GOVERNMENT OF INDIA

MINISTRY OF TRANSPORT AND COMMUNICATIONS

(RAILWAY INSPECTORATE)

RAILWAY ACCIDENT

REPORT

on

DERAILMENT

of

2 TF DOWN PASSENGER TRAIN

between

MAINPURI AND BHONGAON STATIONS

(NORTHERN RAILWAY)

on

29th October, 1961

SUMMARY

Date	29th October, 1961.
Time	10·35 hrs.
Railway	Northern.
Gauge	5 ft. 6 inches.
Location	At Km. 1268/7-9 between Mainpuri and Bhongaon.
Nature of Accident	Derailment.
Train involved	No. 2 TF Down Passenger Train.
Consisting of	Engine and 8 bogie coaches.
Engine No.	AWD 12384.
Estimated speed	45 miles per hour.
System of Operation	Absolute Block System with Paper Line Clear on Morse Telegraph.
No. of tracks	Single line.
Gradients	1 : 800 falling.
Curvature	Nil.
Weather	Clear.
Visibility	Good.
Casualties	Killed .. 22
	Injured :
	(*a*) Grievous .. 17
	(*b*) Minor .. 45
Cause	High speed in excess of permissible limit.
Persons held responsible	Driver of the train.

To

The Secretary to the Govt. of India,
Ministry of Transport & Communications,
New Delhi.

(Through : The Commissioner of Railway Safety, Simla-3).

Sir,

In accordance with Rule 9 of Railway Board's Notification No. 1926-T dated 19-3-1930, I have the honour to submit herewith my report on the accident to No. 2TF Down passenger train at Km. 1268·69 between Mainpuri and Bhongaon stations on the Shikohabad—Farukhabad section of the Northern Railway at 10·35 hrs. on 29th October, 1961.

2. *Inquiry* : (*a*) The site of the accident was inspected on the evening of 29th October, 1961 at about 20·20 hrs. in company of the General Manager, Chief Engineer, Chief Mechanical Engineer, Chief Operating Superintendent and the Divisional Superintendent, Allahabad and other Divisional Officers. The site was again inspected on the 30th and 31st October, 1961 and 1st and 2nd November, 1961. The inquiry was held both at Mainpuri and Shikohabad on the above dates. I saw the injured persons at Mainpuri Hospital on 29th October, 1961 and recorded the evidence of some of the injured persons on 1st November, 1961.

(*b*) The District Magistrate and the Superintendent of Police were informed of the holding of inquiry. The Superintendent of Police and his Deputy attended the inquiry on one day. No representative of the District Magistrate attended.

(*c*) The following were present at the inquiry :—

(1) Shri B. D. Mehra, Divisional Superintendent, Allahabad.

(2) Shri I. Sahai, Divisional Operating Superintendent, Allahabad.

(3) Shri Madan Gopal, Divisional Engineer, Allahabad on 30th October, 1961 and for short periods on other days.

(4) Shri Agnihotri, Offg. Superintendent of Police, Mainpuri.

(5) Shri Afghani, Dy. Superintendent of Police, Mainpuri.

} On 2nd November 1961 for part of the time.

(*d*) The evidence of 29 witnesses was recorded.

3. *Brief description of the accident* : (*a*) No. 2TF Down passenger train left Mainpuri Kacheri, a 'D' class station, at 10·28 hrs. and while proceeding towards Bhongaon, it derailed at Km. 1268·69, at 10·35 hours after travelling a distance of 6·26 Kms.

(*b*) The engine and tender capsized, and the following four coaches derailed and telescoped into each other. The remaining four choaches were undamaged and remained on the rails. The track under the engine and first four coaches was completely smashed, while that in rear of the site, was distorted at places up to a distance of 1·4 Km.

4. *Casualties* : As a result of the accident, 16 passengers and 2 Railway staff (the Driver and the second Fireman) were killed outright. Two passengers and Two Railway staff died subsequently in Mainpuri Hospital. 14 passengers and 3 Railway staff were hurt grievously while 43 passengers and two Railway staff received simple injuries. The injured passengers are progressing satisfactorily in the various hospitals to which they were admitted.

5. *Composition of the train* : (*a*) The composition of the train was as follows :—

Engine No. AWD 12384 (2—8—2)

	Underframe.	Body.
1. CTT 1312 SR-Bogie III class, tourist coach ..	Steel IRS type	Wooden frame with steel panelling.
2. TLR 4811 NR-Bogie III class, Luggage & Brake van	,,	,,
3. T 3499 NR-Bogie III class	Steel IRCA type	,,
4. GT 9437 NR-Bogie III class	Steel IRS type	All steel, ICF.
5. GT 9435 NR-Bogie III class	,,	,,
6. T 2828 NR-Bogie III class	Steel IRCA type	Wooden frame with steel panelling.
7. TLR 5094 NR-Bogie III class, Luggage & Brake van	,,	,,
8. GT 4192 NR-Bogie III class	Steel IRS type	Steel HAL.

(*b*) The length of the train including engine was 642 ft., its weight 462 tons while the total brake-power was 266 tons.

6. *Damage* : (*i*) Engine and coaches :

(*a*) The engine, after derailing and capsizing was lying almost on its right-hand-side, at an angle of 20° to the horizontal and at an angle of 30° to the track, towards the left. The right hand wheels had ploughed deeply into the ballast and formation to an extent of 4 to 5 ft. below what would have been the top of the ballast. The left wheels were in the air about 4 ft. above the formation level. The Bissel wheels had got disconnected owing to the breakage of the pivot pin. The hind truck radial wheels had been wrenched off from the yoke frame, which had broken on both sides, and were lying at a distance of 36 ft. in rear on the left of their proper position on the engine. The axle boxes of the radial wheels had come off, one lying 28 ft. from the centre of track opposite the engine to the left, and the other being buried in the debris near the centre of the track.

(*b*) The tender body had completely separated from the under-frame, which is carried on a pair of bogies. The frame was lying in the rear of the engine with the inter-drawbar bent, with its right side bogie wheels embedded in the ballast and formation and the left side bogie wheels on the formation at an angle of 10° to the horizontal 10° with the track towards the left. The tender body had been pushed forward to the right and was resting on its right side.

(*c*) Coach No. CTT 1312 next to the engine lay with its underframe over the ploughed up portion of the track and formation, behind the tender. The left front end of the underframe was just resting on the tender frame. The rear end of the under-frame was at a lower level than the front end. The bogie wheels were lying underneath but separated from it. The body of this coach was completely smashed owing to the following coach having telescoped into it. The under-frame was slightly twisted and the bogie frames were bent.

(*d*) The under-frame and body of TLR 4811, the second coach from the engine, had slithered over the under-frame and flooring of CTT 1312, smashing every vestige of the body of the latter and had come to rest with its front portion, which was at a higher level than the rear portion, mounted on the top of the tender body lying ahead. Its rear end was resting on the flooring of CTT 1312 about 20 ft. from the latter, rear end. The bogie frames, wheels and bolsters had been wrenched off from the under-frame and remained behind the under-frame of CTT 1312. The body had suffered some damage specially at the ends but remained upright on the frame. The front bolster was lying outside to the left. Both bogie frames were twisted. The under-frame had also bent and twisted to a small extent.

