



GOVERNMENT OF INDIA
MINISTRY OF TOURISM AND CIVIL AVIATION
(COMMISSION OF RAILWAY SAFETY)

RAILWAY ACCIDENT INVESTIGATION REPORT

on
COLLISION

between

**Barkakana Crack II goods train and rolling down 20 BOX loads of
goods train Muri Crack I**

at

Km. 357/1

between

Muri and Sondimra Stations

on

Muri-- Barkakana section

of

South Eastern Railway

on

24-3-1975

C O R R I G E N D U M

Sl. No.	Page No.	Para No.	Line No.	FOR	READ
1.	1	1	5	Muni	Muri
2.	3	9	5	extricted	extricated
3.	5	13	11	GC-II	EC-II
4.	7	22	12	was till	was still
5.	7	23	6	meters	metres
6.	8	24	4	meters	metres
7.	8	28(b)	7	meters	metres



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SUMMARY

Date	24th March 1975.
Time	16.56 hours.
Railway	South Eastern Railway.
Gauge	Broad (1.676 m).
Location	Km. 357/1 between Muri and Sondimra stations on Muri-Barkakana Section.
Nature of accident	Collision.
Train involved	(i) Barkakana Crack II Goods. (ii) Rolling down 20 BOX loads of Muri Crack I Goods.
Consisting of	(i) 18 loaded BOX wagons with engine No. 8150 WG. (ii) 20 loaded BOX wagons.
Estimated speed at impact	(i) Barkakana Crack II-30 Km./h. (ii) Rolling down load-About 53 Km./h.
System of operation	Absolute Block System.
Number of tracks	Single.
Gradient	1 in 200.
Alignment	2° curve.
Weather	Stormy with hail and rain.
Visibility	Restricted to some extent.
Casualties	Killed—4. Injured—1—grievous.
Cause	Inadequate securing arrangements of the BOX loads at Sondimra, which rolled down and entered the block section during a storm.
Responsible	(i) Assistant Station Master and (ii) Station Master of Sondimra Station. (iii) Guard of Muri Crack I goods train.

GOVERNMENT OF INDIA
MINISTRY OF TOURISM AND CIVIL AVIATION
(Commission of Railway Safety)

From

The Additional Commissioner of Railway Safety,
South Eastern Circle
14, Strand Road (12th Floor),
Calcutta-700001.

To

The Secretary to the Government of India.
Ministry of Tourism & Civil Aviation.
New Delhi.

Through : The Commissioner of Railway Safety, Lucknow.

Sir,

In accordance with Rule 4 of the Statutory Investigation into Railway Accidents Rules, 1973, issued under the Ministry of Tourism & Civil Aviation Notification No. RS.13-T(8)/71, dated 19th April, 1973, I have the honour to submit herein the report of my inquiry into the collision between Barkakana Crack II Goods train and rolling down 20 BOX loads of Goods train Muri Crack I at Km. 357/1 between Muri and Sandimra stations on Muri-Barkakana Section in Adra Division of South Eastern Railway at about 17.00 hrs. on 24th March, 1975.

2. Inspection of site and Inquiry

(a) On 29-3-1975 accompanied by the Divisional Superintendent, Adra, Transportation Superintendent (Safety), Garden Reach and other Divisional Officers, I inspected the site of accident, the broken up engine and 6 wagons lying there and also examined the extent of visibility at the site. The balance 14 wagons brought to Sandimra station were inspected there.

(b) Public having information bearing on the accident were invited through a Press Notification to appear at the inquiry or to communicate with me by post. None, however, appeared at inquiry nor any communication has been received so far. The District Civil authorities and the Police including Government Railway Police were duly notified of the inquiry which was commenced on 29-3-1975 at Muri and continued on 30th March, 1975. The Officers present at the inquiry were:—

- (1) Shri N. Dutt, Divisional Superintendent, Adra.
- (2) „ B. C. Dalbehra, Transportation Superintendent (Safety), Garden Reach.
- (3) „ D. C. Misra, Deputy Divisional Superintendent, Ranchi.

Other Officers were called in as and when required.

Evidence of 15 witnesses was recorded.

NOTE : (1) The words 'right' & 'left' & 'rear' used in this report are in reference to the direction of travel of the trains.

(2) The abbreviations BC-II and MC-I used in this report denote Barkakana Crack II and Muri Crack I Goods trains respectively.

3. The kilometerages of the various stations mentioned in this report, reckoned from Howrah are indicated below:—

	Km.
Howrah	0.00
Muri	345.2
Site of collision	357/1
Sondimra	360.5
Barkakana	403.9
Adra	283.6
Ranchi	410.7
Hatia	417.14

There are 15 telegraph posts to a kilometre on the section.

4. The Accident.

On 24-3-75, while Barkakana Crack II Goods train hauled by WG locomotive No. 8150 was on the run from Muri towards Sondimra (single line section), 20 loaded BOX wagons of Muri Crack I, stabled earlier at Sondimra, rolled into the same block section during a hail-storm and collided with the former train at about 17.00 hrs. at Km. 357/1. The collision resulted in complete detaching of the boiler and cylinders of the locomotive from its underframe, similarly of the tank from the tender underframe with considerable damages and smashing up of 3 BOX wagons as also heavy damage to another 3. One of the BOX wagons had mounted over the engine while the others were telescoped and capsized.

