



GOVERNMENT OF INDIA

MINISTRY OF CIVIL AVIATION & TOURISM

(COMMISSION OF RAILWAY SAFETY)

RAILWAY ACCIDENT INVESTIGATION REPORT

ON

COLLISION OF SG 35 UP BUDGE BUDGE — SEALDAH EMU LOCAL
WITH THE REAR OF ACCIDENT RELIEF TRAIN BETWEEN PARK
CIRCUS AND SEALDAH STATIONS OF EASTERN RAILWAY ON 4.6.81.

SUMMARY

Date	4-6-1981
Time	19.55 hours.
Railway	Eastern
Gauge	Broad Gauge (1676 mm.)
Location	Km. 1/26 on the Up line between Park Circus and Sealdah South Stations on Sealdah-Ballygunge Electrified Section.
Nature of Accident	Rear-end collision
Trains involved	1. SG, 35 Up Budge Budge-Sealdah EMU Local. 2. Accident Relief Train.
Speed	30 Km/h.
System of Operation	Automatic Block System
Number of tracks	Two
Gradient	1 in 500 and level
Alignment	Straight
Weather	Cloudy
Visibility	Good
Cost of damage	Rs. 1,54,000/-.
Casualty	Killed Nil Grievous injury 6 Simple injury 2
Relief arrangements and Medical attention	Satisfactory
Cause	Due to Motorman of SG 35 Up not exercising great caution after passing the semi-automatic signal No. AB. 3 on the Up line in the 'ON' position.
Persons held responsible	Shri C.D. Ghosh, Motorman of SG 35 Up EMU Local.
Important Recommendations	<ol style="list-style-type: none"> 1. Railway to examine the feasibility of improving the drainage of the track between Park Circus and Sealdah in order to avoid repeated failures of automatic signals. [Para 9.1(i)]. 2. Railway to suitably revise the stancilled instructions in the driving cab of CR 277 to lay stress on the speed restriction which a driver must observe after passing an automatic signal in the "ON" position [Para 9.1 (ii)]. 3. Provision of separate Medical Van for Sealdah South Suburban section at a suitable location in the Calcutta Goods Yard, [Para 9.1 (ii)]. 4. Railway to expedite installation of automatic warning system in suburban areas. (Para 9.2). 5. Railway needs to take urgent steps to improve the awareness of the relevant GRs among the Motorman by vigorous safety counselling. (Para 9.3). 6. Railway to conduct ambush checks frequently to detect drivers violating speed limits and taking up with such staff adequately. (Para 9.4). 7. Railways should immediately arrange to conduct a check of all lines electrified with A.C. Traction and ensure that the correct track relays are provided. (Para 9.5). 8. Railway to examine whether it would be possible to alter the design of EMU driving cab to provide a small hood in front and afford more protection to the Motorman as well as the passengers travelling in the compartment behind the cab against the impact of collision. (Para 9.7).

Abbreviations used in this Report

E.M.U.	Electric Multiple Unit.
B.G	Broad Gauge.
C.T.S.S.	Chief Traffic Safety Superintendent.
D.R.M.	Divisional Railway Manager
ACEE	Additional Chief Electrical Engineer.
SI, GRP	Sub-Inspector, Government Railway Police.
ART	Accident Relief Train.
ONE	Over-head Equipment
MFD	Maschinen Fabrik Deutschland.
ADMO	Assistant Divisional Medical Office
POH	Periodical Overhaul.
AT	Antitelescopic
ACB Plate	Anticreep Bearing Plate.
M.S. Canted Bearing Plate	Mild Steel Canted Bearing Plate.
PWI.	Permanent Way Inspector
AEN	Assistant Engineer
DEN	Divisional Engineer
ASM	Assistant Station Master
GR	General Rule
OC	Officer in Charge
Dy. SRP	Dy. Superintendent of Railway Police
TI	Traffic Inspector
AME (P)	Assistant Mechanical Engineer (Power).
AEE/TRS/R	Assistant Electrical Engineer/Traction Rolling Stock/Running
E.P.	Electro-pneumatic
M.R./B.P..	Main Reservoir/Brake Pipe
DSTE	Divisional Signal & Telecommunication Engineer.
AOS (G)	Assistant Operating Superintendent (General).
Dy. CRS (S&T)	Deputy Commissioner of Railway Safety (Signal & Telecommunication)
FIC/Gr. A/RTS	Fitter in Charge/Grade A/Relief Train Supervisor.
RDSO	Research, Designs and Standards Organisation.
DC	Direct Current

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

No. _____/MAC-117. Dated the 1981.

From : S. Subramanian,

Commissioner of Railway Safety Eastern Circle,
14, Strand Road (12th floor),
Calcutta-700 001,

To : The Secretary to the Government of India,
Ministry of Tourism & Civil Aviation,
Sardar Patel Bhavan, Parliament Street,
New Delhi.

Through : The Chief Commissioner of Railway
Safety,
16-A, Ashok Marg,
Lucknow-226 001.

Sir,

In accordance with Rule 4 of the Statutory Investigation into the Railway Accidents Rules 1973, I submit herewith the Report of my enquiry into the Collision of SG. 35 Up Budge Budge—Sealdah EMU Local with the rear of Accident Relief Train at Km. 1/26 on the Up line between Park Circus and Sealdah South Stations on the Sealdah—Ballygunge Electrified B. G. Double line section in Sealdah Division of Eastern Railway at about 20.00 hours on 4-6-1981.

1.2 Inspection and Inquiry

(a) I was informed telephonically of the accident at about 22.00 hours on 4-6-1981 by the CTSS of Eastern Railway when he informed me that no grievous injuries were reported. On the next morning however he informed me that there were three cases of grievous injuries. Accordingly I inspected the site of accident at 10.00 hours on 5-6-1981 accompanied by CTSS, Eastern Railway, Calcutta and other Divisional Officers of Sealdah Division. I also visited the patients in the National Medical College Hospital and the B. R. Singh Railway Hospital as well as the Motorman of SG. 35 Up who was also admitted into the B. R. Singh Hospital.

(b) A Press Notification was issued inviting members of the public having knowledge relating to the accident to tender evidence at the enquiry to be held at Dr. B. C. Roy Institute, Sealdah from 10th to 12th June 1981 or to communicate with me by post. Civil and Police authorities were duly notified.

(c) I conducted the enquiry at Sealdah from 10th June 1981 to 12th June 1981. I could not commence the enquiry earlier as I had to open a diversion for public carriage of passengers in Bilaspur Division of South Eastern Railway on 9th June 1981, the programme of which had already been fixed sometime previously and could not be postponed. On 11-6-1981 I recorded the evidence of Motorman of SG. 35 Up at B. R. Singh Railway Hospital and on subsequent dates recorded the evidence of some more witnesses including some of the injured passengers in B. R. Singh Railway Hospital and the Eastern Orthopaedic Hospital, Howrah.

The following officials were present at the enquiry :—

Railway officials

1. Shri S. K. Basu, CTSS, Calcutta.
2. Shri S. R. Sarkar, DRM, Sealdah.
3. Shri M. S. Pai, ACEE (Loco), Calcutta (on 10-6-1981 only).

Non-Railway officials

1. Shri Raj Mohan Singh, SI, GRP, Sealdah (on 10-6-1981 only).

The evidence of 35 witnesses was recorded including 7 from the public.

(d) In this report, the terms 'right', 'left', 'leading', 'trailing', 'front', and 'rear' where used, are in reference to the direction of movement of SG. 35 up EMU Local.

1.3 The Accident

(a) At about 20.00 hours on the cloudy night of 4th June 1984 Sealdah bound SG.35 Up EMU Local collided with the rear of Accident Relief Train which was stationary at Km. 1/26 on the Up line between Park Circus and Sealdah South Stations on the Ballygunge—Sealdah South Electrified Section of Sealdah Division of Eastern Railway. The stationary Accident Relief Train was waiting outside the Automatic Signal AB. 1 showing 'Red'. Within two or three minutes, the following train SG. 35 UP rammed the ART Van from behind. Prior to the collision the EMU Local had stopped at the previous semi-automatic signal AB. 3 and proceeded ahead accelerating somewhat after passing the level crossing E/1 at Km. 1/40. It was estimated to be travelling at a speed of 30 Km/h at the time of collision.

As a result of the impact the ART was pushed forward by about 8—10 m. The EMU Train came to rest at a distance of 15.2 m. south of OHE mast at Km. 1, 26. The distance between the two trains was measured after the accident at 19.5 m.

The collision resulted in some damage to the MFD Van, the last coach of the ART Van and extensive damage to the driving coach of the EMU. There was no derailment of either of the two trains and no damage resulted either to the track, OHE or signals.

(b) *Visibility*

The weather was cloudy and it had just stopped raining but the visibility was like any other night and was satisfactory under the headlight of the EMU Local. The view however was restricted owing to curves, cuttings and the existence of two over-bridges at the site of accident.

(c) *Casualties*

As a result of the accident, 58 persons were injured. 6 persons including the Motorman of SG.35 Up sustained greivous injuries, 2 sustained simple injuries and 50 sustained trivial injuries. Fortunately there were no deaths.