(*e*) T 3499, the third coach from the engine had also telescoped over the rear portion of under-frame of CTT 1312 on the portion left clear by the telescopic movement of TRL 4811. The bogie frames and wheels of this coach had also been wrenched off from the under-frame, the front one being the under-frame, and the rear one lying outside to the left. The sides of the body were broken and the roof had caved in. The sole bars and head stocks were badly bent. Both bogie frames had buckled and all buffers broken.

(*f*) The front end of GT 9437, the fourth coach from the engine, had telescoped into the body of T 3499 at the latter's rear end and had come to rest with the front end 21 ft. over it. Both bogie frames and wheels of GT 9437 had been wrenched off from the bolsters. The front bogie was lying just behind the fourth coach T 3499. The rear bogie was lying more or less at its proper place with its left hand wheels inside the track. The body had suffered slight damage. The strayrods were slightly bent and both trollies were out of square and frames bent.

(*ii*) Permanent Way :

(*a*) Approaching from the direction of Mainpuri Kacheri and proceeding towards Bhongaon, it was observed that the track had slightly distorted at Km. 1267·28 and 1267·93 for lengths of 189 ft. and 172 ft. and to a maximum extent of 15/16″ and 7/8″ respectively. The gauge and cross-levels at these sites, were however correct within ±1/8″ except on one joint at Km. 1267·28, where the left rail was lower by ¾″. 32 ft. beyond centre of the culvert at Km. 1268·63, there was another badly distorted section of track, 190 ft. long with a maximum distortion of 9″, where also the gauge and cross levels were correct to ±1/8″. 222 ft. beyond the centre of culvert, for a length of 85 ft. the track was straight, but beyond that, upto the level crossing at Km. 1268·80, the track had been completely churned up, with all sleeper plates and tiebars broken, rails pushed forward, broken, bent and embedded, fishplates broken or bent and cracked and most of the fishbolts sheared off.

(*b*) The total cost of damage to Railway property was estimated as below :

	Rs.
Engine and tender	11,920
Coaches	1,66,300
Permanent way	14,780
Total ..	1,93,000

7. *Relief Measures* : (*a*) The accident occurred at 10·35 hrs. The Guard of the train sent messages through a gangman and a cyclist at 10·48 hrs. and one of these messages was received at Bhongaon station at 11·04 hrs. The Station Master relayed the news to Mainpuri at 11·07 hrs. and also alerted Bhongaon Civil Hospital and private medical practitioners at 11·08 hrs.

(*b*) Station Master Mainpuri, on receipt of the news, advised, between 11·10 hrs. and 11·28 hrs. the Railway staff at Mainpuri, including the Railway Assistant Surgeon, Permanent Way Inspector, the District Magistrate, the Superintendent of Police, the Civil Surgeon and Shikohabad station, the latter to transmit the news to Tundla Control.

(*c*) Tundla Control was informed at 11·30 hrs. and immediately, at 11·32 hrs. ordered the Medical Van followed by the Relief Train with 40 Ton crane stationed, at Tundla to proceed to site. Between 11·33 hrs. and 11·54 hrs., Tundla Control advised the Railway staff at Tundla, Kanpur, Etawah and Aligrah to proceed to site by Relief train and other means, including Permanent Way Inspector at Tundla, Assistant Engineers, Aligrah and Kanpur, Assistant Medical Officer, Tundla and Assistant Operating Superintendent Tundla. The North Eastern Railway Officers at Fatehgarh were also advised. Allahabad Control was advised at 11·55 hrs. who informed Northern Railway Headquarters at 12·15 hrs.

(*d*) In the meanwhile the Civil Surgeon Mainpuri with his staff and private doctors had reached the site between 11·22 and 11·25 hrs. The Guard had started despatch of the injured persons by requisitioning the buses that had arrived at the level-crossing gate and the first lot of injured persons had reached Mainpuri Hospital by 11·15 hrs. and the last injured person was despatched to Hospital by 13·00 hrs. Social organization with food, water, ice, tea, milk, fruits etc. also reached the site at 11·25 hrs. for succour to the injured. The Station Master Mainpuri also arrived at site at 12·24 hrs. with refreshments for the injured passengers.

(*e*) The District Magistrate Mainpuri reached the site at 11·20 hrs. and local Railway staff from Mainpuri at 11·45 hrs. and Assistant Commercial Superintendent, Allahabad, who was on inspection at a nearby station, at 12·45 hrs.

(*f*) The Tundla Medical Van with the Assistant Medical Officer, Assistant Surgeon, Nurses etc., Assistant Operating Superintendent and other Railway staff from Tundla, reached the site at 15·30 hrs. The District Traffic Superintendent and Assistant Mechanical Engineer, North Eastern Railway, Fatehgarh also reached the site at about the same time. The Medical Van from Kanpur which had also been despatched, arrived at Shikohabad at 16·20 hrs. but was not sent to site as it was not required. The Relief Train from Kanpur with 65 Ton crane arrived at Shikohabad at 16·40 hrs. and was detained there till such time as it was actually required at the site.

(*g*) The General Manager, Northern Railway along with Heads of Departments and the Divisional Superintendent, Allahabad reached the site at 20·20 hrs. The other Divisional Officers from Allahabad reached Shikohabad at 20·10 hrs.

(*h*) The 40 Ton crane from Tundla was taken to the site in case part of the wreckage was to be lifted to extricate any victims of the unfortunate accident, but fortunately all injured persons and dead bodies could be recovered earlier without the help of the crane. No bodies were discovered after the wreckage had been cleared.

8. *Restoration of communications* : (*a*) The uninjured passengers of No. 2TF train who had not already left by bus or other conveyances were taken back to Mainpuri station at 17·10 hrs. in the last four coaches of the train which had not derailed.

(*b*) The Relief Train from Kanpur with 65 Ton crane was brought to the site of the accident, at 14·30 hrs. on 30th October, 1961, after I had made my initial inspection of the site and wreckage. A diversion was laid on the left hand side of the wreckage for facility of clearance, which was completed at 07·30 hrs. and the track was restored for through communication at 10·15 hrs. on 1st November, 1961.

9. *Number of Passengers* : No. 2TF train had accommodation for 490 passengers and the number actually travelling was estimated to be 245.

10. *Weather conditions* : The weather was clear with bright sunshine and the visibility was good.

11. *Description of the locality* : (*a*) The accident occurred at Km. 1268·69 between Mainpuri and Bhongaon stations on the Shikohabad—Farukhabad B.G. Section of the Northern Railway. The Divisional Headquarter is located at Allahabad. There is a Control Office at Tundla as well as at Allahabad. The Shikohabad—Farukhabad section is however in a non-controlled section, communications being carried through Morse Instruments.

(*b*) The distances from Howrah of the various stations and other important places referred to in the report are as follows :

	Km.
Shikohabad	1211·98
Mainpuri	1259·81
Mainpuri Kacheri	1262·43
Culvert No. 98 (2 × 2ft. open top)	1268·63
Site of accident	1268·69
Level crossing No. 6 'B' class	1268·80
Bhongaon	1273·72

The general direction of the line between Mainpuri and Bhongaon is North-Easterly. The country-side is agricultural, inter-spersed with grazing ground for cattle. The road at level crossing No. 6 is a highway with tarred surface, connecting Shikohabad with Farukhabad.

