when it failed to stop at the Bibbington's summit, Ball realised that something was wrong and he applied the hand brake in the van. This had no effect and the train entered the Dove Holes loop at about 25 m.p.h. Ball saw steam pouring out of the cab, but he could do no more than keep the brake hard on with the brake stick. He remained at his post until the collision took place.

Ball stated that he had been working with Driver Axon all that week, and that on the other journeys the train had always stopped at Bibbington's Sidings where he pinned down the brakes. His routine was to walk towards the engine, and drop the number of brake handles which he thought necessary. He then walked back towards the van, pinning down the brakes until the driver was satisfied. Usually he pinned down about 16, and he would have done the same on this occasion if the train had stopped.

27. Driver C. J. Robinson, who was in charge of the banking engine at the rear of the Buxton freight train, said that it left the sidings after he had exchanged signals with the driver in front in the usual way. The banking engine was not attached but he kept working it hard against the brake van. The speed up the incline was about 15 m.p.h., and he did not notice anything unusual until he reached the banking engine stop board near the bridge, where he gradually shut off steam to allow the train engine to take the full load. On this occasion, however, the train did not slow down, and as it drew away from him he saw the guard struggling with the brake in his van and the fireman waving to him from the ground. Robinson stopped and picked up Fireman Scanlon who said "He has gone over on second regulator; the steam pipe has burst. I tried to shut it with a fire iron but could not manage it." They stopped at Bibbington's Sidings signal box where the fireman enquired of his train, and then they searched the line to Dove Holes box in case the driver had jumped off. On arrival there they were told that the telephone line to Chapel-en-le-Frith had "gone dead", and they realised there must have been an accident. They could not proceed any further so they returned to Buxton.

The Motive Power Department fitters

28. Fitter G. Bradwell, who was on duty in the Buxton Motive Power Depot, said that on the morning of the accident he was given a repair card for engine No. 48188 indicating that the steam brake nut was blowing. He went to the engine and saw a little steam coming from the connection between the steam pipe and the driver's brake. He gave the union nut about a quarter of a turn with a spanner and the leak stopped. He said that occasionally he found these joints leaking and he usually cured the trouble by tightening the nut; if this did not suceed he unscrewed the nut and changed the walkerite joint. Very occasionally he found a leak through the brazing but this usually occurred with the smaller injector steam pipes. In this particular case Bradwell said that he would have removed the nut if he had realised that the steam joint had been leaking on the previous day but he was told by the driver that the trouble had only just started.

29. Leading Fitter J. Gough of the Buxton Motive Power Depot, who has 32 years' experience as a fitter, confirmed the practice described by Fitter Bradwell regarding stopping leaks on copper steam pipes. Most of them were stopped by tightening the nut, and in cases where the steam continued to blow it was nearly always due to a leak through the walkerite joint. Very occasionally he found a collar needed re-brazing but it was usually on the small pipes. He had never known of a collar being twisted off, as had occurred in this case.

30. Fitter's Mate G. F. Lovatt said that he was on duty at Warrington, Dallam, Motive Power Depot on 8th February, the day before the accident, when he received a report from a Driver Holt that a steam joint was leaking on engine No. 48188. He found that a little steam was coming through the joint between the steam pipe and the driver's brake valve and he stopped it by tightening the nut about one-eighth of a turn.

31. Fitter J. Harker of Stockport, Edgeley, Motive Power Depot, who has 42 years' experience as a fitter, said that on 23rd November last he attended to a leaking joint between the steam pipe and the driver's brake valve of engine No. 48188. He also stopped it by tightening the nut by about a quarter of a turn. He confirmed that in cases where tightening the nut did not stop a leak, the walkerite joint usually needed renewing. Very rarely he had found leaks through the brazing between the collar and the pipe. He had never heard of a large collar coming off a copper steam pipe but sometimes the brazing round the collar of small pipes was broken away when the nuts were screwed up too much.