1.4 *Passenger occupation*

SG.35 Up EMU Local was carrying about 600 passengers against the capacity of about 1500 passengers.

II. RELIEF MEASURES

2.1 (a) Soon after the accident the first information regarding the accident was conveyed by the Gateman of level crossing gate No. 1E to Sealdah South Cabin at 20.00 hours by telephone, who then passed the message to the Control. All concerned were thereafter advised. ADMO, B. R. Singh Hospital left for the site by ambulance, accompanied by another Lady Doctor and other para-medical staff. The Medical Van was also despatched from Sealdah.

(b) Hearing the sound of the collision, some young people belonging to a social club nearby rushed immediately to the scene of accident and arranged to shift all the injured passengers to the National Medical College Hospital and Nilratan Sarkar Medical College Hospital nearby, so much so the Guard of the train did not have to furnish first-aid to any of the passengers. The ADMO, B. R. Singh Hospital did not find any injured passengers at site. On being informed by the public that the injured passengers had been shifted to the National Medical College Hospital, the doctors returned to the B. R. Singh Hospital, picking up one injured person on the way. Even before the ADMO left for the site at 20.20 hours, the Motorman of the train and another passenger had managed to reach B. R. Singh Hospital and were admitted by him before he proceeded to the site. Meanwhile another ADMO at Kamardanga Health Unit of Eastern Railway heard about the accident

at 20.40 hours and reached the site at 20.55 hours. Being informed that all the injured passengers had already been shifted to the National Medical College & Hospital he proceeded there to see the injured passengers. He found that 3 patients had been admitted and about 3 to 4 patients were waiting outside. Some patients had already been rendered first-aid and released. Out of 4 patients waiting 2 patients requested him to get them admitted at B. R. Singh Hospital and accordingly he arranged their admission there. The Medical Van was ordered at 20.20 hours. It left the bar line at 20.46 hours and arrived at platform No. 5 of Sealdah main station at 20.53 hours. It was ready at 21.10 hours and reached the site at 21.55 hours. It was only utilised to provide lighting at the site.

(c) While the police authorities were not aware of any theft of belongings of injured passengers, one of them admitted to the B. R. Singh Hospital mentioned in his testimony that he felt his watch and wallet being snatched in the darkness by some miscreants.

(d) The uninjured passengers of SG.35 Up either dispersed by themselves or were brought to Sealdah by SG.38 Down Local which was stopped at the accident site and worked back.

2.2 *Restoration*

The Government Railway Police officials reached the site at 21.00 hours. Police clearance was given at 22.00 hours. The restoration work started immediately thereafter. The MFD Van returned from the site at 4.43 hours on 5-6-81. The damaged rake of SG.35 Up was cleared from the Up line at 6.07 hours and normal working was resumed at 6.25 hours on 5-6-81.

2.3 *Interruption to traffic*

As a result of the accident a total of 18 trains were cancelled on 4-6-81, in addition to the ill-fated train; 13 were in the Up direction and 5 in the Down direction. During the period of interruption skeleton services were maintained between Ballygunge and the 4 terminii viz. Diamond harbour, Lakshmikantapur, Canning and Budge Budge by short terminating and running 9 special trains. On the morning of 5-6-81 also, a few trains had to be short terminated and worked back as specials till restoration of normal services.

III. THE TRAINS

3.1 The ART (stationary train) was hauled by two steam locomotives. The leading locomotive No. 12352 type CWD was probably manufactured in Canada and was commissioned in May 1949. It had its last POH on 13-2-79 and earned 72,689 Kms after the last POH. The engine was working tender foremost and no Head lamp was provided on the tender. There was no Speedometer/Speedrecorder as it was being utilised only in goods and shunting services. The length of the locomotive was 21.04 metres, and its weight 147.4 tonnes. The engine

was provided with steam brakes only, the braking force on the locomotive being 60.225 tonnes.

The second steam locomotive No. AWD 12197 was commissioned in September 1944 and had its last POH on 8-5-78 and had earned 87963 Kms. after POH. The last trip inspection of this locomotive was done on 3-6-81 in Narkeldanga Loco Shed. The engine was provided with headlights both on the engine as well as on the tender. It was

not however provided with Speedometer Speed Recorder. The length, weight and the braking force of the locomotive were identical to that of leading CWD locomotive.

Coaches

3.2 The details of the coaches of ART (stationary train) are furnished below :—

Coach No. from engine	Owning Railway	Type	Coach No.	Year built	Date of last POH	Return date	AT/Non-AT
1.	ER	CBPR	5728	1938	30-9-80	12/76	Non-AT
2.	ER	RT (Staff Car)	247	1960	30-9-80	9/83	Non-AT
3.	ER	RT (Material Car)	0178	1913	28-4-80	4/83	Non-AT
4.	ER	RT (Material Car)	0179	1915	26-9-80	9/83	Non-AT
5.	ER	RT (Material Car)	241	1936	14-1-80	1/83	Non-AT

The total length of the train including the locomotive is 152 metres and the total weight 474 tonnes. The total braking force on the train was 189 tonnes. The train was fully vacuum braked with two vacuum

cylinders on each coach, all working.

3.3 The details of the coaches of SG.35 Up (Ramming train) are furnished below :—

Coach No. from Scaldah end.	Owning Railway	Type	Coach No.	Year built	Date of last POH	Return date	AT/Non-AT
1.	ER	DT	10992	1965	19-2-80	2/82	AT
2.	ER	NDT	10649	1963	13-11-69	11/81	AT
3.	ER	MC	10418	1970	13-11-79	11/81	AT
4.	ER	NDT	10157	1963	6-10-79	10/81	AT
5.	ER	NDT	11054	1968	6-10-79	10/81	AT
6.	ER	NDT	10672	1963	6-10-79	10/81	AT
7.	ER	MC	10465	1972	6-10-79	10/81	AT
8.	ER	DT	10021	1963	29-6-79	6/81	AT

DT—Driving Trailer Coach, NDT—Non Driving Trailer Coach, MC—Motor Coach.

The total length of the train was 165.8 metres and its weight 285 tonnes and the braking force 227 tonnes. The train was fully air-braked. Four cylinders were provided for each trailer coach and eight cylinders for each motor coach. Out of a total of 40 cylinders 39 were working giving a percentage of effective brake cylinders of 98%.

3.4 Damages

(a) There was no damage to the locomotive of the ART.

(b) The MFD Van of the ART which was the last coach suffered damage to the side panel of the right side rear end. The tail lamp was broken and the beams fixed to the van for lifting jacks etc. were bent and pushed inside. All the equipments inside the last two coaches were scattered here and there as a result of the collision.

(c) *Damage to EMU Coach No. 10992.*

The driving cab of coach 10992 was extensively damaged with parting of the super structure and shift-

ing of bogie towards Ballygunge by about 3 metres; centre pivot was sheared. All the control equipment in the driving cab was badly damaged. The front body was smashed as was the partition of the vendors compartment. The side bearers, sole bar, cattle guard, pneumatic pipe lines etc. were heavily damaged.

(d) *Damage to permanent way.*

There was no damage to the permanent way.

(e) Total approximate cost of damages to the railway assets has been assessed as under :—

(i) Permanent Way	Nil.
(ii) Damage to ART Van	Rs. 4,000/-
(iii) Damage to EMU	Rs. 1,50,000/-
(iv) Signalling	Nil.
Total	Rs. 1,54,000/-

IV. LOCAL CONDITIONS

4.1 The section and the site

(a) The collision occurred at Km. 1/26-28 on the Up line between Park Circus and Sealdah South stations on the Ballygunge—Sealdah South Electrified (25 KV AC) section in Sealdah Division of Eastern Railway. The Railway line in this portion runs from south to north, through heavily built up residential areas. At the accident spot, there is a cutting of about 0.5 metres. After Park Circus station the track runs in a left handed curve of $1\frac{1}{2}^\circ$ (Rad. 1389 m.) followed by a right handed curve of $2\frac{1}{2}^\circ$ (Rad. 778 m.) and again followed by a left handed curve of $1\frac{1}{2}^\circ$ (Rad. 1167 m). Thereafter the alignment runs more or less straight except at the entry to Sealdah station. The collision occurred on the $1\frac{1}{2}^\circ$ curve. The track rises in a gradient of 1 in 500 from Park Circus station upto Km. 1 24-25 and is level beyond.

(b) The permanent way consists of 90R Rails of 12.8 metres length welded in panels of 3 rails. The rails are 14 years old. The sleepers are wooden, laid to N+6 density with ACB plates and M. S. Canted Bearing Plates. The sleepers too are 14 years old though some of them have been replaced subsequently 25% of the sleepers are unserviceable. Fish plates are 45 cms. long and 4 holed. Creep Anchors (Fair V) have been provided at the rate of 12 to 15 per panel. Stone ballast is provided for a depth of 20 cms. below the sleepers.

(c) Signalling

The Ballygunge—Sealdah South Section is a double line section provided with automatic block working with multiple aspect colour light signals (partly 3 aspect and partly 4 aspect). In the Up direction between Park Circus and Sealdah South exist the following signals.