(*c*) The height of bank at the site of accident is about 4 ft., the bank being of ordinary clay. The track between Mainpuri Kacheri and Bhongaon is on the straight. The gradients are easy. Leaving Mainpuri Kacheri, there is a short rising grade of 1 : 400 for about ½ kilometer followed by a level portion for a little over a kilometer. The grade then falls at 1 : 500 for a distance of about ¾ kilometer, followed by a level portion for about 2 kilometers. Thereafter there is a falling grade of 1 : 800 up to Km. 1269, i.e. past the site of accident.

12. *Description of Permanent Way* : The permanent way, laid in 1905, consists of 75 lb. D.H. rails 30 ft. long manufactured in 1882 to 1895 in Sheffield, England, on D & O plate sleepers manufactured at Jamalpur and Patna by the Ex-East Indian Railway in 1902 to 1925. The sleeper density is N, N+1, N+2 and N+1—D at different places on broken stone ballast 6″ to 8″ deep. The first nine miles from Shikohabad had however been re-laid in 1959-60 with 75 lb. RFF rails on CST-9 sleepers at a density of N + 2. At the site of the accident, the track is laid with 75 lb. DH rails manufactured in the year 1894, on D & O plate sleepers with a density of N per rail.

13. *Distances* : The distance between Mainpuri Kacheri (Km. 1262·43) and Isan bridge (Km. 1264·42) is 2 Km. (1·25 miles) and the distance from Isan bridge to site of accident (Km. 1268·69) is 4·27 Km. (2·65 miles), the total distance from Mainpuri Kacheri to site of accident being 6·27 Km. (3·9 miles).

14. *Booked and permissible speeds* : The maximum permissible speed on the section is 35 m.p.h. for 'A' and 'B' group of engines of Ex-East Indian Railway. For Ex-East Indian Railway 'C' group of engines, which include AWD/CWD locomotives, the maximum permissible speed is 30 m.p.h. The booked speed is 30 m.p.h. and trains hauled by AWD locomotives are not expected to make up time in case the train is running late.

III. SUMMARY OF EVIDENCE.

15. (*a*) *Guard B. K. Asthvana of No. 2TF* stated that his train left Mainpuri Kacheri at 10·28 hrs. Immediately before the accident, he felt a mild jerk and as he was looking out of the window to see what had happened, there was a severe jerk after his brake van had passed the small culvert and he fell down on the floor of the compartment. He got up, and went out and saw the nature of the accident. He proceeded to gate lodge No. 6 and got help from the gateman for protection of rear of the train. Originally, he gave the time of accident as 10·45 hrs. but when it was pointed out to him that this would mean that it took 17 minutes to cover a distance of about 4 miles, he retracted his first statement, and admitted that the time of the accident would be 10·35 hrs. The train, on its run between Shikohabad and the site of accident had been stopped out of course three times by students pulling the alarm chain and the last such stop had taken place as the train was starting from Mainpuri Kacheri. After a detention of 4 minutes, the train left at 10·28 hrs.

(*b*) *Gateman Kanauji of Level crossing No. 6* stated that on sighting the train about 1½ miles away, he closed and padlocked his gate and awaited the approach of the train. When the train was about 4 telegraph posts away, he noted that the train was coming at very high speed which was much faster than normal on the Branch line. At a distance of 2½ telegraph posts, he noted that the engine was lurching violently. As the train approached, he heard some loud noises, and the engine and some coaches capsized just short of the level crossing. Before the train approached, he had seen nothing wrong with the track. He had not exhibited any hand signal flag towards the direction of approach of the train. The flags he carried were folded under his arm.

(*c*) *Gangman Kamaruddin of Gang No. 7* stated that on the day of the accident, the gang was working at Km. 1266/11 to 1267/1½. The train (No. 2TF) passed the site of work at a speed faster than normal. Shortly afterwards he heard a loud noise. A villager sent by the gateman told him that the train had met with an accident, and the whole gang then proceeded to the site of accident. Earlier, while coming to the work-site from where the tool box is kept, he had passed the site of the accident, and he did not see anything wrong with the track.

(*d*) *Station Master R. P. Gautam of Mainpuri* pointed out that Traffic Inspector Shikohabad had given several messages regarding rough running of the track at different mileages in the section.

He also stated that some outsiders had informed him that some gangmen had been working at the site of this accident just prior to the accident, but he was vague as to who gave him this information.

(*e*) *Cowherd Basta Singh of village Uddampur Naraini*, who was grazing his cattle in the vicinity of culvert No. 98, stated that he noticed that the train (No. 2TF) was approaching at a speed faster than other trains he had previously seen. Immediately after passing the culvert the train met with the accident. Before the arrival of the train, he had seen no gangmen working at the site of accident; the gang was working at a site about 4 or 5 furlongs away towards Mainpuri. He noticed that the gateman closed the gate leaves before the arrival of the train. He did not notice whether the gateman was exhibiting any flag as he stood waiting for the train to pass.

(*f*) *Bankey Lal of village Lallupur* was proceeding towards Bhongaon on foot and stopped near the level crossing (No. 6) and noticed that the train (No. 2 TF) was approaching at a much faster speed than other trains. There were no gangmen working in the vicinity, but they were working about a mile away towards Mainpuri. The gate leaves were closed when he arrived at the level crossing. The gateman, while awaiting the passage of the train, did not exhibit any flags, but had the flags folded under his arm.

(*g*) *B. N. Gupta, Chemist-in-Charge, Shikohabad* entrained No. 2 TF at Shikohabad to go to Farukhabad. He was sitting in the rear of the third coach from the Engine. The speed of the train was high after leaving Mainpuri, so much so that owing to the jerks he could not read the magazine which he was doing so far. About 3 minutes before the accident, the jerks had increased, and the train was lurching in such a way that he felt it would topple over. In his estimate, the train was travelling at not less than 40 m.p.h. just before the accident. Between Shikohabad and Mainpuri the train had travelled at a speed of 30 m.p.h. According to his watch, the accident occurred at 10·35 hrs., and his watch was correct to within plus/minus two or three minutes.

(*h*) *S. P. Bhatnagar, Brick Kiln owner, Bhongaon* stated he was travelling on No. 2TF in the second coach from the Engine. After passing the Isan river, and near village Mohanpur, which is about a mile from the bridge, the train started lurching, and he apprehended that there might be an accident. He travels by train frequently on this section and according to him, the train was running at normal speed, although he could not assess the speed. He had no watch and so did not note the time of the accident.

(*i*) *Satya Dev, Student, Shikohabad* stated he was travelling in the third coach from the engine. He felt violent lurching about a furlong away from the level crossing gate. He travels over the section about twice a month and according to him the train was travelling at normal speed, although he could not assess the speed. He had no watch and so did not note the time of the accident.

(*j*) *Rakshak Mata Prasad of Tundla* was proceeding to Farukhabad on duty, travelling in the last coach of the train No. 2TF. When the train was nearing the level crossing (No. 6) he felt severe jerking. He travels daily from Tundla to Farukhabad and back and according to him the train was travelling at normal speed. He had no watch and so did not note the time of the accident.