5. Visibility.

The weather was stormy with hail and rain and visibility was restricted to some extent.

6. Casualties

As a result of the accident 4 persons (railway staff) travelling on the locomotive were killed on the spot and 1 (the Driver) received grievous injury.

II. RELIEF MEASURES

7. Intimation of the accident

Adra Control had been informed at 16.45 hrs. by the Station Master, Sondimra about the rolling down of 20 loaded BOX wagons from his station towards Muri. Finding that Barkakana Crack No. II was also in the same block section and apprehending a serious accident the Breakdown Specials from Adra and Hatia with Medical Vans were ordered out immediately. The information of the actual collision was conveyed by the Gateman of the level crossing at Km. 357/6 to the Station Master, Sondimra at 18.00 hrs.

8. Medical attention

(a) Assistant Engineer, Muri and the Compounder of Assistant Medical Officer, Muri started for the site by engine and brake at 18.25 hrs., brought back the injured Driver at about 20.00 hrs. and left for the Heavy Engineering Corporation Hospital at Hatia at 21.20 hrs. The other 4 persons were found dead and later certified so by the Assistant Medical Officer, Muri who reached the site at about 21.45 hrs. He had been at Adra at the time of the accident and proceeded to Muri at 18.15 hrs. reaching there at 20.40 hrs. Other Divisional Officers also left Adra at 18.40 hrs. for the site via Muri by road.

(b) The Accident Relief Trains with Medical Vans from Hatia and Adra started at 18.35 and 19.30 hrs. respectively reaching Muri at 22.45 hrs. on 24-3-1975 and 3.05 hrs. on 25-3-1975. The Medical vans were then not required at site as the only injured person had already been taken to the hospital and the others involved were dead.

9. Restoration of the track

The unaffected 14 BOX loads of Muri Crack I and those of Barkakana Crack II, which were on rails were pulled to Sondimra and Muri respectively. There was considerable difficulty in clearing the damaged engine and the damaged 6 BOX wagons. The 4 dead bodies could be extricated from the engine at about 10.30 hrs. on 25-3-1975 after considerable gas cutting. The track was cleared and made fit at 8.25 hrs. on 27-3-1975.

III. COMPOSITION OF TRAIN AND DAMAGE

10. (a) Barkakana Crack II Goods Train:—

(i) *Steam locomotive No. 8150 WG*—Type 2-8-2 built at Chittaranjan Locomotive Works and put in service in 1960, gross weight 176.44 tonnes, length over buffers 23.9 m fitted with speed indicator in working order. The locomotive was fitted with steam and vacuum brakes.

(ii) The rake consisted of 18 BOX wagons of which 9 were loaded with pig iron and the balance with steel sheets in coils. The train was fully vacuum braked with 27 pistons working out of 32 i.e. 84%. The length of the train inclusive of engine was 274 m and its weight 1639.66 tonnes. Based on standard data the calculated brake power would be 683.5 tonnes. There was no brake van on the train.

(b) **Muri Crack No. I**—The rake of Muri Crack No. I which was stabled at Sondimra consisted of 20 BOX wagons all loaded with coal and there was no brake van on this rake also. This had been stabled at Sondimra from 19.50 hrs. on 19-3-1975. The length of this rake was 277.25 m and its weight 1625.84 tonnes. In the 14 unaffected wagons 23 pistons out of 28 i.e. 82% were found to be in working condition. The condition of hand brakes and other details of these wagons are recorded below based on joint examination after the wagons were brought back to Sondimra:—

Sl.No. from Muri end	Wagon No.	Type	Builder/ year built	Ret. date	T.W. C. Cap.	P.	R.	Condition of hand brakes	Remarks if any
1.	NR 81968	BOXC	ISW & Co. 1964	} These were badly damaged and could not be checked.					
2.	SE 85890	BOXT	CIMMCO 1973						
3.	ER 101195	BOXC	JESSOP 1962						
4.	SE 57273	BOXC	ISW & Co. 1964						
5.	SE 57105	BOXC	JESSOP 1961						
6.	ER 87153	BOXT	TIM 1973						
7.	CR 89857	BOXT	B.W. & Co. 1973	2/78	27.4 53.9	BW & Co. 7-8-73	PTRU 8-3-75	S/O Working.	..
8.	ER 104863	BOXT	B.W. & Co. 1970	10/74 £	27.4 53.9	BW & Co. 21-4-70	BSL 5-6-73	S/O Working.	..
9.	ER 85028	BOXC	TMC 1961	4/74 £	25.2 56.1	KPA 21-1-70	BSL 12-11-71	S/O Working	Stenciled unfit for ldg.E/book-ed to P/Line
10.	ER 104009	BOXT	KPA 1969	12/73 £	25.4 55.9	KPA 20-12-69	..	E/O Not working due to bent screw	Do.
11.	SR 28220	BOXC	TMC 1963	7/75	25.3 55.4	KTTW 19-5-71	ADAW 28-7-73	S/O —Working	..
12.	SE 56348	BOXC	ISW 1961	9/76	25.6 55.7	KPA III	KPA 23-9-72	S/O —Not working smoothly.	..
13.	SE 54647	BOXC	ISW 1961	7/76	25.5 55.8	KTTW 1-7-72	MDGR 11-6-74	E/O —Working but tight	..