Signal No.	Kilometrage	Description	Intersignal distance
AB/5	2.705	Semi-automatic gate signal controlled by 'A' Class Level Crossing 2E.	
AB/3	2.098	Semi-automatic gate signal controlled by 'A' Class Level Crossing 1E.	607 m.
AB,1	1.464	Automatic signal	634 m.
60	0.88	Manual stop signal controlled by Sealdah South Cabin	584 m.
55, 56, 57	0.621	Intermediate Home	259 m.
53 & 52	0.412	Routing Home	209 m.

While the visibility of signals AB 5 and AB 3 are satisfactory, the visibility of signal AB 1 is not so satisfactory owing to the presence of curves, cuttings and overbridges. When a train stops short of this signal, the visibility of this signal is sharply reduced for a following train. The proper functioning of the signals is also affected by insufficient drainage of rain water from the track.

(d) The kilometrages of stations etc. referred to in this report are reckoned from Sealdah South and are as under :—

Sealdah South	0.00 Kms.
Site of accident	1.70 Kms.
Park Circus	2.93 Kms.
Ballygunge Junction	5.07 Kms.
Budge Budge	25.51 Kms.

There are on an average of 15-16 masts per kilometre in the straight portion and at the site of accident there are 20 masts per kilometre.

(e) Head quarters, system of working and train speeds

The control office is situated at Sealdah, the Head quarters of the division. One Section Controller is in charge of the entire Sealdah South Suburban Section. The Electrical signal maintainer, the signal inspector (Gr. III), DSTE and Sr. DSTE are all headquartered at Sealdah.

The PWI, AEN and DEN are also Headquartered at Sealdah and their jurisdiction in the South section is from 0.00 km to 2/17 kms.

The maximum speed on the section is 80 kms. The maximum speed for EMU trains is 80 kmph. A temporary speed restriction of 30 kms. per hour has been in existence since 27-1-81 covering the accident site owing to theft of Permanent Way fittings.

V. SUMMARY OF EVIDENCE

5.1 (a) *Sri Haradhan Basu*, (witness No. 1) Guard Grade 'C' was working as Guard of ill-fated SG.35 Up on 4-6-81. The train left Ballygunge at 19.45 hours. It was booked to run through Park Circus but stopped at signal No. AB.5 in the 'ON' position from 19.48 to 19.50 hours. It again stopped at AB.3 in the 'ON' position from 19.52 to 19.54 hours. After he had proceeded some distance beyond AB.3 the Guard experienced a severe jerk and fell down on the floor of the cab. All the lights of the train went off. The Guard then went to the front suspecting an accident. He found that the leading coach of his train had rammed into the rear of the MFD Van which was standing near signal AB.1. He could not find the Driver of SG.35 Up in the cab or nearby. He came to know from the passengers that all the injured persons had been shifted to the nearby hospitals by some local boys who rushed to the site as soon as the accident happened. He then arranged to protect his train in the rear and passed a memo to ASM, Park Circus informing all concerned about

the accident at 20.45 hours. He looked out for any injured passengers with a view to rendering first-aid but could not find any as all had already been shifted to the hospitals by the local boys.

(b) Answering questions the Guard stated that he personally saw the signal No. AB.5 showing Red. The Motorman, after stopping the train at the signal for the prescribed time interval, proceeded cautiously upto the next signal AB.3. Asked at what speed it was travelling then, he replied that he estimated the speed to be 25 Km/h. The train again stopped at AB.3 when the Motorman gave a single bell code. The Motorman waited for 2 minutes and started proceeding cautiously upto the level crossing No. 1/E ahead. Within 3 minutes thereafter he felt the heavy jerk of the collision. He could not remember whether there was any application of brake prior to the impact. The speed of the train was not that fast that he could feel any application of the brake. The weather was cloudy with lightning and thunder but it was not raining. The visibility was like that of any other night and the signals were quite clearly visible. According to him the speed of the train at the time of impact was about 8 to 9 Km/h. He confirmed that the Motorman had no difficulty in bringing his train to a stop wherever he was required to stop on the run from Budge Budge to Sealdah. The brake pressure was about 2 Kgs. per sq. cm. After the impact he found a distance separating the MFD Van and SG. 35 Up. was 4 metres.

5.2 (a) *Sri Bidyut Neogi*, (witness No. 2) son of Rabindra Nath Neogi, 1/1, Dihi Sreerampur Road, Calcutta-14 was one of the members of 'Paribartan' Club situated at 35/R, Christopher Road, Calcutta-14. At about 19.55 or 20.00 hours on 4-6-81, while he was playing in the club, he heard a loud report of train collision and rushed out to the spot along with his friends. He found that SG.35 Up had collided with MFD Van and heard the cries of a number of injured passengers from various compartments of the EMU. He immediately organised rescue operation and arranged to extricate all the injured passengers and send them by road to the National Medical College Hospital or Nilratan Sarkar Medical College Hospital nearby.

(b) Answering questions Sri Neogi stated that it had just stopped raining at the time of accident and the visibility was just like that on any other day. The sound of the collision could be heard loudly just like bursting of a cracker. According to him about 29 injured persons were sent to the National Medical College Hospital and some more injured persons were taken to N.R.S. Hospital.

5.3 *Sri Alope Chakraborty*, (witness No. 3) son of Sudhir Chakraborty, 35-R Christopher Road, Calcutta-14 was also in 'Paribartan' club at the time of accident. He generally confirmed what Sri Neogi had stated. They were the first to reach the site of accident and did not find the Motorman trapped inside the cab. They did find some injured people inside the Vendor's compartment just behind the Motorman's cab. After the accident the distance between the two trains was about 8 to 10 metres.

3-343 Deptt. of CA/89

5.4 *Sri Uma Prosad Acherjee*, (witness No. 5) son of Ramani Ranjan Acherjee, CIT Buildings, Christopher Road, Calcutta-14 was also inside 'Paribartan' Club. He stated that he had reached the site of accident within 3 to 4 minutes along with other members of Club and rescued all the injured passengers and arranged to send them to different hospitals. He did not find any person trapped inside the cab. He did not particularly look for the tail lamp of MFD Van.

5.5 *Sri Pijush Roy Chowdhury*, (witness No. 6) son of Pabitra Roy Chowdhury, 35 R, Christopher Road, Calcutta-14 stated that he was also a member of 'Paribartan' Club. He generally confirmed the testimony of the previous 3 witnesses.

5.6 (a) *Sri S. K. Dey*, (witness No. 7) Motorman, Sealdah. Sri Dey had worked the EMU from Sealdah to Baruipur and back between 7.00 hours and 8.47 hours in the morning of 4-6-81. He found the rake with 6 traction motors in service and the brake power of the unit was quite good. He did not have any difficulty in stopping the train. The unit was also fitted with a flasher light.

(b) Answering questions Sri Dey replied that when he worked the train on that day he had no difficulty in stopping the train either at the platform or short of any signal showing Red as he had adequate brake power. He had tested the wind screen wiper and found it working though he did not have any occasion to use it during the run.

5.7 (a) *Sri Tarapada Banerjee*, (witness No. 8) Motorman, Sealdah worked the same Unit from Sealdah to Canning and back on the day of the accident (From the records it is seen that he had worked the train from 8.56 hours to 12.15 hours in the afternoon). When working this Unit he did not experience any trouble whether electrical, Mechanical or pneumatic. The brake power of the Unit was found to be quite good and the headlight in working order. He had no difficulty in maintaining the running time in both the directions.

(b) Answering questions Sri Banerjee stated that the maximum speed that one could achieve between Park Circus and Sealdah South station could be upto 70 Km/h provided all 6 traction motors were working but normally the motorman do not run at speeds more than 30 to 40 Km/h. On the day of the accident, he did not experience any difficulty in stopping his train either at the station or at the signals. He had checked the headlight before starting from Sealdah (in the day time) had found that the headlight was burning properly.

5.8 (a) *Sri R. S. Das*, (witness No. 9) Motorman, Sealdah worked the same Unit between Sealdah and Diamond Harbour on 4-6-81 (from the records it is seen that he had worked his Unit from 13.06 hours to 17.30 hours i.e. just before the ill-fated train was worked by Sri C. D. Ghosh. He found that the brake power of the Unit was quite good and he experienced no trouble on the run from Sealdah to Diamond Harbour and back. The train ran to time in both the directions and all the safety items of both end

driving cabs were intact. The Unit was also fitted with flasher light.

(b) Answering questions Sri Das stated that the normal average speed at which he ran between Park Circus and Sealdah did not exceed 40 Km/h. When specifically asked at what speed he would proceed after passing an automatic signal in the 'ON' position where due to curvature the track ahead could not be seen, he replied "Walking speed". He was not aware of the specific speed limit of 8 Km/h prescribed in GR 277(2) in such situations. He again confirmed in answer to a specific question that he did not experience any difficulty in stopping the train during the run, as he found the brake power adequate.