(*k*) *Claims Tracer O. P. Saxena, Etawah* stated he was proceeding by No. 2TF to Farukhabad on duty and was travelling on the fourth coach from the engine. He travels frequently on this section, and according to him the train was travelling at normal speed, although he could not assess the speed. There was some bumping but this was as usual. He had no watch and so did not take note of the time.

(*l*) *Driver E. S. Chatterjee, Tundla* worked No. 4ATF on the date of accident. His train left Mainpuri Kacheri at 06·07 hrs. and when he passed the site of the accident, he did not feel that there was anything unusual about the track.

(*m*) *Traffic Inspector S. L. Kackar, Shikohabad* stated that he travels often between Shikohabad and Farukhabad. He had issued some chits for rough running to the PWI (Mainpuri) last year, but in the current year, he had no occasion to do so. In his opinion the running had improved since last September.

(*n*) *Driver Iqbal Hussain, Tundla* worked the UP Shunting Goods on the date of the accident from Farukhabad to Shikohabad. He would have passed the level crossing gate (No. 6) at about 06·55 hrs. and he found the track good between the level crossing and the culvert.

(*o*) *Gateman Moharman of Gate No. 6* who was on duty upto 06·00 hrs. on the day of the accident stated that during his duty hours two goods and two passenger trains passed the gate and there was nothing unusual about their running. When he handed over to Gateman Kanauji in the morning the track was in good condition.

(*p*) *Booking Clerk-in-Charge, Jagannath Prasad, Mainpuri Kacheri* stated that he maintains a train arrival and departure register. According to the clock in the station, which is checked with the train Guards' times, No. 2TF arrived at 10·30 hrs. and left at 10·32 hrs.

(*q*) *Assistant Commercial Superintendent K. D. Sinha, Allahabad,* was on inspection of stations on Mainpuri—Farukhabad section on the day of the accident. He had just left Mota station which is between Bhongaon and Farukhabad when he was informed of the accident. He had left Mainpuri by push trolly at about 08·45 hrs. and passed the site of the accident at about 09·30 hrs. on his way towards Bhongaon. He did not notice anything unusual about the track in the vicinity of the level crossing, nor were any gangmen at work near the gate. When he returned to the site of the accident at about 12·45 hrs., he noted that in the Engine, the regulator was in the closed position and the vacuum brake was in the 'on' position.

(*r*) *Assistant Mechanical Engineer, J. D. Micheal, North Eastern Railway, Fatehgarh* on being advised about the accident at 12·30 hrs., arrived at the site at 15·40 hrs. He was the first Railway Mechanical Deptt. officer to arrive at the site. He examined the Engine and observed, among other things, that the regulator was in the shut position, the reversing lever in almost mid-gear and the vacuum brake application handle in 'on' position. The train pipe needle was showing zero and the vacuum chamber needle was at 5 inches of vacuum. The brake blocks were pressing hard on the engine wheels. He inspected the track half a mile behind and half a mile ahead of the site of the accident and (with the help of the Permanent Way Inspector, Mainpuri) recorded the gauge and levels. He also made detailed observations of the condition of the track at the site.

(*s*) *Assistant Engineer Thakur Singh, Etawah,* within whose jurisdiction the section Shikohabad to Farukhabad falls, was away on leave and heard of the accident at Jullundur City on 30th October, 1961 and resumed duty on 31st October, 1961 forenoon. He had last trollied over the section Bhongaon to Shikohabad on 12th October, 1961. He had found nothing special to note down in regard to the track between Bhongaon and Mainpuri, which was in good condition. The length from Km. 1266 to Km. 1268 does not contain specially bad soil. During his Engine and Brake Van inspections also he had not noticed any dangerous condition in the track. His last brake van inspection was carried out on 5th September, 1961 and his last Engine Inspection on 30th July, 1961. The routine brake van and engine inspections, which he has to do over the whole of his subdivision once in two months, had been delayed as he was busy on the main line section of his sub-division owing to the General Manager's Inspection. Since 6 miles of track had been recently relaid on this section he had sufficient released materials for renewals on the remainder of the section. He stated that there is an average of 3 broken rails per year on this section, but it has been found that the wear on rails does not exceed 5% by weight. The breakages are due to fatigue in the metal. He was aware that the Drivers of CWD (and AWD) class of Engines, since they started working passengers trains, have been exceeding the speed limit, and on two occasions when he was with the Divisional Engineer the latter had called and warned the drivers concerned for doing so.

(*t*) *Permanent Way Inspector K. N. Verma, Mainpuri* was at his headquarters, being Sunday, when he received a message at 11·30 hrs. regarding the accident. He arrived at the site of accident at 12·00 hrs. He later recorded the gauge and level of the track in rear end in front of the accident site along with Permanent Way Inspector Shikohabad and Assistant Mechanical Engineer, North Eastern Railway Fategarh, who were there. He gave details of through packing etc. done between Km. 1266 and Km. 1269, as follows :—

Km. 1267/3-4	Through Packing	4th October, 1961
Km. 1266/8½-10	Attending slacks	10th " "
Km. 1266/0-2½	-do-	11th " "
Km. 1268/3-4	Through Packing	13th " "
Km. 1267/9-11	Attending slacks	14th " "
Km. 1267/1-2½	-do-	17th " "

From 25th October, 1961 regular through packing was started from Km. 1266/7 and upto 29th October, 1961 had reached upto Km. 1267/1. The site of accident i.e. Km. 1268/7-9 had been through packed on 17th August, 1961 and slacks attended on 12th September, 1961. Complete overhauling of track was done at Km. 1268/2-10 in December, 1958, and will be done again shortly, as complete overhauling is required to be done once in 3 years. He had last trollied through from Mainpuri to Bhongaon on 26th October, 1961. He had inspected the track by Engine on 8th October, 1961 and 14th October, 1961. He had noticed that drivers of AWD/CWD class of engines were running trains at speeds between 35 and 40 miles per hour and he had warned the drivers concerned.

(*u*) *First Fireman Gurbachan Singh of No. 2TF* stated that after leaving Mainpuri the train was proceeding without any jerk or lurching movement at the normal speed of 25 to under 30 m.p.h. While approaching gate No. 6 he had just finished firing the boiler and was observing through the look-out window. As the Engine passed the culvert, he felt a jerk, which came from the front of the engine as if a wheel had jumped. Along with this jerk, he was thrown against the look-out window, with his head outside and body inside the cab and received burns and other injuries. He could not say what was happening in the cab. While approaching the level crossing, the Driver had his hand on the brake handle, but he could not say whether the Driver was applying the brakes or not, before or immediately after the jerk was felt.

(*v*) *Police Constable Piarey Lal, Mainpuri* had entrained No. 2TF at Mainpuri Kacheri to proceed to Bhongaon. He was on the second compartment from the Engine. After passing Isan Bridge, the train picked up speed and he noted that the train was running faster than normal which is about 30 to 32 m.p.h. On this occasion, he assessed that the train was travelling at not less than 40 m. p. h.

(*w*) *Divisional Engineer (II) Madan Gopal, Allahabad* stated that during his inspection he had not found anything unusual in the length of Gang No. 7 and the running over the Shikohabad—Farukhabad section had not been bad. He had inspected the gang length by Motor trolly on 11th August 1961 and by Inspection carriage on 5th September, 1961. He had noticed that drivers of trains exceeded the permissible speed limit and on these occasions, he had either verbally warned the drivers concerned or had reported the incidents to the Divisional Mechanical Engineer. The reports to the latter were sent in February, May and June 1961.