Sl. No. from Muri end	Wagon No.	Type	Builder/ year built	Ret. date	T. W. C. Cap.	P.	R.	Condition of hand brakes	Remark if any
14.	SE 57022	BOXC	ISW 1961	11/76	25·6 55·7	KGPW 1-11-72	ADAW 22-7-74	S/O—Not working	..
15.	ER 84570	BOXC	ISW 1961	10/79	25·5 55·8	RWS 3-10-73	..	E/O—Jammed	..
16.	SE 57040	BOXC	ISW 1961	12/76	25·5 55·6	JUDM 23-12-72	..	S/O—Not wor- king due to 1 B/Block deft.	..
17.	SE 56319	BOXC	ISW 1961	11/76	25·6 55·7	RWS 9-11-72	..	S/O—Work- ing.	..
18.	ER 104722	BOXT	B&R 1970	5/74 £	25·5 54·8	B&R 26-5-70	GGC 12-10-73	S/O—Work- ing but hard to operate.	..
19.	NR 85489	BOXT	MISBB 1971	9/75	27·7 53·6	MISBB 21-9-71	NEJE 19-8-73	S/O—Work- ing.	..
20.	WR 70671	BOXT	B & Co. 1964	5/79	25·4 55·9	RWS 7-5-75	MB 20-2-75	S/O—Not working	..

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*T.W.—Tare weight & C. Cap—carrying capacity.

**E/O—End Operated, S/O—Side Operated. All the wagons were loaded with coal.

£According to Railway Board's Wireless Message No. 73/DME/M(N) dated 29th June 1973 the return dates have to be changed to 6 years from POH date.

11. Damage and disposition.

- (i) *Locomotive No. 8150 WG*—Smoke box end of the boiler was completely smashed, boiler was detached from the engine underframe and all the expansion shoe fittings, breather plate bolts and cylinder saddle bolts had been sheared off. Underframe was bent and headstock damaged. Drag box and hind truck portion, engine cab and under-floor completely smashed. Tender shell damaged, underframe damaged and twisted, rear headstock of the same completely severed, the bogie frame damaged.
- (ii) *Rolling stock*—Out of 20 loads of MC-I, 14 were on rails and 6 were telescoped into each other and capsized and half portion of one had mounted on the top of the engine. Of these 6 wagons, 3 wagons viz. SE 81968, SE 85890 and SE 57105 were completely smashed. The other 3 viz. ER 101195, SE 57273 and ER 87153 had both body and under-frame damaged, their bogies were also damaged.

2 BOX wagons of BC-II (next to engine) viz. SE 57505 and WR 71082 also had their end panels completely damaged and interlocked. These wagons, however, did not derail but the train had parted from the engine and there was a gap of 32.9 m between the engine and first wagon.

12. Cost of damage

The estimated total cost of the damage to railway assets was Rs. 4,85,000 as detailed below:—

Locomotive	Rs. 2,50,000
Rolling stock	Rs. 2,25,000
Permanent Way	Rs. 10,000
TOTAL	Rs. 4,85,000

IV. LOCAL CONDITIONS

13. The site

(a) The collision took place in the block section at Km. 357/1 between Sondimra and Muri stations, 3.4 Kms. away from the centre of Sondimra station situated at Km. 360/8. Before collision, MC-I rake was stabled on the main line at Sondimra station. The yard is in 1 in 400 grade falling towards Muri and from just outside the facing points the grade changes to 1 in 200 also falling towards Muri. The stabled 20 BOXES started rolling towards Muri, passed the yard and entered the block section by bursting the main line points which were set for the loop and locked. Before collision, the rake passed 2° right hand curve between Km. 360/1 and 359/12 immediately after the station and then 3° right hand curve between Km. 358/8 and 357/13. After passing the next straight portion the rake entered the 2° left hand curve 33 metres ahead of Km. 357/6 and collided with GC-II at Km. 357/1. The curve ends 13 m short of Km. 356/13.

*The gradients towards Muri are:—*1 in 400 fall upto Km. 359/15 within Sondimra station yard and then in 1 in 200 fall from Km. 359/15 to Km. 356/4-5. The accident took place on the grade of 1 in 200 fall in cutting 2.13 m deep. The cutting begins at Km. 357/7 and ends at Km. 356/10.

The terrain is hilly with light vegetation. A kutchra road connecting Golaroad and Jhalidah civil towns runs parallel to the railway track at a distance of 27.8 m at the site of the accident.

(b) The permanent way consists of 90 lbs. B.S. rails 36'-0" long on A.J. steel sleepers having a density of N + 2 both on straight and curves, ballasted with broken stones to 4" cushion. The sleeper fittings are of clip and bolt type for fixing rails with sleepers, two per rail seat. The extent of unserviceable sleepers is 5%.

14. Signalling and Operation

Sondimra—is a non-isolated 'B' Class (single line section) station provided with rudimentary interlocking, the points are fitted with hand plunger key locks. The adjacent stations are Muri towards Chandil and Golaroad towards Barkakana. The station has one loop, the main line without isolation and a short dead end siding taking off from the loop at Barkakana end provided with a derailing switch. There is, however, a ballast siding (loop) taking off from the main line provided with traps at both ends worked by the signal lever control key. Hence no signalled movement is possible on this loop. This Siding is primarily meant for loading of ballast by the Engineering Department although it is occasionally used for placing hot axle wagons etc. The station is provided with minimum equipment of Lower Quadrant signals viz. an Outer signal and a Home signal in either direction. The trains are worked on Absolute Block System with Noalo's Block Token Instruments located in the Station Master's Office.