5.9 *Dr. N. N. Mukherjee*, (witness No. 10) ADMO, B. R. Singh Hospital received intimation from the Control Office about the accident at 20.05 hours. He left the hospital at 20.20 hours along with Dr. Mrs. A. Mukherjee and other para medical staff to the site of accident reaching there at 20.30 hours. Before leaving the hospital he admitted two injured persons Sri C. D. Ghosh, Motorman and one passenger of the ill-fated train who had managed to reach B. R. Singh Hospital by that time. On reaching the site he did not find any injured person and was informed by the local people that all the injured passengers had already been shifted to National Medical College and N. R. S. Hospitals.

5.10 (a) *Dr. B. N. Das*, (witness No. 11) ADMO, Kamardanga Health Unit came to know about the accident at 20.40 hours from the local people and he immediately rushed to the site of accident. He found that all the injured people had been shifted to National Medical College Hospital. He proceeded there and on being requested by some other patients he shifted them to the B. R. Singh Hospital.

(b) Answering questions he stated that from the condition of the damaged driver's cab he felt that it would not have been possible for the Motorman to survive had he been entrapped inside the cab and death would have been instantaneous. He did not notice whether any tail lamp was burning in the MFD Van.

5.11 (a) *Sri Ajit Kumar Mondal*, (witness No. 12) ASM North Cabin, Ballygunge was on duty from 14.00 hours to 22.00 hours on 4-6-81. The MFD Van left Ballygunge at 19.35 hours and while passing his cabin he found that the electric tail lamp of the MFD Van was burning very brightly.

(b) Answering questions he stated that after 19.30 hours the weather was cloudy with no rain and the visibility was clear. The tail lamp of the MFD, being an electric tail lamp was almost as bright as that of an EMU train. At the time the MFD Van passed his cabin he had Leverman Sri Swapan Ghosh with him in the cabin (the Leverman also confirmed later that the tail lamp was burning brightly).

5.12 (a) *Sri R. K. Chatterjee*, (witness No. 14) Section Controller was on board No. 3 from 16.00 hours to 22.00 hours on 4-6-81. At 20.10 hours he received an intimation from the ASM Sealdah South cabin that SG.35 Up had bumped into the rear

of MFD Van standing near automatic signal AB.1. He immediately informed the Dy. Controller (passenger chasing) for taking necessary action immediately. He also issued necessary instructions to stop all the Up and Down trains.

(b) The Medical Van was offered from Sealdah Goods Yard at 21.35 hours and left at 21.45 hours for the site.

5.13 (a) *Sri Sachindra Nath Moitra*, (witness No. 15) Signal Inspector (South)-I Sealdah came to know about the accident at 21.00 hours on 4-6-81. He reached the site at 21.45 hours and found that signal AB.1 was showing 'Red' and the Accident Relief Train was stationary, well clear of the signal. There was some damage to the last vehicle of the ART. The Driver's cab of the EMU was in a totally damaged condition. He enquired from Sri Fulchand, on duty Gateman, as to how the accident happened. The latter told him that after the Accident Relief Train passed, he opened the level crossing gate for allowing road traffic. He immediately received indication in the panel about the approach of another train. He closed the level crossing gate again. The approaching train waited at AB.3 Signal for a minute, came slowly unto the gate and thereafter started accelerating. Within a few moments it had collided with the Accident Relief Train.

(b) He was asked whether there were frequent failures of signals between Park Circus and Sealdah. In reply he stated that there were many failures due to water-logging of the track particularly near Signal No. AB.1. When the water level subsided, the signal resumed working by itself without human intervention. Sometimes the signals failed owing to miscreants' activity also.

5.14 (a) *Sri Chaitanya Das Ghosh*, (witness No. 19) Motorman, Sealdah was incharge of the train when the accident took place. He had worked it from Sealdah to Budge Budge and was returning to Sealdah. The headlights at either end were very dim. Wipers at both ends were not working and the brake power of the train was weak. He left Ballygunge at 19.45 hours and encountered AB.5 in the 'ON' position. He stopped at AB.5 for 2 minutes from 19.48 to 19.50 hours and after exchanging bell code with the Guard he proceeded cautiously. He was feeling dazzled by rain drops and had no mind to move but was being threatened to do so by some unruly passengers. He next found signal AB.3 in the 'ON' position. He stopped at the rear of it for 2 minutes from 19.50 hours to 19.54 hours and again after exchanging bell code signal with the Guard proceeded ahead cautiously "in the midst of rain" keeping a sharp look out ahead. After he had travelled for 5 to 6 minutes he found a shadow ahead at a very close distance and immediately applied the emergency brakes and released the 'dead man' in order to stop the train. Unfortunately it rammed against the rear of the ART. The ART did not have tail lamp in the rear. No Guard was booked to work the ART. It appeared to him as if the ART was slowly moving backward. After the impact he was locked inside the cab and was rescued by some members of the public who broke open the protecting wire mesh

and the look-out glass on the left hand side of his cab. He was taken to B. R. Singh Hospital and was admitted there for treatment.

(b) Answering questions he stated that he did not have any difficulty in controlling the train from Budge Budge. He found that the brake power of the train "was not very much effective but it was average". He saw the MFD Van from a distance of 15 to 20 metres. He was going at a very slow speed at the time of the accident, practically rolling. He could not recollect whether the Speedometer was there or working. The focussing of headlight was not very good and he could hardly see 20 to 25 metres on the run. The wind screen wiper was not at all working. When asked why he worked the train under such bad conditions he stated that it was not so bad that he could not run the train and with his usual experience he was able to work the train. When asked why he did not send for the Guard at Park Circus when he found signal AB.5 in the Red, he replied that he did think of asking for the Guard's assistance but he was threatened by the commuters who banged on the partition and asked him to start the train. When asked as to how his cab could have suffered such severe damage if he travelled at about 8 Km/h at the time of impact, he replied that it could have been damaged as a result of uneven distribution of the forces of impact on the cab. He had no family problems exercising his mind at the time of working the ill-fated train.

5.15 (a) *Sri B. R. Dutta*, (witness No. 20) PWI, Scaldah was among the first to reach the site of accident at 21.00 hours on 4-6-81 along with Assistant Engineer, (Headquarters) Scaldah. He noticed that after the collision the MFD Van was pushed forward towards Scaldah by 18 m. (504) and the EMU had then gone backwards by 1.4 m. (4' - 9"). There was no damage to the permanent way. The driving cab of the EMU was heavily damaged and its front trolley had shifted nearly 3 m. towards in rear.

(b) Answering questions Sri Dutta stated that he found the tail lamp of the MFD Van broken with small glass pieces sticking to the holder. He had imposed a speed restriction of 30 Km/h between Park Circus and Scaldah South due to theft of permanent way fittings. He had deployed patrolmen in two batches to patrol the track because of theft. He had received verbal complaints from the Signalling Branch about water logging in the area leading to track circuit failure. He had arranged to impress upon the Corporation authorities to clean the underground rains in the vicinity. He felt that there was need to lift the track in this location to improve the drainage which would mean major work in lifting the flyover bridges.

5.16 (a) *Sri J. L. Dasgupta*, (witness No. 21) Dy. SRP, Scaldah received intimation about the accident at 20.35 hours. He reached the site at 21.35 hours. His OC along with some constables had already reached the spot. He found the Motorman's cab badly damaged and the MFD Van with some damage in the rear. He was informed that the injured

persons had already been shifted to the hospitals nearby by local people.

(b) Answering questions he replied that he received no complaints at all from the injured passengers about looting of personal belongings by the miscreants after the accident. According to the information gathered by his OC from the members of the public the tail lamp of the MFD Van was burning at the time of accident. He was informed by the staff of the MFD Van that the head lamp of SG.35 Up was burning somewhat dimly.

5.17 (a) *Sri B. K. Banerjee*, (witness No. 22) FIC Gr. 'A'/RTS was incharge of the MFD Van and was returning to Scaldah after rereiling a derailed engine at Ballygunge. The Accident Relief Train stopped at Park Circus station at 19.40 hours as signal AB.5 was red, and started at 19.42 hours. It again stopped at signal AB.3 for 2 minutes as it was Red. Since the next signal AB.1 was also in the 'ON' position, the train stopped at AB.1 at 19.54 hours. Within a minute of stopping at the signal, SG.35 Up bumped against the rear of the MFD Van at 19.55 hours. There was considerable damage to the MFD Van itself and though the other vans did not get damaged structurally all the materials and the equipment inside got displaced and violently scattered inside the vans as a result of the collision. On getting down from the train he observed that the leading coach of the EMU was badly damaged. He learnt that the Motorman Sri C. D. Ghosh was injured and removed to hospitals along with other injured passengers.

(b) Answering questions he mentioned that before leaving Ballygunge he had personally checked along with TI/Safety that his tail lamp was burning brightly. There was a slight drizzle when he passed through Park Circus but it had stopped drizzling when the train stopped at signal AB.1. After the accident he went back to the MFD Van and found that the glass of the tail lamp was broken and the holder and the cap of the bulb were intact. He also saw the filament of the bulb. (The DRM also confirmed that he reached the scene of the accident about an hour later, and saw the filament of the bulb in the tail lamp). From the way in which the equipment and other materials were strewn about inside the coaches of the ART and the fact that the foundation bolts of generator weighing half a tonne were broken, he was positive that the speed of impact was much higher than 8 Km/h and could be about 40 Km/h. He reached the cab of the EMU within 3 to 4 minutes of the collision. He was informed that the Motorman had been taken to the hospital. Had he been trapped inside the cab it would not have been possible to have extricate him and send him to the hospital in the short period of time.