(*x*) *Divisional Mechanical Engineer (I) J. L. Soni, Allahabad* stated that although he was not personally aware of Drivers complaining about the unsatisfactory running on Shikohabad—Farukhabad section, his Loco Foreman at Tundla had told him that some Drivers had complained, and he had verbally informed the Divisional Engineer regarding the complaint. He had received Inspection notes from the Divisional Engineer regarding Drivers exceeding the prescribed speed limit and the Drivers' concerned were either warned or censured.

(*y*) *Loco Foreman S. K. Saxena, Tundla* stated that one or two drivers had, in August 1961, verbally complained about running on Shikohabad—Farukhabad section being slightly rough, and he had passed on this information to his Divisional Mechanical Engineer when the latter visited the shed a few days later.

IV. OBSERVATIONS & TESTS.

16. (*i*) Permanent Way:

(*a*) Measuring all distances from the centre of culvert No. 98, the following observations were made :

(1) At 119 ft. 7 inch there was a grinding mark on the gauge face of the right hand rail. (2) At 150 ft. an asbestos fibre fixing board, part of electric lamp resistance arrangement of a coach was found lying in the middle of the track, broken into two pieces. (3) At 169 ft. there was a serrated grinding mark on the gauge face of the right rail for a length of 19 ft. (4) At 213 ft. 6 inch there was a mark of wheel mounting on the left hand rail table for a length of 2 ft. 5 inch. (5) At 224 ft. 8 inch there were marks of wheel flanges on the inner jaws of D & O plate sleepers on the right rail side for a length of 84 ft. 4 inch, four lugs and six jaws being broken. On the left rail side, the marks were on the lugs for a length of 26 ft. 3 inch, four lugs being broken. (6) At 227 ft. 4 inch there was a grinding mark on the gauge face of the right rail for a length of 21 ft. 7 inch. (7) At the joint on the right rail at 249 ft., one bolt and nut had snapped. (8) At 268 ft. a junction-box cover was found lying in the track near the right rail. (9) At the right hand joint at 279 ft. there were marks on the nuts of all four fish bolts. (10) At 293 ft. 6 inch, a bolt, size $2\frac{5}{8}'' \times \frac{3}{4}''$, was found lying near the right rail, and there was a rubbing mark on right rail gauge face for a length of 15 ft. 6 inch. (11) At the right hand joint at 309 ft. the four fishbolts with nuts attached had sheared off and the fishplates were lying on either side of the rail. The next rail ahead had been pushed forward for a length of 2 ft. 7 inch. The left hand joint opposite to this was however intact, except that one bolt and nut had sheared off. (12) At 312 ft. 4 inch there was a faint mark on the left hand rail table for a length of 4 ft. 10 inch which may have been made by a wheel dismounting. (13) The joint on the left hand side at 339 ft. had snapped, and the end of the rail was bent inwards while the next rail in front had been pushed or pulled forward by 5 ft. 11 inch. There was only one fishplate lying here. On the right hand side, at 341 ft. 7 inch also the joint had snapped and the next rail had been pushed or pulled 21 ft. 3 inch ahead. The exposed or rear end of the rail table of this rail had been lipped, as if some wheel had mounted over it. No fishplates were found at this joint. (14) Beyond 341 ft. 7 inch the permanent way was destroyed upto the level crossing.

(*b*) All the fishplates including those which had broken loose, for the length of track destroyed were eventually accounted for after recovery from the debris.

(*c*) No loose fishbolts and nuts were found. Fishbolts and nuts recovered from the site of the accident were snapped or sheared except for a few, which remained intact with the fishplates on broken pieces of rails. I travelled by train over the section Shikohabad to Mainpuri on the evening of 29th October, 1961 and at speeds upto 32 m.p.h. did not notice any bad running. Again on the morning of 31st October, 1961, I motor-trollied from Shikohabad to site of accident to have an idea of the standard of maintenance of the track. I found the track to be in generally good condition and the line and level fit for the maximum permissible speed of 35 m.p.h. The percentage of missing cotters was about 20.

(*d*) The three distorted portions of the track at Kms. 1267·28, 1267·93 and 1268·63 were of a sinuous nature. The maximum amount of distortion was 15/16 inch, 7/8 inch and 9 inch respectively. The distance between the first and second distorted portions was 0·65 Km. and that between the second and the third, was 0·70 Km. The gauge and level at these sites were checked and found to be correct to $\pm 1/8$ inch except at one place at Km. 1267·28 where the level was $\frac{3}{4}$ inch lower on the left rail. There was no creep and the joints did not show any signs of jamming.

(*e*) Ten rails taken out from the track in the vicinity of site of accident were weighed. The maximum loss of weight was found to be 4·55 percent, which is within the permissible limit. Similarly the profiles of 10 rails were taken and the maximum wear at rail table and gauge face was found to be about 3/16 inch on each. The area, taken by planimeter, confirmed the percentage loss of weight as obtained by weightment method.

(*ii*) Engine and Tender :

(*a*) The pivot pin of the Bissel wheels had broken off 4½" from the cotter end. The fracture was fresh with crystalline structure and there was no old flaw. The radial wheels had broken off from the yoke frame. On the right hand side the break on the yoke frame had occurred at a place where a strap had been riveted to the frame and had been welded previously. The welded section did not show any flaw. The fact that at this place the frame had been bent away indicated that the fracture was an after-effect of the accident.

(*b*) The left leading coupled wheel showed no marks of damage. The left intermediate coupled wheel showed a skid mark on wheel tread, opposite to the crank pin, about 6" long. There were also three heavy dent marks on the wheel flange, about 1/8" to 3/16" deep at one place. The left driving coupled wheel showed a skid mark on wheel tread in the same position as on the inter coupled wheel. The left trailing coupled wheel showed a skid mark on wheel tread, in the same position as on the inter and driving coupled wheels. There were blueing marks on brake block treads of the inter and driving coupled wheels.

(*c*) The right leading coupled wheel showed dent marks on tyre clips and on balancing weight. The right intermediate coupled wheel showed dent marks on tyre clips, two of them having been uprooted, and dent and scratch marks on the balancing weight. The right driving coupled wheel and the right trailing coupled wheel showed similar marks as for the inter coupled wheel, except that five tyre clips had been uprooted, in the driving coupled wheel, and none uprooted in the trailing coupled wheel. There were slight blueing marks on the brake block treads of the inter and driving coupled wheels but not to such a marked extent as those of the left hand side wheels.

(*d*) The connecting rods and side rods of the coupled wheels on both sides were not damaged. The tender bogie wheels were intact and showed no marks. All spring gear of engine and tender was intact. The main bearing springs were sitting properly and the compensating beams were in good order. The side control spring of the hind track was taken out and the free length was found to be correct. The breather plates were in good order. The wheel gauges of the engine were within permissible limits. The side clearances of the engine wheels were checked and found to be well within the maximum permissible limits. Wheel tyres did not show any root wear. The tread wear was nominal and tyre profiles were more or less true.