Conclusions and Remarks

32. This accident was initiated by the very unusual failure of a steam pipe joint which not only put out of action the power brakes on the engine of the Buxton freight train, but also filled the cab with scalding steam at high pressure. This drove the enginemen back from the controls so that they could not shut the steam stop valve nor reach the whistle to give warning of their predicament; they applied the tender hand brake but it was only with great difficulty that they managed to close the regulator partially. Meanwhile the train was still being pushed towards the top of the Buxton incline by the banking engine, the crew of which were unaware of the trouble ahead. By the time this engine had gradually stopped

pushing, the front of the train had almost reached the short level section at the summit, and the train's momentum, together with the power from its engine working with a partially opened regulator, was sufficient to carry it on to the falling gradient where the tender and guard's hand brakes had little effect.

It is estimated that the train passed through Dove Holes station at about 25 m.p.h. and reached a speed of 55 m.p.h. at the moment of the collision; the speed would have risen to nearly 80 m.p.h. at Whaley Bridge if the train had had a clear run, though it might easily have become derailed on one of the many sharp curves which impose a restriction of 50 m.p.h. between Chapel-en-le-Frith and Disley. If the train had remained on the rails and had not met any other obstruction it would probably have stopped about half a mile short of the second long falling gradient at Disley.

33. None of the freight train or banking engine crews was in any way to blame for the runaway. Driver Axon and Fireman Scanlon showed great courage and determination in their endeavours to close the regulator after the steam joint had failed, and Scanlon made a plucky effort to carry out his driver's orders to pin down wagon brakes. Driver Axon could have saved his life by abandoning the engine but he stayed on the footplate to give a warning to the Dove Holes signalman that the train was running away and no doubt in the hope of regaining control on a more favourable gradient. He set an outstanding example of devotion to duty, and I am very pleased to record that he has since been awarded the George Cross posthumously.

Guard Ball took prompt action in applying the brake in his van and in keeping it hard on with the brake stick. He could do no more.

Driver Robinson, who was in charge of the banking engine, had no reason to suspect that anything was wrong with the train engine, and he acted correctly in working his own engine hard against the brake van in front until he gradually shut off steam at the first stop board. His engine was not coupled to the train and consequently he could not assist in stopping it. It is not customary to couple a banking engine to the rear of an unfitted freight train because any lack of co-ordination between the two drivers might lead to a snatch which could part the train.

34. Signalman Bowyer, who was on duty in Bibbington's Sidings signal box, might have realised that the Buxton train was running away when it passed the box much faster than usual and with steam pouring from the cab, but I do not consider that his omission to send the "Train running away on right line" signal had any material effect on the course of events. He was clearly alert because he promptly sent the 9 bells signal when he noticed that the train had passed without a tail lamp.

35. Signalman Fox was placed in a very difficult position when he saw the Buxton train approaching the Dove Holes signal box too fast and with steam pouring from the cab. He had only a moment in which to decide whether to reverse the route for the main line or to leave it set for the trap siding at the end of the loop. He was not in a position to know from the speed of the train that the brakes on the engine had completely failed, and in the circumstances I do not criticize him for allowing it on to the main line although the section ahead was not yet clear. On the one hand there was the possibility of the driver regaining control on the main line before his train overtook the one in front, and on the other hand the certainty of a serious derailment at the end of the loop.

36. Signalman Howe, Driver Robinson and the other railway staff at Chapel-en-le-Frith acted with commendable promptness in giving warning of the runaway train and in getting the passengers out of the diesel train. The Rowsley train enginemen had very little warning and in any case they could not have accelerated their train to any good effect.

37. If Fitter Bradwell had unscrewed the nut from the leaking steam pipe joint when he examined the Buxton engine before it left the shed, he would have discovered the defective collar, but as he did not know that the joint had also been blowing on the previous day, he had no reason to suspect any unusual trouble. In these circumstances he cannot be criticised for carrying out the repair by tightening the nut in the normal way, nor do I blame the other fitters for taking similar action. It is not practicable to examine all engine repair cards before each 'X' day examination and, consequently, the fitter who noticed the leaking joint on the 1st September did not realise that the same pipe had been blowing on two other recent occasions.