5.18 (a) *Sri Chandra Prasad*, (witness No. 23) Fitter was travelling in the MFD Van when his train was stationary at signal No. AB.1. He noticed another Up train approaching his train without stopping and colliding with his train.

(b) Answering questions he stated that one person sitting in the rearmost portion exclaimed that a train

was coming towards them. This was within a minute of his train stopping at the signal at Sealdah (Signal AB.1). They all started shouting hoping that the following train would stop but it collided against the train all the same. The headlight of the EMU was not very bright but was clearly visible from 100 metres. He could not estimate the speed of the approaching train. He was positive that his train did not move back after coming to a halt at signal AB.1.

5.19 (a) *Sri Jadu*, (witness No. 24) Fitter was travelling in the rearmost portion of the MFD Van. The train had stopped at three signals and while it was stationary near signal AB.1 he saw another train coming towards his train. Within a moment the train bumped into the rear of MFD Van. All the staff travelling in that van fell down on the floor. While some of them sustained slight injuries none of them sustained serious injuries. The materials inside the van were scattered here and there.

(b) Answering questions he specifically mentioned that he noticed that his tail lamp was burning all right when his train passed level crossing No. 2/E (i.e. shortly before its stopping at signal AB.1). The headlight of the following train was not very bright but he could see it from a distance of 100 metres. He could not estimate the speed of the following train but he observed that the train did not reduce the speed till the moment of collision. The weather was clear and the visibility was normal at the time of the accident.

5.20 (a) *Sri Bulla*, (witness No. 25) Driver Gr. 'C' worked the Accident Relief Train from Ballygunge to Sealdah. Leaving Ballygunge at 19.35 hours he was proceeding very cautiously and successively stopped at signals AB.5, AB.3 and AB.1 which were all red. Within a few second of stopping at signal AB. 1 the SG.35 up Local had bumped into the rear of his train at 19.55 hours.

(b) Answering questions he replied that he had stopped the train about 8m (25') behind signal AB. 1 by destroying the vacuum and restored the vacuum handle back to the running position. His train did not move backward even by an inch. After the impact his engine had been pushed forward by about 6 metres. Due to the impact all had fallen down on the engine floor. Questioned about the safety equipment in his possession he mentioned that he carried complete equipment except the Rule Book.

5.21 (a) *Sri K. R. Roy Chowdhury*, (witness No. 26) Driver Narkeldanga Loco shed was the Driver of engine No. 12197 CWD. He generally corroborated the statements of Driver Bulla of the leading engine.

(b) Answering questions he stated that the collision took place within less than a minute of his train coming to a halt at signal AB.1.

5.22 (a) *Sri B. Chakraborty*, (witness No. 27) Motorman, Sealdah had worked the same rake on

3-6-81 from Sealdah to Krishnanagar and back. According to him the brake power of the Unit was quite good and he experienced no trouble while on run from Sealdah to Krishnanagar and back. He found that the safety fittings of the driving cab, wipers, headlight, flasher Unit, Deadman's device etc. were all in perfect working order.

(b) Answering questions he stated that he worked the train between 15.27 hours and 21.10 hours on 3-6-81. He found the brake power was quite good and no cylinder was isolated. The brake pipe pressure was 2.4 Kg/cm during the entire run. He found no difficulty in stopping the train when the train was going at a very slow speed, such as 8 to 10 Km/h. The condition of head lamp was quite good and the focussing was satisfactory enabling him to see upto a distance of 3 masts. The wind screen wiper was working but since it was not raining he did not have to use it.

5.23 (a) *Sri B. C. Sarkar*, (witness No. 28) Guard, Sealdah was working as Guard of SL 256 Down EMU Local from Sealdah to Lakshmikantapur on 4-6-81. He left Sealdah station at 19.41 hours and arrived Park Circus station at 19.46 hours. While approaching Park Circus station he noticed the MFD Van standing on the Up line at signal No. AB.3. He found the tail lamp of the MFD Van burning brightly.

(b) Answering questions he stated that he happened to notice the tail lamp of MFD Van as his curiosity was aroused when he saw the MFD Van stopping at AB.3. While passing he noticed that the tail lamp was burning brightly and was fixed on the right side of the Van. Proceeding he saw the SG 35 Up near signal AB.7 and the time interval between the two was about 4 minutes. Asked about the weather condition and the visibility at the time of mishap he replied that it was not raining but cloudy and the visibility was normal.

5.24 *Sri Swapan Kumar Ghosh*, (witness No. 29) Leverman, Ballygunge was on duty at Ballygunge North Cabin from 14.00 hours to 22.00 hours on 4-6-81. He saw the MFD Van passing his cabin and noticed that the tail lamp of the MFD Van was burning brightly. It was an electrical tail lamp located on the right side.

5.25 *Sri H. N. Bhattacharjee*, (witness No. 30) Assistant Electrical Engineer(R), Sealdah received the first information about the accident at 20.05 hours. He reached the site of accident at 21.15 hours by road along with ANE (Power). When he reached the site he found all the injured passengers had already been shifted to the nearby hospitals. Neither could he find the Motorman of the train. He described in detail the damage to the cab of SG 35 Up. He found that the MFD Van had an electrical tail lamp which appeared to have been smashed in the collision. He could however see the portion of the bulb cap in the holder as well as the prongs holding the filament. He found the brakes of the EMU in a fully released condition and the air reservoirs fully empty. He estimated

the speed at the time of impact to be between 20 and 25 Km/h. Giving his observations of the brake cylinders of the EMU he stated that out of 40 brake cylinders only one brake cylinder was isolated and both the compressors were in a perfect working order. The brake power of the rake was 98% and fully effective. This was verified subsequently in a joint trail.

5.26 (a) *Sri G. C. Ghosh*, (witness No. 34) Assistant Mechanical Engineer (Power), Sealdah Division received information at 20.05 hours on 4-6-81 about the collision of SG 35 Up with the MFD Van. He reached the accident spot at 21.15 hours along with AEE/TRS/R Sri H. N. Bhattacharjee (witness No. 30). He found that all the injured passengers had been removed to hospitals by the local people. He found that some of the staff of the MFD Van sustained trivial injuries.

(b) Answering questions he stated that the right side rear end of the rear coach side panel of the MFD Van was damaged, tail lamp broken and the beam of the lifting jacks attached to the rear of the MFD Van at top was also damaged. He found the brakes of the ART Van in the released position. He did not make efforts to find out the distance by which the train was pushed forward as a result of the collision. He estimated the speed of SG 35 Up at the time of collision as about 30 Km/h.

5.27(a) *Sri Phulchand Bhaskar*, (witness No. 35) Gateman of 1E level crossing stated that he was on duty at the level crossing No. 1E at the time of collision. The ART Van had just passed the level crossing and come to a halt in rear of signal No. AB.1 which was showing Red. The tail lamp of ART Van was burning. Within two minutes of the passage of the ART Van he received indication in his panel of the approach of another train. He lowered the lifting barriers but did not take off signal AB.3 SG 35 approached and after stopping for two minutes at the signal proceeded ahead, slowly at first but accelerating thereafter to about 35 Km/h. He tried to alert the motorman about the train ahead but the motorman did not notice him. After about a minute he heard a loud sound of collision. After protecting the level crossing with red hand signal lamps, he conveyed information about the collision to the South Cabin on the telephone.

(b) Answering questions the witness stated that he saw the tail lamp of the MFD Van burning brightly. The Budge Budge Local SG.35 Up was coming slowly upto the level crossing and started picking up speed thereafter. He found only the Motorman travelling in the cab and none else. The speed of the SG.35 Up at the time of collision was approximately 30 to 35 Km/h. The headlight of EMU was quite bright just like that of any other EMU local and the focus of the headlight was also as good with the beam being thrown downwards only.

5.28 *Sri Shyamjiban Bairagi*, (witness No. 36) staying at 43/B, Sudhir Chatterjee Street, Calcutta-6 was travelling in the second coach of the driver's cab of the ill-fated train. He stated that the train was

travelling smoothly. The train stopped for one minute at the signal (the signal referred to being AB.3) and gradually started picking up speed of about 30 to 40 Km/h approximately. All of a sudden his train bumped against a train standing ahead as a result of which he was thrown from his seat and lost consciousness. He was severely injured in his right leg and shifted to Chittaranjan Hospital by the local people. He was finally shifted to B. R. Singh Railway Hospital at 2 A.M. on 5-6-81.

VI. TESTS AND OBSERVATIONS

6.1 Position of controls in the driving cab of SG.35 Up

The damaged driving cab of the ill-fated train SG 35 Up was checked by AEE/R/Sealdah at 22.00 hrs. on 4-6-81 and it was observed that the E. P. Key was in a charged condition on the brake controller. The driver's key was in position. The E. P. unit, M.R./B.P. cock, Brake cylinder bogie isolating cock were all normal. The speedometer was defective. As a result of the collision the driving cab was smashed and consequently the brake controller, Master controller Headlight stabiliser terminal boards, gauges, look out glasses etc. were all heavily damaged.