(*e*) In the cab, the regulator was found in fully closed position, the reversing lever in 10% foregear, the vacuum brake operating handle in the full-on position. The brake blocks of engine and tender were binding hard on the wheel treads. The engine and tender are fitted with steam brake and S. J. type ejector is provided for train vacuum brakes. The brake handles are synchronized, so that pulling the vacuum brake handle automatically puts on the steam brake also. There was no speedometer fitted to the engine.

(*iii*) Coaches :

Although the four following coaches were badly smashed and damaged, there were no indications to suspect that some defect in the coaches could have caused the derailment.

V. DISCUSSION.

17. *Possible causes of the accident* : The accident could have occurred owing to one of the following causes :

(*a*) Tampering of track.
(*b*) Defect in track or obstruction on track.
(*c*) Defect in Mechanical equipment.
(*d*) Excessive speed.

Each of these causes are discussed in the following paragraphs :

18. *Tampering of track*: The Assistant Commercial Superintendent, Tundla, had passed the site of the accident at about 09·30 hrs. in a push trolly and had not noticed any defect in the track. The gateman of the level crossing gate had not noticed any defect in the track prior to the arrival of the train. No unauthorized person or even gangmen were seen to be working in the immediate vicinity of the site, before or after the Assistant Commercial Superintendent, Tundla, had passed in his trolly. Immediately after the accident although it was noticed that fishbolts and nuts had snapped, and some fishplates were lying loose, no fishbolts were found with the nut removed, i.e. there were no fishbolts and nuts lying loose separately. The snapped fishbolts had the nuts attached to them tightly on the threaded portion. The number of fishplates that should have been in the track in the

ploughed up portion was fully accounted for after clearance of the debris. The total length of rails in this portion, was also fully accounted for, although some in broken or bent condition. Also the probability of any unauthorized persons trying to tamper with the track in broad day light and under the eyes of the gateman of the level crossing is hardly conceivable. Therefore the cause of the accident can definitely not be attributed to tampering of track.

19. (*a*) *Defect in track* or (*b*) *Obstruction on track*: (*a*) (*i*) The track had been inspected by the undersigned by motor trolly right from Shikohabad to the site of the accident. The percentage of unserviceable sleepers was two to three and that of missing cotters about 20, the loss being attributed to theft. These are not abnormal conditions of track. Owing to cotters being missing, the jaws had slightly moved out and faint marks of wheel flanges were observed. But such conditions would not cause a derailment. These marks were found throughout the length between Shikohabad and site of accident and even ½ a mile beyond the site. I am informed that these marks can be found throughout the length between Shikohabad and Farukhabad on the 75 lb. D. H. track. The loss of weight in the rails was found to be within 5 percent. There are about three cases of rail fracture per year, caused by fatigue in the metal, but no broken rails were found on the day of the accident by the keyman when he went on his round. Also, if the derailment was caused by rail breakage, one would expect to find broken rail or rails at the badly distorted portion of the track just beyond Culvert No. 98. But no rails had broken in that portion. The broken rails were found only in that portion where the coupled wheels of the engine had dismounted and ploughed up the track.

(*ii*) If the three distorted portions of the track had been in existence prior to the accident, the one at Km. 1268·63, which was badly distorted, could not have been over-looked by either the gangmen when proceeding to their work site, or the keyman on his round or the gateman on duty near the site of the Assistant Commercial Superintendent when he passed on push trolly. There was no creep or jamming of joints which could have caused such distortion. The D & O plate sleepers have a cross-keel which prevents the track from lateral movement under normal conditions. This keel would be effective, unless, for some reasons, the bed of the track under the plates is disturbed. As seen from the gang chart and as stated by the Permanent Way Inspector, complete overhauling which includes screening of ballast and consequently certain amount of disturbance of track, had not been carried out recently at the site of accident. So unless abnormal conditions existed, the track would not be distorted. The Loco Foreman has stated that in August, 1961, one or two drivers had complained about the running on Shikohabad—Farukhabad section being slightly rough. There is a Complaint Register for drivers at Tundla Shed, where drivers put down any complaints other than those regarding Engine Maintenance which is recorded in the Engine Repair Book. The Complaint Register was examined but there are no entries at all regarding rough running on the section concerned. The Traffic Inspector had also not notified the Permanent Way Inspector regarding any rough running in the current year, although he had occasion to do so last year. There was sufficiency of ballast both between rails and at the haunches. I am therefore of the opinion that the track was in a fit condition to take the classes of engines running in the section at the specified maximum permissible speeds of 35 m.p.h. and 30 m.p.h. respectively.

(*b*) It has been suggested that the Driver may have applied his brakes suddenly because the gate leaves of the level crossing may have been opened and some bus or other vehicular traffic might have been crossing the track. It had also been rumoured that a cowherd had observed the gateman exhibiting a red flag towards the approaching train. But no such cowherd was found, although enquiries were made. The gateman had stated that he closed and locked the gate leaves before the arrival of the train, and in accordance with instructions, he was standing by the gate, with the hand signal flags folded under his arm. Two witnesses, viz., Basta Singh and Bankey Lal, the latter of whom I thought to be a most reliable witness, had stated that the gates were closed by the gateman before the arrival of the train and Bankey Lal, who was at the gate, had also stated that the gateman had his flags folded under his arm. Both have also corroborated the statement of the gateman that, at the time the train was approaching, there were no buses or other vehicles at the gate. Fireman Gurbachan Singh had not observed any obstructions across the track. The Guard of the train, after the accident, also found the gate leaves closed when he came to the level crossing. There is no evidence of any other kind of obstruction across the track. Hence the suggestion the driver may have applied his brakes suddenly on seeing some obstruction across the track is not borne out by the evidence. Besides, an emergency application of brakes would normally not cause a derailment.

20. *Defect in Mechanical Equipment*: (*a*) From the nature of the observations made on the breakages of the pivot pin of the Bissel wheels and the yoke frame of the radial wheels of the engine, I have come to the conclusion that the breakages were the after-effects of the derailment, as no old flaws or other defects were found. The nature of the dent and scratch marks on the right hand coupled wheels of the engine is also consistent with the fact that the wheels, after derailing, were striking against the rails and cast iron sleepers as the wheels ploughed through the track. The dent mark on the flange of the left intermediate coupled wheel was not the usual derailing mark, but judging from the depth and nature of indentation, was caused by a rail-end or a jagged end of a broken rail hitting against it after the track had been uprooted. The skid marks on the left coupled wheels were obviously caused by the brake-blocks binding on the wheels, although no corresponding definite marks were observed on any rail table.

(*b*) As observed, there were no tell-tale marks on the wheels of the tender bogies or the following four coach bogies which would go to indicate that any of these wheels derailed first owing to some defect. The connecting rods and side rods of the engine were undamaged, and hence there could not have been any unbalancing force on the engine to cause derailment. The three small items found lying on the track, viz. the broken insulated fixing board, the junction box cover and the 2-5/8" × ¾" dia. bolt, must have dropped out of one of the four leading coaches, on receipt of the first impact after the engine derailed and lost speed and before the coaches actually telescoped. The first two items would not in any case cause derailment, as they were light and frail. The bolt which could have been one of those holding the buffer to the head-stock, did not show any indication of any wheels having gone over it. Hence none of these items could have caused the derailment.