38. The ordinary vibration on the footplate has a tendency to loosen the nuts of steam joints with resulting leaks, and the standard procedure is to stop them by tightening the nuts. I have no criticism of this practice, but with butted joints of the type used on this engine the brazed collar is concealed by the nut, and defects cannot be seen until it is removed. This is not usually done unless the normal method of stopping the leak has failed, and hence trouble may develop without its being immediately noticed. In this case the collar was badly brazed on to the connecting pipe from the combined injector steam valve to the driver's brake valve. In the first place it was not solidly brazed over the whole distance from the ring of brazing to the end of the pipe, and, secondly, owing to the small space between the collar and the pipe, some of the brazing overflowed on to the inside face of the collar and made it thicker on one side than on the other. This resulted in uneven pressure on the impregnated asbestos packing when the nut was screwed down, and consequently the joint would not have been steam tight until the nut had been tightened very hard.

The initial distortion of the nut and collar must have started a long time ago because the metallurgical report shows that it began before the pipe was last annealed, presumably at Horwich in April 1955. It is significant that since then, this joint blew much more frequently than others on engines of the same

class, and it seems clear that the brazing gradually disintegrated as the nut was tightened more and more until the collar was free to turn in the pipe and finally became so loose that the end blew out. The reports were not sufficiently numerous or unusual to attract special attention and hence the deterioration of the joint remained unnoticed.

39. Prompt action has been taken by the Chief Mechanical and Electrical Engineer of the London Midland Region to ensure that a similar failure does not occur again. On all engines fitted with steam brakes the butted joint connecting the steam pipe to the driver's brake valve will be converted to a coned joint. With this type of joint not only will the bearing surfaces be better, but leaks through the brazing can be detected without removing the nut. The method of brazing has also been improved by chamfering the collar so as to ensure full penetration of the brazing metal between the pipe and the collar without relying on an excessively large fillet.

It is anticipated that the conversion of the butted pipe joints on the large number of engines at present so fitted will be complete within the next three or four years. In the meantime, the Motive Power Superintendent has arranged for all butted joints on drivers' steam brake valves to be taken down at the first 'X' day examination and subsequently at every 40—48,000 miles so as to ensure that any fault in the brazing or the collar is readily detected. Orders have also been issued that if a steam leakage from a butted joint is observed at any time, the pipe is to be removed forthwith and the joint and brazing thoroughly examined and repaired where necessary.

I recommend that similar action be taken, where necessary, in the other Regions.

40. This collision probably would not have occurred if the automatic vacuum brake had been in operation throughout the train, because the failure of the steam brake would not have affected the working of the vacuum brake which could have been applied immediately by throwing over the combination brake handle on the engine. I think that in spite of the difficult conditions on the footplate, one of the enginemen might have managed to do this before the train got out of control, and even if he had failed, the guard on realising the situation could have applied the brakes throughout the train by opening the brake valve in his van. The retarding power of these brakes would have been sufficient to reduce the speed and eventually to stop the train even on the sharp falling gradient to Chapel-en-le-Frith. It is satisfactory to note that in their modernisation plan the British Transport Commission have announced their intention to equip all freight rolling stock with the continuous automatic brake, and that during the year 1957-58 over 200,000 more new or rebuilt freight vehicles will be fitted with continuous brakes.

I have the honour to be,

Sir,

Your obedient Servant,

C. A. LANGLEY,

Brigadier.

The Secretary,
Ministry of Transport and Civil Aviation.

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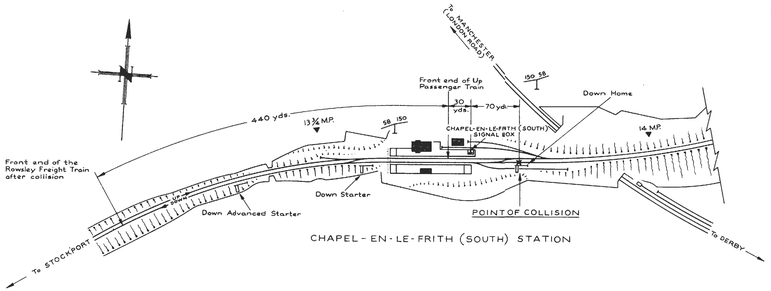
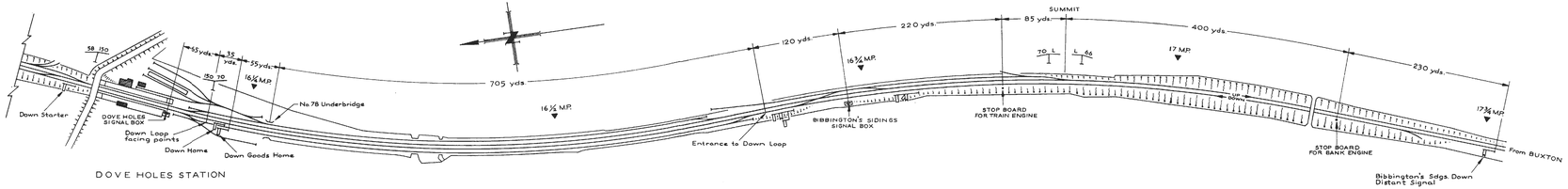
LONDON MIDLAND REGION