6.2 Brake tests of the rake

A brake test was conducted on 8-6-81 jointly by AEE/TRS-R/Sealdah, DSTE/ Sealdah and AOS(G)/ Sealdah by attaching a separate driving trailer to the 7 coaches of the EMU, care being taken to simulate the conditions under which the ill-fated train ran by ensuring the identical number of active and isolated brake cylinders. The results of the trial are enclosed as Annexure I. It was found during the trial that the brake power of the rake was fully satisfactory.

6.3 Joint test regarding the visibility of the signals

A joint test was conducted on 11-6-81 in which Dy. CRS (S&T), Calcutta also participated. The test was conducted as follows :—

The ART was stationed between signal AB.1 and AB.3 such that the last vehicle was at Km. 1/26 in the same position as was the MFD Van of the ART on the day of the accident. The observations were made from the driving cab of a following train, SL 255 Up, Ex. Ballygunge to Sealdah South with regard to the visibility of the signals and the MFD Van. It was seen that the tail lamp of the MFD Van was visible from the driving cab of the following train from OHE mast No. 2/4 i.e. a distance of about 1.02 Kms. Signal AB.1 was not visible from the cab of the EMU after passing AB.3 owing to the curvature of the line and the obstruction by the ART. At this stage a prearranged signal was given to the MFD Van to switch off the tail lamp in order to assess the visibility of the MFD Van under 'no tail lamp condition' as claimed to be the case by the Motorman of the ill-fated train. The last coach of the ART was distinctly visible from a distance of 73 metres. The visibility of the headlight was about 2½ mast length viz. 150 metres. The EMU train was moving at a slow speed of about 8 Km/h. As

soon as the last van was sighted the emergency brakes of the EMU were applied, (the dead man's handle was lifted). The train stopped within 5 metres.

6.4 Another test was conducted about a month later using the same rake which was involved in the accident (but with a different driving trailer). A substitute tail lamp was erected at Km. 1/26 such that it occupied the same position in space as the tail lamp of the MFD Van of the ART on the day of the accident. The observations about the visibility of the substitute tail lamp, signal AB.1, the speed achieved and the braking distance are enclosed as Annexure II. The observations are briefly as under :—

Signal No. AB.3 was visible from EP 2/20 at a distance of 503 metres. The substitute tail lamp was visible from location 2/12 from a distance of 671 metres. The signal No. AB.1 was visible from EP 2/10 over a distance of 764 metres, but disappeared from view at a distance of 580 metres and again became visible from a distance of 517 metres. After stopping at signal AB.3 the train was driven slowly (at a speed of about 10—15 Km/h) upto the level crossing gate No. 1E (as claimed by the motorman of the ill-fated train). The train was then accelerated from the level crossing gate till E/S 1/30, a distance of 383 metres. The speed achieved was slightly less than 30 Km/h. The emergency brakes were then applied and the train came to a stop over a distance of 22 metres, well before the substitute tail lamp. All these trials were conducted with empty stock. It would be pertinent here to emphasise the difference between this trial and the one referred to in paras 6.3 above. While the earlier trial conducted on 11-6-81 was with ART standing at signal No. AB.1 in the same position as on the day of the acci-

dent, the later trials on 6-7-81 were conducted by keeping a substitute tail lamp at location 1/26. While in the former case the visibility of AB.1 was totally impaired owing to the presence of the ART ahead, in the latter case the signal AB.1 kept appearing and disappearing from view while the EMU was on the run, owing to the existence of the reverse curves and fly overs at this location.

VII. DISCUSSION

7.1 Time of the accident

According to the testimony of the Guard of the ill-fated train Sri Basu [Para 5.1(a)] the train stopped at signal AB.3 till 19.54 hours. It then travelled slowly upto the level crossing and within 3 minutes thereafter he felt a heavy jerk of the collision. Assuming the train took 4 minutes in all, the time of collision would be 19.58 hours. According to the testimony of the Motorman Sri C. D. Ghosh [Para 5.14(a)] the collision occurred within 5 to 6 minutes after passing signal AB.3 at 19.54 hours. This would place the time of collision as 20.00 hours. According to Sri B. K. Banerjee, FIC of the MFD Van [Para 5.17(a)] the collision occurred within 1 minute of the MFD Van stopping at signal AB.1 at 19.54 hours. This would place the time of collision at 19.55 hours. Sri Bulla, Driver of the ART Van [Para 5.20(a)] also testified that the collision occurred at 19.55 hours. Accordingly I place the time of the collision as 19.55 hours.

7.2 The speed of the train at the time of the accident

(a) The following witnesses have given the evidence regarding the speed of the train as under :—

Name of witness	Witness No.	Evidence regarding speed.
Haradhan Basu, Guard	1 [Para 5.1(a)]	8 Km/h.
C.D. Ghosh, Motorman	19 [Para 5.14 (b)]	Very slow just rolling
Phulchand Bhaskar	35 [Para 5.27 (a)]	35 Km/h.
Shyamjiban Bairagi	(36 Para 5.28)	40 Km/h.

(b) The following witnesses have estimated the speed of the train based on the damages as under :—

G.C. Ghosh, A.M.E (P)	34 [Para 5.26 (b)]	30 Km/h.
B.K. Banerjee, FIC	22 [Para 5.17 (b)]	40 Km/h.

(c) After taking into account the extent of damages to the cab and other relevant factors, I conclude that the speed of the train at the time of the accident was 30 Km/h.

7.3 Cause of the accident

The Motorman of SG 35 Up encountered signal AB.5 at the Sealdah end of the platform at Park Circus station in the 'ON' position and after waiting for two minutes he proceeded with great caution and again encountered automatic signal AB.3 in the 'ON' position. After stopping there for the prescribed time interval he proceeded further at a slow speed

upto level crossing No. 1E. After finding that the gates were duly closed, he seems to have accelerated his speed to about 35 Km/h in contravention of GRs 277, 279 and 283 when he suddenly found the MFD Van of the ART just ahead (as per his own testimony). It was too late at that instant to apply the brakes and bring his train to a stop to avoid a collision. He therefore collided with stationary train ART at a speed of about 30 Km/h causing injuries both to himself and a number of passengers in his train.

7.4 Why did the Motorman cause the accident ?

The Motorman Sri C. D. Ghosh has stated in his testimony (Para 5.14) that he could not avoid the accident in view of the following circumstances :—

- (i) There was no tail lamp in rear of the MFD Van.
- (ii) His brakepower was very weak and hence he was unable to avoid the collision, even though he was working the train "at a very slow speed practically rolling".
- (iii) The wind screen wiper was not working.
- (iv) The headlight was too dim.
- (v) The ART appeared to be backing.

I have examined all these aspects very closely in the light of the evidence gathered during the inquiry but I find myself unable to accept any of the grounds put forth by the Motorman in his defence, as explained in the following paragraphs.

7.5 Brake-power of the EMU SG.35 Up

The motorman has claimed that the brake-power of the train was very weak. In answer to a further question the Motorman admitted that he had no difficulty in controlling the train at any of the halts en route from Budge Budge and that the brake-power was adequate "but not very much effective but it

was average". The three Motormen who worked this rake immediately before Sri C. D. Ghosh (see para Nos. 5.6, 5.7 and 5.8) have all averred that the brake-power of the train was quite good. After the accident it was found that out of a total of 40 cylinders 39 were working and only one was isolated giving a brake-power of 98%. Again, in the trial conducted on 8-6-81 with the same rake but with another driving trailer in lieu of the damaged one, it was found that the brake-power of the EMU was fully adequate and akin to any other normal EMU rake with full brake-power. In this connection it may be mentioned that the attachment of a fresh driving trailer to the unit during the test could not have vitiated the brake-power of the unit as a whole as the equipment available in driving trailer was common in both cases. In view of such overwhelming evidence from various sources about the adequacy of the brake-power, the contention of the Motorman of the ill-fated train that the accident was caused due to weak brakes cannot be accepted.

7.6 Whether the tail lamp of the MFD Van was burning ?

The Motorman claimed in his testimony that there was no tail lamp in the MFD Van of the ART. I have examined this point also very carefully. I find that the following witnesses, have testified that the electrical tail lamp of the MFD Van was burning brightly.

Witness No.	Name and designation
12 (Para 5.11).	Ajit Kumar Mondal, Cabin ASM, Ballygunge.
22 (Para 5.17).	B.K. Banerjee, FIC, Gr. 'A, (incharge of ART).
23 (Para 5.18).	Chandra Prosad, Fitter.
24 (Para 5.19).	Jadu, Fitter.
28 (Para 5.23).	B.C. Sarkar, Guard.
29 (Para 5.24).	Swapan Kumar Ghosh, Leverman, Ballygunge.
35 (Para 5.27).	Phulchand Bhaskar, Gateman, Sealdah.