The following relevant 'Special Instructions' are incorporated in the Station Working Rules on Sondimra under para 13 thereof:—

- (a) In the ordinary course of events, vehicles should not be allowed to stand on a running line. Should it be necessary to detach vehicles from a train and leave them standing on the running line the Station Master must take necessary precautionary measures in terms of G/SR No. 150/1(iii).
- (b) The practice of loading and unloading of vehicles on running lines except "Smalls" when loaded into and unloaded from tranship trains is strictly prohibited.
- (c) Vehicles standing in the station siding must be secured as laid down in G/SR 154/1(a) to (j).

V. SUMMARY OF EVIDENCE

15. Station Master, Sondimra, Shri C. S. Banerjee was on duty from 7.00 to 19.00 hrs. on 24-3-1975. He gave line clear to Barkakana Crack No. II at 15.50 hrs. to Muri and the train entered the section at 16.30 hrs. There was heavy rain followed by a storm from about 16.20 hrs. At about 16.45 hrs. he noticed that the 20 BOX loads stabled on the main line at his station began rolling towards Muri. He along with his Token Porter and Points-

man tried to stop the BOXes by putting stones on the rails and tightening the hand brakes but failed to control the same. Immediately thereafter, he informed Assistant Station Master, North Cabin, Muri and Controller at Adra. At about 18.00 hrs. a Gateman came to the station and informed him of the accident and injury to one person which information was relayed to the control. The BOX loads had been stabled on the main line at his station from 19-3-1975 evening during the shift of Rest Giver Assistant Station Master, Shri P. S. Mondal, as no line had been available at Muri to receive the train. When witness joined duty on 20-3-1975 he had noticed that safety chains had not been used but the hand brakes of six wagons on either end had been applied. He secured the safety chain with lock on the 8th wagon from Muri end. After the wagons rolled away he had found the safety chains with the lock broken lying where he had applied the same under the rail and it was shown to his reliever.

In reply to questions he stated that Shri P. S. Mondal had informed him on 20-3-1975 when he took charge that the safety chain could not be used as the padlock was not available on the previous night. Witness did not notice that the length of the chain was inadequate for putting two knots in the case of BOX wagons, the wheels of which did not have any holes. Regarding the standard equipment of two locks for the station he stated that one of the locks was missing for a long time, a man had been sent to the Divisional Office before he joined at the station on 31-10-1974 but no supply was received.

16. **Assistant Station Master (Rest Giver), Shri P. S. Mondal** was on duty from 19.00 hrs. of 19-3-1975 to 07.00 hrs. of 20-3-1975. Muri Crack No. I with 20 BOX loads, was stabled at Sondimra on the main line on 19-3-1975 as per orders of the Section Controller. He instructed the staff to tighten the hand brakes of the load at both ends. Safety chains could not be used as the big lock could not be found and he informed the Station Master about the same on the next morning. The chain with a lock was then put on the BOX wagons at about 07.15 hrs. in his presence. He had not informed the Controller that he did not have the locks for the safety chains.

Since he had seen loads being stabled on the main line quite often he did not raise any question for their stabling in the ballasting siding, when the Controller ordered him to stable the load on the main line. He did not know the grades in his yards nor could he read the grades shown in the Station Working Rule Diagram even though he had passed the last refresher course in 1972. The Special Instructions in Para 13(a) of the Station Working Rules for Sondimra specified that ordinarily vehicles should not be allowed to stand on the running line, but the witness did not point out this fact also to the Controller when he was asked to stable on the main line. After departure of the loco he had set the points at both ends of the main line against that line and locked them. He had also checked personally the tightening of the hand brakes of 5 or 6 wagons of each end and had found the brakes of one or two wagons defective (wheels jammed) so the brakes on the 6th and 7th wagons were tightened but he did not remember if any wagon had its brake wheel at the end.

17. **Guard Shri D. K. Basu** who worked Muri Crack I on 19-3-1975 had arrived Sondimra at 19.50 hrs. The train was stabled there on the main line, and he was asked to proceed with light engine to Muri. There was no brakevan on the train from Barkakana. A Porter from the station tightened brakes of 3 to 4 wagons from the engine end, no safety chains were used. As the Controller was pressing him to start immediately the Assistant Station Master told him that the safety chains would be applied and the brakes of balance number of wagons as required would be tightened. On this assurance he left with the light engine for Muri.

In reply to questions he stated that he had checked the tightening of the hand brakes of only 3 or 4 wagons next to the engine. He had stabled loads on the main line at this station earlier also but not in the last 3 months. He was aware of the grade 1 in 400 at Sondimra and 1 in 200 in the section both falling towards Muri.

18. **Pointsman Shri K. N. Biswas** was on duty from 19.00 hrs. of 19-3-1975. He tightened hand brakes of about 5 to 6 BOXES from the engine end before detaching the engine and later he along with Pointsman, Shri Ganori Ram tightened the brakes of 4 or 5 wagons in the rear. He also found that hand brakes of some wagons were turning freely both ways and he had informed the Assistant Station Master of the same who was satisfied to learn that 4 to 5 brakes had been tightened in the rear. The safety chains were not used as the locks could not be found.

19. **Pointsman Shri Ganori Ram** also stated that brakes of 5 to 6 wagons both in the front and the rear were tightened but he did not remember the exact number nor did he notice that the 6th wagon (from the rear) did not have the brake wheel on the side but at the end.