(*c*) The engine had last undergone POH on 11th February, 1961 and B, C & D Schedules on 5th October, 1961, 13th September, 1961 and 28th October, 1961 respectively. None of the schedules were overdue. The Engine Repair Book did not show any major complaints from the Driver, the only repetitive item worth mentioning being adjustment of brake-gear. But such frequent entries for brake-gear are not abnormal and the brake-gear was found to be in good condition after the accident.

(*d*) The dates when the four derailed coaches underwent periodical overhaul, repacking and oiling are given below:

Coach No.		P		R		O		I.O.H.
CTT 1312	PWP	16-8-60	MAS	22-9-61	MAS	17-10-61	MAS	22-9-61
TLR 4811	AMV	24-12-60	TDL	24-8-61	TDL	24-10-61		..
T 3499	AMP	24-12-60	—	—	ALD	16-10-61		..
GT 9437	PWP	30-9-60	TDL	25-10-61		—		..

It will be seen that no item was overdue. There were no indications of hot-box. No essential part of the engine and coaches were found in the track behind the site of accident. I am therefore of the opinion that the derailment was not caused by any defect in the mechanical equipment of the engine and tender, or of the following coaches.

21. *Excessive speed*—(*a*) Time of Accident: It is unfortunate that the Guard did not note the time of the accident immediately after its occurrence. He noted the time only after he had surveyed the damage and was issuing a memo to Station Master, Bhongaon for help, and the time then was 10·45 hrs. according to his watch. He assessed that it was 8 to 10 minutes after the accident that he noted the time. According to his watch, the accident would have occurred at about 10·35 to 10·37 hrs. Chemist-in-Charge B. N. Gupta, a passenger and a reliable witness, has stated that, according to his watch, the accident occurred at 10·35 hrs. I accept 10·35 hrs. as the time of the accident.

(*b*) Speed: (*i*) As per acceleration time chart obtained from the Railway Testing and Research Centre, Lucknow for a AWD/CWD engine, hauling 8 bogie coaches on the level, on the assumption of 100 per cent efficiency of engine and no steam leakages, it takes 1½ minutes for the train to attain 30 m.p.h. from start after covering a distance of 0·46 miles. For the purpose of calculating the probable speed of the train which was involved in the accident, allowing for efficiency of the engine being less than 100 per cent and allowing for steam leakages, it has been assumed that it took 2 minutes for the train to attain 30 m.p.h. from start after covering 0·5 miles. It may be mentioned here that as per acceleration time chart, it should have taken 8·38 minutes for the train to travel the distance of 3·9 miles between Mainpuri Kacheri and the site of accident, if the train after attaining the speed 30 m.p.h., had continued steadily at that speed. But, as will be seen from what is stated below, it took 7 minutes for the train which met with the accident, to cover this distance.

(*ii*) According to the Guard, the train left Mainpuri Kacheri at 10·28 hrs. but according to the Booking Clerk-in-Charge, Mainpuri Kacheri, the train left at 10·32 hours as per the clock in the station which is regulated with the times of the train guards. If we take 10·28 hrs. as the time of departure, the train took 7 minutes to cover a distance of 3·9 miles. If we take 10·32 hrs. as the time of departure the travel time comes to 3 minutes. The latter time would give an impossibly high figure for speed and may therefore be rejected. Accepting the figure of 7 minutes as the running time, and allowing 2 minutes for acceleration during which time the train would have travelled ½ mile, the speed would work out to, 41 m.p.h. at the least for the remaning distance of 3·4 miles.

(*iii*) Brick Kiln owner S. P. Bhatnagar has stated that after the train left Mainpuri Kacheri and after passing Isan bridge, he felt the train was lurching noticeably. U.P. Constable Piarey Lal has stated that after passing Isan bridge, the train picked up speed. Isan bridge is 1·25 miles from Mainpuri Kacheri. After the distance of 0·5 miles was covered for acceleration in 2 minutes, there would be a distance of 0·75 miles upto the bridge, which the train would have travelled at say the normal speed of 30 m.p.h., and this would take 1½ minutes. Hence in the remaining 3½ minutes the train would have covered (3·9—1·25) miles or 2·65 miles. This would give a speed of 45 m.p.h., just before the accident.

(*iv*) It may not be fair to assess the speed based only on the assumptions made above, as there may be some doubts about the corrections of taking 10·35 hrs. as the time of the accident. For such short distances, a minute this way or that makes an appreciable difference in the calculated speeds. But there is other corroborative evidence that the train was travelling at a high speed. These are mentioned below.

(*v*) Witnesses who were able to assess the speed of the train, such as Chemist-in-Charge B. N. Gupta and U.P. Constable Piarey Lal have stated the speed of the train was not less than 40 m.p.h. thereby implying that the speed might have been higher. Other witnesses such as Gateman Kanauji, Gangman Kamaruddin, Cowherd Basta Singh and Agriculturist Bankey Lal, who have watched other trains pass, have also testified that the train was running at a much faster speed than is normal. The Divisional Engineer, the Assistant Engineer and the Permanent Way Inspector have also testified that they have had to warn drivers on several occasions for exceeding speed limits, sometimes to the extent of travelling at 40 m.p.h.

(*vi*) I have gone through the Joint Train Report for the section Shikohabad—Farukhabad of the last six months, and find that there are a number of occasions when trains hauled by AWD/CWD class engines have made up time to an extent of 1 minute or 2 minutes on the run between stations on loco account, i.e. by speeding up. Making up 1 minute would indicate a speed of 31-32 m.p.h. and making up 2 minutes would indicate a speed of 34-35 m.p.h. Similarly an examination of the record made by the Hallade Track Recorder on the section, made on 18th May 1961 on train No. ITF with a CWD engine, revealed that at one stage, between Km. 1293 and 1294, the speed was assessed to be 72 Km. per hour or 45 m.p.h., the average speed between station about 55 Km. per hour or 34 m.p.h. The Driver must have been unaware that a Hallade Recorder was on the train and it was indeed fortunate that the train did not suffer any mishap, probably owing to the fact that the high speed of 45 m.p.h. was maintained for a short distance only. These facts appear to prove that the drivers have been running at speeds anything upto 50 per cent in excess of the maximum permissible speed.

(*vii*) Some witnesses such as Brick Kiln owner S. P. Bhatnagar, student Satyadev, Rakshak Mata Prasad and Claims Tracer O. P. Saxena have testified that although they could make no assessment of the actual speed before the accident, the train was, in their opinion, travelling at normal speed. The latter estimation may have been based on the fact that sometimes trains have been travelling at speeds in excess of the maximum permissible. Some of these trains run between Tundla and Farukhabad via Shikohabad. The section Tundla—Shikohabad is on the main line, where the maximum permissible speed of AWD/CWD class of engines is 45 m.p.h. Drivers, on the run between Shikohabad and Farukhabad may have thought that they could run at more or less the same speed as on the main line overlooking the fact that because on the Branch line, track was on lighter rails and of lower standard of maintenance, the speed of AWD/CWD class of engines had been restricted to 30 m.p.h. and of other classes of engines permitted on the section to 35 m.p.h.