Even assuming that the witnesses Nos. 22, 23 and 24, being the staff of ART, were interested witnesses, the other witnesses were all disinterested witnesses who had nothing to gain by saying that the tail lamp was burning brightly. Witness No. 28 Sri B. C. Sarkar was working as Guard of an EMU proceeding in the opposite direction and had noticed that the tail lamp was burning brightly just a few minutes before the accident took place. Similarly witness No. 35 Sri Phulchand Bhaskar, Gateman had observed the tail lamp of the ART burning brightly moments before SG.35 Up rammed into its rear. Therefore the second claim of the Motorman of the ill-fated train that the tail lamp of the ART Van was not burning cannot also be accepted.

7.7 Working of the wind screen wiper

The third claim of the Motorman was that the wind screen wiper was not working and that he was dazzled by rain drops on the wind screen of the driving cab. Witness Nos. 7, 8 and 9, the three Motormen, who worked the EMU immediately before Sri Ghosh have all averred (Paras 5.6 to 5.8) that the wind screen wiper was working. Even assuming that the automatic functioning of the wind screen wiper did not

take place it is always possible for the Motorman to manually work the wind screen wiper from inside the cab, to remove the rain drops, which he could have done either at Ballygunge or at Park Circus where the train stopped. Therefore I consider that this claim of the Motorman is merely an after thought and cannot be accepted as contributing in any way to the accident.

7.8 Dimness of the headlight

Sri Ghosh has claimed that the focus of his headlight was not proper and that this prevented him from noticing the obstruction of the ART earlier. Here again the three Motormen who worked the unit prior to Sri Ghosh have all testified that the headlights were working properly. Witness No. 27, Sri B. Chakraborty, Motorman who worked the same rake on the evening of 3-6-81 from Krishnanagar to Sealdah has averred (Para 5.22) that the focus of the headlight was satisfactory. Even if the focus of the headlight was dim as stated by Sri Ghosh that does not explain his failure to notice the brightly lit tail lamp of the ART Van standing ahead. Therefore this plea also can only be regarded as an after thought of the Motorman and is not acceptable.

7.9 Did the ART move back after stopping at AB.1 ?

The following witnesses have all categorically stated that the ART did not move back "even an inch" after being stopped short of signal AB.1.

Name	Witness No.	Para No.
B.K. Banerjee, F.I.C.	22	5.17
Chandr Prosad, Fitter	23	5.18
Bulla, Driver	25	5.20

I see no reason to disbelieve their testimony. Besides the gradient of level and 1 in 500 at this location was not such as to cause the ART to move back after being brought to a halt behind signal AB.1. Accordingly I find this contention of Sri C. D. Ghosh also to be unacceptable.

7.10 Could not the Motorman of SG 35 Up have applied the brakes and averted the accident ?

I have examined this issue carefully. According to GR 277/2 which was amended in the year 1967 a driver passing an automatic signal at danger is required to go at a speed not exceeding 8 Km/h when the visibility of the line ahead is not clear due to curvature, cuttings etc. GR 283(3) contains the procedure to be adopted for passing a semi-automatic signal acting as a Gate signal in the 'ON' position according to which the Driver should proceed cautiously upto the level crossing gate and after ascertaining that the gates are locked against the road traffic and on getting hand signals from the Gateman he should then proceed cautiously upto the next stop signal complying with the provisions of GRs 277 to 279. In the stretch of the track between Park Circus and signal AB.1 the visibility is severely limited owing to the existence of curves, overbridges etc. The Motorman should therefore have not exceeded a speed of 8 Km/h after passing semi-automatic gate signal AB.3 in the 'ON' position. It would be seen from the trials conducted on 11-6-1981 that the tail lamp of MFD Van was visible from the driving cab of the following train from a distance of 1.02 kilometres. Even assuming that the tail lamp of the MFD Van was not burning as claimed by Sri C. D. Ghosh, the obstruction due to the profile of the MFD Van was visible from a distance of 73 metres. When the train was travelling at a speed of 8 Km/h the Motorman was able to bring the trial train to a halt within a distance of 5 metres. Even after making an allowance for the fore knowledge of that Motorman, it should have been easily possible for any motorman who was reasonably vigilant to bring his train to a halt in a distance of about 15 to 20 metres had he been observing the speed limit of 8 Km/h. On the contrary the evidence adduced during the inquiry ruled out the possibility of the tail lamp of the ART Van not burning. Therefore it should have been easily possible for the Motorman Sri C. D. Ghosh to stop his train in time and avoid the collision if only he had been travelling

at the stipulated speed of 8 Km/h, even after making allowances for poor brakepower, and dim headlight as pleaded by him. It is also clear from the evidence that for some unaccountable reason the Motorman had started accelerating his train after passing level crossing 1E. Perhaps the Motorman had expected the line would be clear upto signal AB.1 though that does not authorise him to increase his speed before reaching AB.1. In any case, it is clear that the accident could have been very easily averted with ordinary vigilance on the part of the Motorman.

7.11 Responsibility of the Guard of SG 35 Up

According to the evidence of the Guard Sri Haradhan Bose, the Motorman has exchanged signals with him after encountering signal AB.1 in the 'ON' position and started proceeding at a slow speed. The Guard has further stated in his evidence that after passing the level crossing the train continued to move at a slow speed of about 8 Km/h. This evidence does not appear to be correct in the light of the clear statements made by the witness No. 36 Sri Shvamjiban Bairagi and witness No. 35 Sri Phulchand Bhaskar that the train accelerated to a speed 30 to 35 Km/h after passing the level crossing. The Guard may be suitably taken up by the Railway for giving false evidence regarding the speed of the train at the time of the collision.

7.12 Responsibility of Sri B. K. Banerjee/FIC Gr. 'A'

Sri B. K. Banerjee/FIC Gr. 'A' was the supervisor incharge of the MFD Van and in the absence of a regular Guard the duties of Guard devolve on him, in accordance with Para 103 of Chapter III of Power Standing Orders. According to the Correction Slip issued to GR 280 vide Railway Board's Notification No. 70/Safety(A&R)/29/13 dated 13-12-76 the Guard is required to protect the train "If the stoppage is on account of accident, failure or obstruction and the train cannot proceed". (the Driver has to sound the prescribed code of whistle). In the present case the ART had come to a stop at automatic signal AB.1 not because of accident, failure or obstruction but because the signal was showing red. After waiting for two minutes the train would have gone past the signal observing the speed limits laid down under GR 277. Therefore I do not consider that Sri Banerjee is guilty of not complying with GR 280. He, however, stated during the inquiry that he was travelling in the penultimate vehicle of the ART Van and not in the last Van in view of the absence of any facility for him to travel in the MFD Van. It appears necessary to provide some sitting accommodation in the MFD Van to enable the FIC, incharge of the ART or the Guard to travel in the last vehicle.

VIII. CONCLUSIONS

8.1 On a careful consideration of the factual, material and circumstantial evidence, I have come to the conclusion that the rear end collision of SG 35 Up Budge Budge—Scaldah Local with the rear of

Accident Relief Train at Km. 1/26 between Park Circus and Sealdah South Station on the Up line of Sealdah suburban section that occurred at 19.55 hours on 4-6-1981 was caused by the Motorman of SG 35 Up Sri C. D. Ghosh not having exercised great caution after passing semi-automatic signal No. AB.3 on the Up line in the 'On' position.

8.2 Responsibility

(a) Sri C. D. Ghosh, Motorman of SG 35 Up EMU Local is primarily responsible for causing the collision by not exercising great caution after passing signal AB.3 in the 'On' position. He thereby violated GR-277, 279 and 283.

(b) Sri Haradhan Basu, Guard of SG 35 Up while not directly responsible for the accident may be suitably disciplined by the Railway for giving false evidence.

8.3 Service Record of Sri C. D. Ghosh

Sri C. D. Ghosh born on 1-8-29 and appointed as Engine Cleaner on 24-2-48. He was promoted to Fireman Grade 'C' on 21-7-52, to Grade 'B' in June '61 and Grade 'A' in July '62. He came on the Electric side as Assistant Driver on 23-6-63, was promoted as Engine Shunter on 8-5-72 and as Driver Grade 'C' on 23-6-67. He was promoted as a Motorman on 2-5-79. It is seen from his service records that he was punished on 6 occasions during the period 1958 to 1971 for minor offences like coming late for duty, selling coal, refusing to work with a particular Driver and for late start. After 1971 he had a blemish-free record and was considered one of the good Motormen in Sealdah Division. He was not habituated to drinking and was reported to be generally well behaved, sober and of a highly religious nature. He had no family problems exercising his mind at the time of working the ill-fated train.

8.4 Relief measures and medical attention

(a) Railway medical help was made available promptly by despatching the medical personnel to the site of accident by road within half an hour of the accident. However, much prompter action was taken by the people residing near the site of accident with the result that all the injured passengers had been extricated and despatched to the nearby Civil Hospitals before the arrival of the Railway medical team by road. This however does not mean any reflection on the promptness with which the medical personnel were sent to the site by road.

(b) However, the despatch of the railway medical van to the site of accident took a much longer time. This was mainly because of the complicated Z movement involved working the ARME Van from Sealdah North to the site of accident. Hence it was recommended in my preliminary report that the railway should examine the feasibility of stationing a second medical van in a suitable double ended siding in the Sealdah Goods yard to enable prompt despatch of

the medical van to the site of any accident occurring in the Sealdah South Suburban Section.