20. **Driver Shri A. G. Khan of Barkakana Crack II** joined duty at 12.45 hrs. on 24-3-1975 after having full rest. He started the train at 16.30 hrs. towards Sondimra. Beyond Barlanga when he passed the Down gradient (a short stretch) and entered the curve in the cutting he saw the rolling down wagons a very short distance ahead. He applied the vacuum brakes and by the time he could release the regulator handle and close the same, the collision occurred. He was thrown out of the cab and fell on the ground outside the ballast. On coming to his senses he found a villager passing with whose help he went to the level crossing and fainted. His speed at the time of collision would be 30 to 35 Km./h. He had not attained higher speed as the gradient was rising for most of the section from Muri. There was slight rise in the speed on the short falling gradient after passing Barlanga. He could not judge the speed of the rolling down wagons. Apart from his two firemen and guard in his cab, a bearer of the running room at Muri also boarded his engine at the level crossing on the north end of Muri while the train was in motion. He did not ask him to get down as that would have necessitated stopping the train and consequent delay. He had 19 BOXes in his train and there was no brakevan.

21. **Section Controller, S. Pramanick** was on duty from 16.00 to 00.00 hrs. of 19-3-1975 on the Barkakana Board. Muri Crack I from Barkakana arrived Sondimra at 19.55 hrs. There was no line available at Muri except No. 5 which was not intended to be blocked except for a short time. As the train crew were also on long hours, witness, with the permission of the Dy. Controller, ordered stabling of the load at Sondimra and allowed power with the guard to leave the station after crossing of 85 UP passenger. The light engine and guard started from there at 21.05 hrs. He did not specifically order stabling on main line but since there were only two running lines at Sondimra and the train had been received on the main line, he did not object to its being stabled on the main line.

He agreed that it would have been safer to stable in the ballast siding which is provided with traps at both ends instead of the main line as there was a continuous falling gradient of 1 in 200 between Sondimra and Muri but said that no running train used to be stabled on this siding. Whenever stabling was required it was done on the main line excepting for isolated wagons with hot axles etc. which were placed in the ballast siding. He was aware of the special instructions in the Station Working Rules of Sondimra but the above had been the usual practice.

22. **Head Train Examiner, S. Dutta** had tested the brake power of the 16 undamaged BOX wagons of Barkakana Crack II train and found that only 5 out of 32 pistons were inactive i.e. brake power was 84%. He made a joint check with Divisional Transportation Inspector, Muri of the condition of hand and vacuum brakes of the 14 undamaged BOX wagons of Muri Crack I on 27-3-1975 (after these had been hauled back to Sondimra). They found that the first wagon CR 89857 BOXT was chained and locked, hand brakes of 5 wagons of Muri end and 5 wagons from the trailing end had been tightened but the 4th from Muri end and 1st and 5th from the rear were not effective due to mechanical defects. The brake power of the 14 wagons were tested with vacuum and 24 out of 28 pistons i.e. 85.7% were working.

On being questioned as to how wagon No. 104009 BOXT with the return date of 12/73 was till in service, he clarified that according to recent orders of the Railway Board POH of box wagons is to be done at the interval of six years. The last POH of this wagon having been done on 20-12-1969, the wagon will continue in service till 12/75 when the next POH will be done. He gave details of the defects in the six wagons out of 14, the hand brakes of which were either not working or jammed.

VI. OBSERVATION AND TESTS

23. The visibility at the site of the accident was considerably restricted on account of the track being in cutting on a 2° curve as well as due to a number of trees on both sides of the track. It was observed that the rolling down vehicles could come into the view of the Driver of Barkakana Crack II from a distance of only 253 meters, when he would be at 105 m from the point of collision and the rolling down vehicles would be at 148 meters further ahead.

24. The damage to the engine of Barkakana Crack II had been extremely heavy, one of the rolling BOX wagons had mounted on the top of the locomotive and in all six BOX wagons had been badly damaged as detailed in para 11. The rake of Barkakana Crack II had parted from the tender of the loco and was pushed back by a length of 32.9 meters. All these indicate that the speed of the rolling down wagons was very high.

25. The main line at Sondimra station where the rake of Muri Crack I had been stabled was inspected and the location where the safety chains had been used was examined. The ballast underneath the rail had been removed to form a depression to pass the safety chain below the rail. The chain and the lock were also examined. It was observed that the lock had been forced open. An actual demonstration of tying up the chain with the tralley frame of a BOX wagon was conducted and it was observed that the length of the standard chain was not adequate for passing twice round the frame and rail nor even enough for putting two knots after passing the chain once under the rail and through the trolley frame. In the absence of the second knot the single one is likely to slip when the chain is under tension, transferring the strain to the lock which is bound to give way. It was obvious, therefore, that BOX wagons cannot be effectively secured by a chain of the standard length of 7 ft.

26. The grade of the main line in Sondimra yard as existing was got checked and it was found that although the central 274 m portion where the load was stabled was in 1 in 400, there were very steep slopes of 1 in 206 and 1 in 158 near the points at Barkakana and Muri ends respectively. From Sondimra to the site of accident the longitudinal section indicated a continuous falling grade of 1 in 200.