(*viii*) The extent to which the engine was deeply embedded in the ballast and formation, and the wrenching off of the pony and radial wheels, and the extent of the damages to the following rolling stock, such as the body of the tender being wrenched off and thrown forward, the telescoping of the second coach on the first coach, completely smashing up the body of the first coach, and the telescoping of third and fourth coaches, the wrenching off of the bogie wheel trucks of all the coaches, are definite indications of a very high speed just prior to the accident. I am of the opinion that such damage would not have occurred if the train was running at a speed of 30 miles per hour. The extent of damage indicates that the train must have been travelling at a speed of 45 to 50 miles per hour.

(*ix*) Another evidence of high speed prior to the accident is the distortion of track at three places. The fact that the track was distorted at regular intervals would go to prove that the train was travelling for a considerable distance at a speed far in excess of 30 miles per hour.

(*x*) Considering all the above factors, I have come to the conclusion that just prior to the accident the train must have been travelling at a speed of 45 miles per hour or thereabouts.

22. *Riding qualities of AWD/CWD Engines*: (*a*) The AWD/CWD class of Engines were of American or Canadian manufacture and were obtained for service in the Indian Railways during the Second World War sometime between 1944 and 1945. Originally they were permitted to run on the ex-East-Indian Railway at 55 miles per hour, but as a result of flange force trials carried out in October, 1948 by the Central Standards Office of the Railway Board, it was found that at speeds beyond 55 miles per hour, the engine produced high flange forces and oscillated badly and was prone to rough riding. The Railway Board, under their letter No. 49/467/29/M dated 16th March, 1949, reduced the maximum permissible speed to 45 miles per hour for these engines. As a result of the inquiry conducted by Government Inspector of Railways, Bombay, on the derailment of No. 402 Up Passenger Train, hauled by a CWD engine, between Visapur and Belwandi on the Central Railway on 31st August, 1959, a question arose whether the maximum permissible speed for these engines should not be further reduced to 40 miles per hour. It is however not necessary to go into this matter here, as, for the section Shikohabad—Farukhabad, the maximum permissible speed had been fixed at 30 miles per hour for these engines. It has however not been possible to trace the application for sanction to run this class of engines on the Shikohabad—Farukhabad section, although old records have been scrutinized both in the office of the Government Inspector of Railways, Calcutta, whose jurisdiction covered the ex-East Indian Railway, and in the Eastern Railway Office. The Railway Board, under their letter No. 4575-W(I) Pt. dated 10th August, 1944, decided as a War emergency measure that all new types of engines could be brought into use on the certificates of the Chief Engineer and the Chief Mechanical Engineer of a Railway although the formal application for sanction of the Railway Board was to be obtained afterwards through

the Government Inspector of Railways, as usual. It is likely that the AWD/CWD class engine, after receipt in 1944 or 1945, were permitted to run, amongo ther sections, on the Shikohabad—Farukhabad section at 30 miles per hour by the ex-East Indian Railway on the certificate of the Chief Engineer and Chief Mechanical Engineer, although, as already stated no correspondence can be traced.

(*b*) The reason for high flange forces and oscillation is that these engines are fitted with swing link controlled pony. Swing link arrangement offers little initial lateral control, which causes high flange forces at the leading coupled wheels. Lack of damping permits hunting oscillation and can produce high flange force even on straight track. Hence the maximum permissible speed for these engines had been kept at 45 miles per hour subject of course, to track conditions. On main lines with main line standards of track materials and maintenance and where the maximum permissible speed is 60 miles per hour, these engines are being permitted to run at 40 miles per hour booked speed and 45 miles per hour maximum; but on branch lines, with lighter track materials and lower standard of maintenance, the speed is further restricted. But, owing to the lighter track, the effect of exceeding the lower maximum permissible speed on such track would be more or less the same as high speeds on the main line, and the increase in flange forces will have a marked effect on the lighter track. Oscillations would start and the engine would lurch from side to side, and, under the abnormal conditions set up, would distort the track.

23. *Probable sequence of events* : After passing Isan Bridge, the Driver had increased the speed of the train. As the train gathered speed, the engine must have started lurching, and the track was slightly distorted at Km. 1267·28 and again at Km. 1267·93. Further on, just after passing the culvert at Km. 1268·63, when the speed had further increased there must have been violent lurching causing bad distortion of track. The driver, being now alive to the danger, must have shut off the regulator and quite naturally, put the brakes on full. Or, as his body lurched with the violent movement of the engine, the weight of his body may have caused the brakes to be applied suddenly. Owing to the violent lurching, the left Bissel wheel would have mounted the rail and the Bissel wheels became derailed. The derailed wheels would have continued, in a suspended position, as they could drop only about 3 inches relative to the engine frame, thus damaging the outer lugs of sleepers on the left hand side and the inner jaws on the right hand side. The mounting of the Bissel wheel must have given the jerk which the first fireman Gurbachan Singh felt at the front of the engine. Owing to the dismounting of the Bissel wheels the engine momentarily recovered from the oscillation and went steady for about 85 ft. but the coupled wheels now being without any guide, must have derailed too and ploughed through the track, damaging it beyond recognition. If the brakes had not been applied or had been applied gradually, the engine might have continued to roll on over the ballast and damaged track, for some distance. But with t of the engine and tender was des With the engine and tender sud on the following coaches, there ence is confirmed by the grinding nd the last derailed coach. For in 119 ft. 7 inch and at 169 ft. were on the portion of distorted track which had shifted towards the right. The mounting mark of the left Bissel wheel was at a short distance away from the forward end of the distorted portion.

24. I have examined the service and other records of Driver Bhagita. He joined service in June 1939 and was confirmed as a driver in December, 1950. His last date of visual test was 22nd June 1961. He had 18 hours and 52 minutes rest before coming on duty to run No. 2 TF train on the day of the accident. He had no mental or other worries at the time. His records show a number of minor punishments, but in the last three years, there are only two entries, one for improper examination of his engine and the other for detention to a train.

VI. CONCLUSION.

25. After full consideration of all the facts, and material and circumstantial evidence, I have reached the conclusion that the derailment of No. 2 TF Down Passenger train at Km. 1268·69 between Mainpuri and Bhongaon stations on 29th October, 1961 was caused by the train attaining the high speed of 45 miles per hour, which is far in excess of the maximum permissible speed of 30 miles per hour on the section for AWD engines. The high speed caused excessive flange forces and violent oscillation of the engine followed by distortion of track, and derailment. The sudden application of brakes caused a rapid loss of speed and almost instantaneous capsizement of the engine and the consequent telescoping of the following four coaches. I hold Driver Bhagita, who unfortunately lost his life in the accident, responsible for driving his engine at such a high speed, in contravention of GRs 89(*a*) and (*b*).

26. I am satisfied that the medical relief afforded was prompt and satisfactory, inspite of the comparatively large number of casualties. This was possible, because the accident occurred at a place where the main road between Shikohabad and Farukhabad crosses the railway track and buses and trucks plying on the road were requisitioned to remove the injured to the hospitals.

Yours faithfully,

A. C. KHASTGIR.

Addl. Commissioner of Railway Safety,
Northern Circle, Calcutta.

CALCUTTA-1.
the 19th March, 1962.

M/P(D)214MofT&C—600—29-4-64—GIPS