(c) I am however satisfied with the medical attention provided by the Railway to the injured passengers. A special word of praise is due to the Additional Chief Medical Officer of Howrah Orthopaedic Hospital Dr. M. S. Ghosh and his team in providing medical assistance of a high order to one of the grievously injured passengers.

IX. REMARKS AND RECOMMENDATIONS

9.1 At the time of submitting my preliminary report I had made the following immediate recommendations :—

(i) The Railway to examine the feasibility of improving the drainage of the track between Park Circus and Sealdah South stations by lifting of track and other measures in order to avoid repeated failures of automatic signals between Park Circus and Sealdah South stations.

(ii) Railway to suitably revise the stencilled instructions in the driving cab regarding GR 277 to lay stress on the speed restriction which a driver must observe after passing an automatic signal in the 'On' position.

(iii) Provision of a separate medical van for Sealdah South Suburban section at a suitable location in the Calcutta Goods Yard to enable its quick movement to the site of the accident. Action taken by the Railway on these recommendations are not known but presumably these recommendations are under examination by the Railway.

9.2 Installation of automatic train control system

The Railway Board have already issued instructions to all the Railways to expedite installation of automatic train control and automatic warning system in suburban areas. It is necessary to expedite action in this respect so that such accidents can be avoided.

9.3 Knowledge of GR 277(2)

During the enquiry a number of Motormen were questioned on the specific speed limit laid down in GR 277(2) for passing automatic signal at danger. None of them was aware of the stipulation of 8 Km/h. This correction slip specifying the speed limit in cases of poor visibility was issued as early as 1969 and the fact that a large number of Motormen are still not aware of the provision of this amended rule is disquieting and brings into question the effectiveness of safety counselling in Sealdah Division. The Railway needs to take urgent steps to improve the awareness of the relevant GRs among the Motormen by vigorous safety counselling.

9.4 Intensification of ambush checks

Railway may take necessary steps to ensure that ambush checks are conducted frequently to detect

drivers violating the speed limits and taking up with such staff adequately.

9.5 During the enquiry it transpired that out of 10 track relays, 8 were of the non-immunised type whereas according to R. E. specifications 9 ohm D. C. track relays should be of the immunised type. The Railway should immediately arrange to conduct a check of all lines electrified with A.C. Traction and ensure that the correct relays are provided.

9.6 The design of the MFD Van may be modified to provide some sitting accommodation for the guard. It should also be made possible for the guard or FIC to check up from the inside of the van itself that the tail lamp is burning (such an arrangement exists in the cab of all EMUs).

9.7 Crashworthiness of the EMU Stock

The Commission has made repeated suggestions in previous cases of similar accidents to improve the

crashworthiness of EMU Stock. It is understood that the RDSO have come to the conclusion that it is not possible to improve crashworthiness of the EMU rakes. It may be examined whether it would be possible to alter the design of EMU driving cabs to provide a small hood in front, as exists in the DC locomotives in the Bombay area, which can be usefully utilised to house equipments such as compressors etc. and provision of which would minimise the consequences of a collision and afford more protection to the motorman and the passengers travelling in the compartment behind the cab against the impact of collisions.

Yours faithfully
(S. SUBRAMANIAN),
Commissioner of Railway Safety,
Eastern Circle, Calcutta

BRAKE TEST RESULT OF RAKE NO. BHEL 418+465 ON 8-6-81

MR pressure—7.5 Kg/Cm²; BP pressure—2.4 Kg/Cm²; Rate of drop of BP pressure & Brake Controller is on uncharged position—1 Kg/Cm² in 3 seconds, 2 Kg/Cm² in 35 seconds and 0 in 47 seconds.

EP Unit isolation—N1; Brake cylinder isolation—1; No. of active Brake Cylinders—39; Percentage Brake Cylinder in active condition—98%.

Sl. No.	Type of brake applied	Distance covered	Time in seconds	Speed in KMPH.
1.	EP	331.5 Mtrs.	25	60
2.	Auto	445.5 "	32	60
3.	Emergency	205.5 "	20	60
4.	Deadman	328.5 "	26	60
5.	Guard's Emergency	250.5 "	22	65

Signal sighting trial was conducted with an empty rake No. 418 + 465 on 6-7-81 to simulate the conditions under which SG 35 collided with stationary ART on 4-6-81 at 19.55 hours.

The observations are as under :-

(a) Signal No. AB-3 visible from location 2/20	Distance—503 metres from signal AB-3.
(b) Substitute tail lamp visible from location 2/12	Distance—764 metres from substitute Tail Lamp.
(c) Signal No. AB-1 visible from location 2/10	Distance—764 metres from signal AB-1.
(d) Signal No. AB-1 disappeared from location 1/42	Distance—580 metres from signal AB-1.
(e) Signal No. AB-1 again visible from location 1/40	Distance—517 metres from signal AB-1.
(f) Speed achieved on full acceleration after stopping at signal No. AB-3 and after passing slowly the level Crossing Gate at 8 KMPH to till arrival at location 1/30 travelling 383 Metres	—25 KMPH.
(g) Breaking distance on full emergency application at speed 25 KMPH	—22 Metres.
(h) Braking distance at speed 30 KMPH while Deadman was applied	—24 Metres.

All these trials were conducted with empty stock.

The trial on 6-7-81 was little different from that which was conducted on 11-6-81 in as much as the earlier trial was done keeping the ART standing at signal No. AB-1 last vehicle being at location 1/26. Whereas the second trial was by keeping a substitute Tail lamp at exact location of ART Tail lamp in X-Y co-ordinate. In the first trial signal No. AB-1 was not visible from level crossing gate and thereafter because of obstruction of bridge and ART.

IEWS OF RAILWAY BOARD ON VARIOUS PARAS OF THE REPORT

Findings : The findings of the Commissioner of Railway Safety with regard to the cause of the accident and responsibility therefore as given in paras 8.1 and 8.2 of the report are, prima facie, acceptable.

Remarks & Recommendations

Para 9.1 : (i) The matter has been examined by the Railway Administration. Due to built up areas on both sides of the track, existence of three road-over bridges and one fly over having limited clearance, it is not found possible to raise the track substantially, and the small extent of raising of track has not been found to be useful. The Railway has, therefore, decided to try to keep the side drains and the outlet drains of the Calcutta Corporation clean to the extent possible, apart from pumping. This arrangement is working fairly satisfactorily.

(ii) This has been implemented by the Railway. Instructions on the subject have been issued to other Railways also.

(iii) As advised by the Railway, the proposal for having an additional medical van in Sealdah South Suburban section has not been found feasible. The

Railway has, however, been asked to re-examine the matter in the light of CCRS's comments.

(On reconsideration, an additional Medical Relief Van in Sealdah South Suburban section was not found practicable. However, CMO/Eastern Railway has taken sanction for a separate road vehicle for the purpose).

Para 9.2 : The Automatic Warning System was introduced on Gaya—Mughalsarai and Howrah-Burdwan Chord Line sections of Eastern Railway. Due to heavy thefts of aluminium body magnets from the track the system has proved unsatisfactory. It is, therefore, now proposed to try track magnets with fibre glass body to obviate thefts. Extension of the Automatic Warning System to other sections will depend upon the successful functioning of the system having magnet with fibre glass body or other modifications as may be warranted by the conditions obtaining on the Indian Railways.

The trial conducted earlier on the Eastern Railway with indigenously designed Auxiliary Warning System was not successful as the performance was not up to the desired level. Recently another system has been installed in the Suburban sections of Western and Central Railways. The working of this system has not been fully established and the performance is being closely watched. The installation of Auxiliary Warning System on the Suburban section of Eastern Railway will be considered after a satisfactory system, capable of working properly under Indian conditions is developed.

Paras 9.3 & 9.4 : Suitable action has been taken by the Railway in compliance with CRS's recommendations. The action taken has been noted by CCRS. Suitable instructions in the matter have also been issued to all the Railways.

Para 9.5 : This has been complied with by the Railway Administration. Necessary instructions in the matter have been issued to the Zonal Railways.

Para 9.6 : Action has been taken by the Railway Administration to provide sitting accommodation for the Guard and a peephole in the MFD Van to enable him to watch the functioning of the tail lamps. Other Railways have also been directed to adopt this recommendation.

Para 9.7 : The matter has been examined in consultation with RDSO. It is considered that if a hood type construction is provided at ends of EMU coaches, the coach will lose its integral character and thereby become weaker than the present integral arrangement. Driving cabs are provided on the trailer coaches at

each end of the EMU rakes. There are no such equipments as compressors on trailer coaches. Even on motor coaches, such equipments are underslung below the under frame. Provision of a hood in front will, therefore, lead to a reduction of passenger carrying capacity of the coach. In view of this position, suggestion for provision of hoods in front of driving cabs is not considered feasible.

CCRS has suggested in another context that the expected loss of passenger capacity be made good by attaching a 10th coach on the 9-coach rakes. In view of heavy investments required in Shifting Signals, OHE masts, point machines, 10th coach etc. and non-availability of motor coaches, this suggestion cannot be implemented at this stage.

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