VII. DISCUSSION

27. **Time of accident**—Since the Guard who was travelling in the loco of Barkakana Crack II has been killed and the Driver was also injured losing consciousness, the exact time of occurrence of the accident could not be reported by any of the persons having firsthand information. Barkakana Crack II had started from Muri at 16.30 hrs. and according to the Driver its speed was 30 to 35 Km./h at the time of collision and he had not attained higher speed due to continuous rising gradient. There was slight increase in the speed on the short falling gradient before approaching the site of accident. Assuming his average speed to be 30 Km./h he would have taken 26 minutes to cover the distance of 12 kilometers from Muri to the site of accident allowing 2 minutes for acceleration. The time of the accident, therefore, comes to 16.56 hrs.

28. **Speed of Trains**—(a) As indicated above Barkakana Crack II was travelling at 30-35 Km./h and the Driver had very little time to apply his brakes effectively before the collision occurred. There would be, however, some reduction in speed as he was going up the gradient of 1 in 200. Hence its speed is taken as 30 Km./h.

(b) The 20 BOX wagons of Muri Crack I started rolling down from rest on an average falling gradient of 1 in 350 for 356 m followed by 1 in 200 falling grade for 3.1 Km. Assuming the effect of wind forces and resistance due to hand brakes and curves to be very nearly compensating each other, it is observed by calculations that a speed of 53 Km./h was likely to have been reached by the rolling load before the impact. The heavy damages caused to the locomotive as well as 6 BOX wagons of the rolling load and parting of Barkakana Crack II by 32.9 meters indicate the momentum of the rolling down load to be of a high order. Its speed is, therefore, taken as about 53 Km./h.

29. **Securing of the stabled load at Sondimra**—General Rule 154 lays down that the Station Master shall see that vehicles standing at the station are properly secured in accordance with special instructions. Subsidiary Rules 154/1(a) to (j) of S.E. Railway have been reproduced in Annexure I. Since the load comprised of BOX wagons, the Assistant Station Master as well as the Pointsmen confirmed that they had tightened the hand brakes of 5 or 6 wagons at both ends of the load. Their not being definite about the number was probably because 1 or 2 wagons at either end were having defective hand brakes (brake wheels either running free or jammed), and the actual number applied had not been checked carefully. The same conditions were repeated even after the accident vide para 22.

As regards proper tightening of the brakes the Assistant Station Master took the brake to be tightened when the brake blocks were pressing against the wheels. Of course

he could have been misled by the vacuum brake having been left in the applied position at the time, but that would not have affected had the brake wheels been tightened properly.

The Guard also did not check all such wagons excepting only 3 or 4 wagons from the engine end and relied on the assurance of the station staff. Nor did he release the vacuum brakes as required under Subsidiary Rule 129/1(iii) to ascertain that the train was secured before detaching the engine. Further, there being no brake van on this rake, securing of the hand brake of the brake van which could have been properly done by the Guard, was also not possible.

Securing by the safety chain was also ineffective for reasons explained in para 25. Only one chain had been used due to non-availability of the second lock and that too of inadequate length.

30. **The storm and its intensity**—It was reported by the Station Master, Sondimra as well as corroborated by several other witnesses that there was a storm raging in the area from about 16.20 hrs. There were reports also of some trees having been uprooted at Gola Road the next station towards Barkakana. I could not, however, observe any evidence at Sondimra station to indicate that the storm was of a very severe intensity. There was, however, a high wind as the Station Master found it difficult to stand when he tried to stop the rolling of the wagons.

31. **Cause of the accident**—From what has been stated above, it is obvious that the tightening of hand brakes of the wagons was not very effective. Securing with the chain and lock also had practically no effect, the chain having been used in incorrect manner due to inadequate length. With this ineffective securing arrangements the wagons started rolling from the falling grade of 1 in 400 with the slight push given by the wind. The BOX wagons provided with roller bearings have very low rolling resistance and are likely to roll down on this grade with the slightest push.

VIII. CONCLUSIONS

32. After full consideration of all facts, material and circumstantial evidence, I have reached the conclusion that the rolling down of 20 BOX loads of Muri Crack I and its subsequent collision with Barkakana Crack II Goods train at Km. 357/1 between Muri and Sondimra stations of South Eastern Railway at 16.56 hrs. on 24-3-1975 was the result of inadequate securing arrangements of the BOX loads at Sondimra, which rolled down and entered the block section during a storm.

33. **Responsibility**—(a) Assistant Station Master, Shri P. S. Mondal is held responsible for not securing properly the hand brakes of 6 BOX wagons at each end of the load and not using at least 2 safety chains nor bringing the fact regarding the absence of locks for safety chains to the notice of the Controller on duty. He thus failed to observe the relevant provisions of Subsidiary Rule 154/1(a) to (j). He also failed to comply with the directive contained in para 13(a)—Special Instructions of the Station Working Rules of Sondimra in having allowed stabling of the BOX loads on the main line.

(b) Station Master Shri S. C. Banerjee is responsible for not maintaining his station equipment properly as regards safety chains and locks which resulted in using only one safety chain instead of 2 as laid down, and involving violation of Subsidiary Rule 154/1(b) (iii), (d), (e) and (g). He also failed to notice the inadequacy of length of the safety chain and to report the fact to the administration.

(c) Guard Shri D. K. Basu of Muri Crack No. I is blameworthy as he failed to satisfy himself that the load had been properly secured before giving permission to his driver to detach the engine from his train standing on a grade. He has thus violated General Rule 129 and Subsidiary Rule 129/1.