COLLISION AT CHAPEL-EN-LE-FRITH ON 9th. FEBRUARY, 1957



CHAPEL-EN-LE-FRITH (SOUTH) STATION



DOVE HOLES STATION

FIG. 1 GENERAL PLAN

SCALE :- 4 CHAINS TO 1 INCH

FEET 100 50 0 100 200 300 400 500 600 700 800 900 1000 FEET

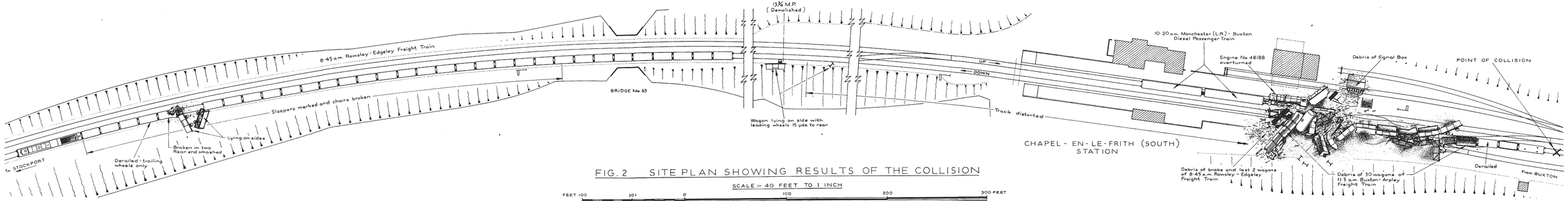


FIG. 2 SITE PLAN SHOWING RESULTS OF THE COLLISION

SCALE :- 40 FEET TO 1 INCH

FEET 100 50 0 100 200 300 FEET

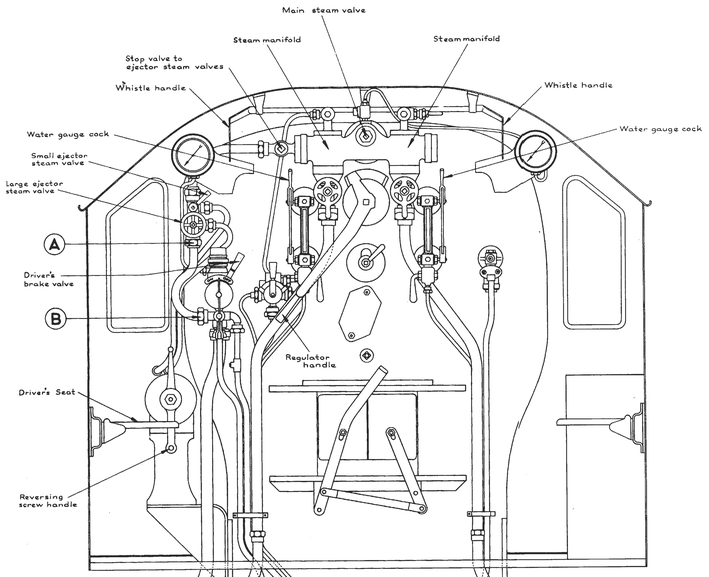


FIG. 3

ARRANGEMENT OF CAB MOUNTINGS ON 2-8-0 FREIGHT ENGINES Nos. 48176 – 48225