34. Service particulars

(i) Assistant Station Master, Shri P. S. Mondal, (School Final) aged 35½ years was appointed as Probationary Signaller on 1-12-1959 and promoted as Assistant Station Master on 27-8-1960 and confirmed after one year. His increment was withheld for 6 months on one occasion in the last 5 years, for detaining 84 Down by 23 minutes on 19-7-1969 at Torang.

(ii) Station Master, Shri S. C. Banerjee, (Matriculate) aged about 54 years was appointed as Assistant Station Master on 27-2-1946, promoted as Station Master on 9-6-1965 and confirmed after 2 years. His increment was withheld for 3 months on one occasion in the last 5 years for negligence to duty.

(iii) Guard, Shri D. K. Basu, (I.A.) aged 33 years was appointed as Probationary Guard on 1-7-1966 and working independently from 15-9-1966. His increment was withheld for one year for not passing Refresher course examination in ambulance in time.

35. **Relief measures**—The only survivor in this accident viz. the Driver of Barkakana Crack No. II had been promptly taken to the Heavy Engineering Corporation Hospital at Hatia. The Assistant Medical Officer, Muri who had been at Adra at the time of the accident also arrived Muri as quickly as possible.

IX. REMARKS AND RECOMMENDATIONS

36. Safety chains of adequate length suitable for securing BOX wagons must be supplied to all stations on sections where such wagons are in use and the staff should be trained on the correct method of using them.

37. As indicated in para 26 the grades in the Sondimra yard varied considerably from what is shown in the Station Working Rule Diagram. Instructions had been issued under Railway Board's No. 71/WDO/AC/SD/1 dated 23rd July 1971 (copy enclosed in Annexure II) that grades in the yards should be checked once in 10 years. These instructions should be complied with and grades of all yards should be checked on a programmed basis allotting high priority to stations in graded sections.

38. I have come across a number of Assistant Station Masters who have not been trained to read the gradients indicated in the Station Working Rule Diagram with the result that they are completely ignorant about the grades in the yards and the significance thereof. The curriculum of training for station operating staff must include reading grade indications in the yard diagrams as well as the significance of steep grades. The Safety Counsellors should also explain these to the staff on line.

39. It came to my notice that there are some Goods trains which are run without brakevans on the South Eastern Railway under Chief Operating Superintendent's Circular No. 50/319/Pt.13 dated 25-9-1974. Running of Goods trains without brakevans, though permissible under special instructions according to General Rule 93, reduces the margin of safety, particularly on all graded sections, as the assistance of the Guard's hand brake is **not available** for emergencies. Further, there is no provision in a BOX wagon where tail lamp or last vehicle board can be fixed. It is understood that there has been shortage of brakevans due to heavy pilferage of materials and other reasons. It is strongly felt that the Administration must take such steps as may be necessary to wipe out the shortage as quickly as possible, and ensure that the number of trains that are so run without brakevans is reduced to the absolute minimum if not completely eliminated.

40. There is provision in the Station Working Orders of the various stations on the section that "in the ordinary course of events vehicles should not be stabled on a running line". Since such an eventuality has, however, occurred, the Administration may consider making this rule more specific on broad gauge sections and insisting that under no circumstances should any vehicle or train be stabled on running lines not provide with trap points or other arrangements to prevent rolling of vehicles into the block section. It should also be impressed on the Section Controllers that they must ensure that stabling does not take place on such running lines.

Yours faithfully,

S. K. MOJUMDER,
Additional Commissioner of
Railway Safety,
South Eastern Circle,
Calcutta.

CALCUTTA,
DATED 26-7-75.

Railway Board's Comments on Para 36 to 40 of the Report.

Para 36 of the Report: Necessary action has been taken by the Railway Administrations to supply to stations safety chains of adequate length so as to secure BOX and other special type wagons. Instructions have also been reiterated to other Railways.

Paras 37 and 38 of the Report: Railway Administration has taken necessary action. Instructions have also been repeated to all railways.

Para 39 of the Report: The Railway Administration has assured that all efforts are being made to run trains with brakevans; and that BOX trains are invariably run with brakevans.

Para 40 of the Report: To prevent recurrence of similar accidents at stations situated on gradients, all railways have been advised to observe special precautions.



G.R. 129.—Permission of Guard to detach engine from train.—When a train has been brought to a stand outside station limits or on a grade, the Driver shall not detach his engine from the train without the permission of the Guard in charge of the train, who before giving such permission shall satisfy himself that the van-brakes have been put on securely, and take such other measures as may be necessary or prescribed by special instructions.

S.R. 129/1.—If for any cause, it becomes necessary for an engine of a train to be detached from its train, the following procedure must be carried out before the engine is uncoupled.

- (i) brake-van brakes must be screwed on tightly;
- (ii) all available hand brakes must be firmly applied, and sprags or any special appliances provided, must also be used.
- (iii) the vacuum brakes, when a train is working vacuum, must then be released by pulling the ball valve wires, and the Guard and Driver on ascertaining that the train is secure, may then detach the engine.

G.R. 154.—Securing of vehicles at stations.—The Station Master shall see that vehicles standing at the station are properly secured in accordance with special instructions.

S.R. 154/1.—(a) The hand brakes of all vehicles provided with them, must be put on.