SCALE:– 1 INCH TO 1 FOOT

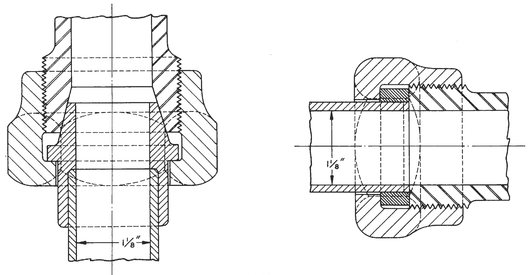


FIG. 4

DETAIL OF JOINT AT 'A' IN FIG. 3

DETAIL OF JOINT AT 'B' IN FIG. 3

SCALE:- FULL SIZE

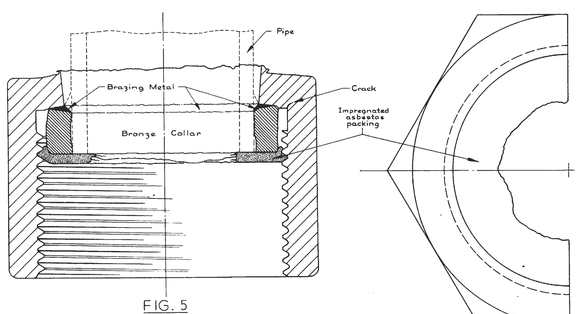


FIG. 5

DEFECTIVE STEAM PIPE JOINT

SCALE : TWICE FULL SIZE

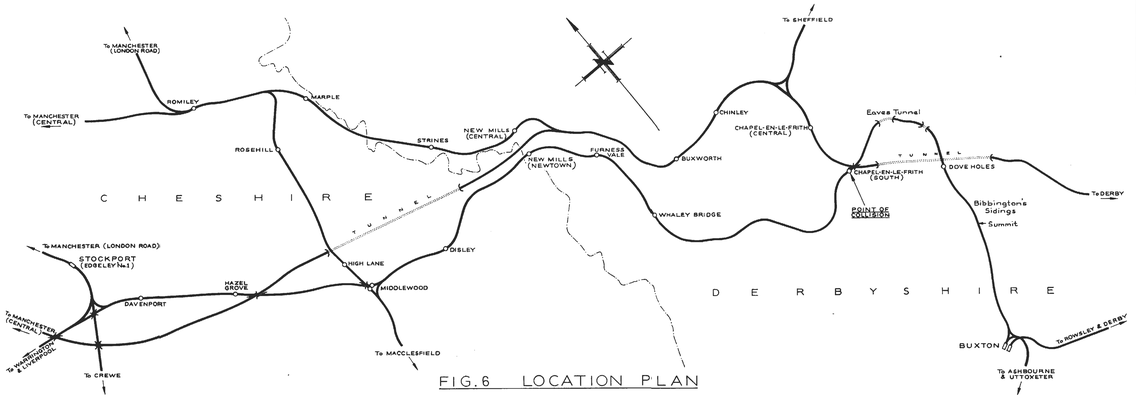


FIG. 6 LOCATION PLAN

SCALE :– 1 INCH TO 1 MILE

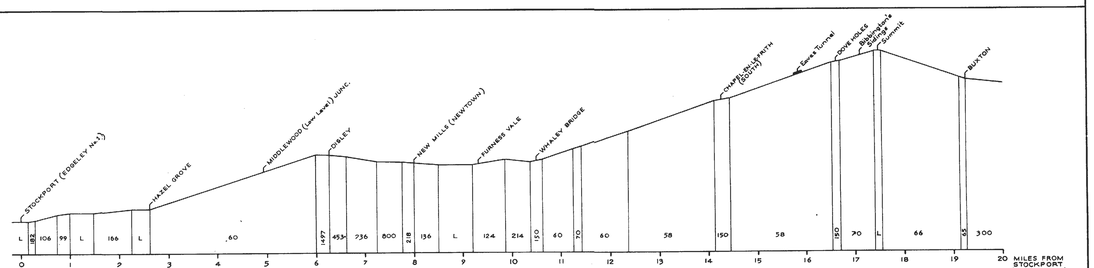


FIG. 7 GRADIENT DIAGRAM

SCALE :– 3/4 INCH TO 1 MILE