- (b) (i) Special type wagons such as BOX, BOBS, BOI, BOY, BRH, BCX, BWS, BWL, CRT are fitted with roller bearings and are liable to roll even on level formation or on a slight bump. Special care should, therefore, be taken to secure these wagons while standing in sidings or on running lines.
- (ii) To prevent rolling down, when engines are detached from rakes consisting of such wagons, the hand brakes of at least six wagons at each end of every rake, should be firmly tightened by the yard staff and by the Guards, when detached in siding.
- (iii) Following precautions are necessary when such type of wagons are stabled at a station:—
 - (x) At least two safety chains must be used and locked.
 - (y) The hand brakes whether side-operated or end-operated must be fully tightened.

If a rake of such type of wagons is stabled, at least six wagons from each end must have their brakes put on tightly.

- (z) The brakes should be operated by station staff, such as, Porters, Shuntmen, or Pointsmen, under the personal supervision of Guard or ASM.
- (iv) The Train Examiner on duty who certifies vacuum on the train, must release the hand brakes when the train is formed and the engine is attached.
- (v) These precautions should be taken irrespective of the gradient in the siding or the yard.
- (vi) Where shunting is necessitated, following further precautions will apply:—
 - (x) Maximum Impact Speed when shunting a single Box/BOBS/BOI/BRH/BOY/BCX/BWS/BWL/CRT wagon fitted with roller bearing must not exceed 3 MPH/5 KMPH.

- (y) Maximum Impact Speed when shunting a group of five of such type of wagons coupled together with transition couplers at either end should not exceed 1.5 MPH/3 KMPH.

(c) Isolated vehicles must never be permitted to stand unsecured. Vehicles must be properly coupled up when left standing on station lines or in sidings; they should have their hand brakes firmly applied and levers pinned down, and, in addition to a wheel of the vehicle at each end being carefully spragged, a wheel of each end vehicle must also be secured by a safety chain round the wheel and the rail.

(d) The safety chains must be passed twice round the wheel and rail, and after tying the ends together, they should be locked, so that no strain falls on the padlock.

(e) When there are a number of vehicles together, every fifteenth at least should be spragged and chained in addition to the end vehicles.

(f) Coaching stock not fitted with hand brakes, when not formed up as a train with brake-vans coupled, must in like manner be secured by sprags and safety chains.

(g) Station Masters are particularly enjoined to see personally each evening before dark, and during stormy weather, to the safety of all rolling stock standing in their yards; and that all vehicles are coupled together in accordance with rules, all wagon brakes securely pinned down, and safety chains and siding scotches correctly locked.

(h) When scotch blocks or derails are provided, vehicles should be placed within them and the scotch blocks or derails locked across the line.

(i) As storms may also arise while shunting is being performed, special care must be taken to provide for the safety of vehicles which may be left unsecured during shunting. This should be done by the provision of an ample supply of sprags, and during the stormy seasons, no shunting should be performed without at least two sprags being placed near the entrance points between each pair of lines on which shunting is being conducted.

(j) Particular care must be taken to remove chains and sprags, before wagons are moved or coupled to trains.

Extracts of Station Working Rules of Sondimra:

(13) Special Instruction:

(a) In the ordinary course of events, vehicles should not be allowed to stand on a running line. Should it be necessary to detach vehicles from a train and leave them standing on the running line the Station Master must take necessary precautionary measures in terms of G/SR No. 150/1(iii).*

(c) Vehicles standing in the station siding must be secured as laid down in G/SR 154/1(a) to (j).

***Subsidiary Rule No. 150/1(iii) is extracted below:—**

(iii) When, however, the load of a train has to be unavoidably stabled on a running line at a non-interlocked station, it must be protected by setting and locking the points at either end against the blocked line. The keys of these points should be kept in the personal custody of the Station Master on duty. Where the points are pad-locked, the keys for either side should be on isolated rings.

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(Railway Board)

No. 71/WDO/AC/SD/1.

New Delhi, dated 23rd July, 1971.

The General Managers,
All Indian Railways.

SUB : Gradient in Station Yards.

At a Station on one of the Zonal Railways, the rake of an Express train from which the engine was detached rolled down and collided with the engine and slip coaches coming from the opposite direction. During the course of investigation it was revealed that although the yard should have been in a grade flatter than 1 in 400 according to the approved plans, the actual average grade was 1 in 285 and as steep as 1 in 175 in some portions. The ACRS who enquired into the collision recommended as under:—

"A check should be made of the station yards involved. If found to be unsuitable, suitable remedial action should be taken to safeguard the station yards and coaches. The engine should be laid down by the station yard."

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The above recommendation of the ACRS has been accepted by the Board. Board desire that the Railway Administration should exercise check on all station yards of their Railway system to ensure that the gradients in the station yard are in accordance with the approved plans and to take suitable remedial action in cases where the yards are infringing the standard dimensions. Wherever the infringements cannot be removed by regrading, action should be taken to obtain Board's approval to such infringements, together with provision of such safeguards in the station working rules as may be considered necessary to guard against rolling down of wagons and coaches.

Board further desire that the check should be repeated at intervals of every 10 years so as to ensure that no unfavourable changes in the gradients affecting safety in the working have taken place. This periodical checking should be done for 1/10th of the stations in each year so that in a cycle of 10 years all stations are systematically covered.

The receipt of this letter may please be acknowledged.

(Sd/-)

U. S. RAO

Director, Civil Engg.,
Railway Board.