

To,

**The Chief Commissioner of Railway Safety,  
Ashok Marg,  
Lucknow-226001.**

Sub: Derailment of Train No. 12173 Dn (Udyognagari Express)  
between SORAI- SUMER Stations on 09.05.2011 at about 06.18 hrs.  
on Bhopal-Bina Broad Gauge Section of Bhopal Division.

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Sir,

In accordance with Rule 3 of Statutory Investigations into Railway Accidents Rules issued by Ministry of Civil Aviation, I forward herewith the Preliminary Report of my Statutory Inquiry into the derailment of 12173 Dn Udyognagari Express train between Sorai and Sumer stations of Bhopal-Bina, double line, Broad Gauge, Electrified section of Bhopal Division of West Central Railway at about 06.18 hrs. on 09.05.11.

## I. INTRODUCTION:

### 1.1. **Preamble:**

On 09.05.11 at about 06.18 hrs 12173 Dn Udyognagari Express train with a load of 22 = 44 coaches hauled by AC Loco No. 21334 WAM4/CR running between SORAI-SUMER stations derailed at Km.900/16-24 on SORAI-SUMER Broad gauge double line section of Bhopal Division of West Central Railway in Vidisha Distt. of Madhya Pradesh.

### 1.2. **Inspection and Enquiry:**

1.2.1. On 09.05.2011 at about 9.00 hrs. I received a call from CCRS/LKO on my mobile phone informing me that train No.12173 Dn Udyognagari Express train had derailed between Sorai and Sumer Stations on Bhopal-Bina Broad gauge section of West Central Railway and injury to passengers were expected. He asked me to conduct statutory enquiry into the accident as CRS, Central Circle in whose jurisdiction the accident had occurred was preoccupied. I immediately got in touch with CSO/WCR and advised him that I will be holding statutory enquiry into the accident on 11<sup>th</sup> & 12<sup>th</sup> May, 2011 at Bhopal. He was asked to preserve all the clues and evidences. He was also asked to carry out detailed photography and videography of the accident site. West Central Railway was asked to publish the notice for holding of enquiry by the undersigned on 11<sup>th</sup> & 12<sup>th</sup> May 2011 at Bhopal. Accordingly notification was published in News Papers by CPRO/WCR. Divisional Authorities were advised to inform Civil & Police Authorities of the enquiry schedule.

I left Lucknow on 09.05.11 by 12194 Dn Pratapgarh-Bhopal Express and reached Bhopal at about 11.00 hrs. on 10.05.11.

I then proceeded to the accident site by CRS/Spl accompanied by DRM and other West Central Railway Officials. I inspected the accident site along with CSO/WCR, CTE/WCR, CRSE/CR and DRM/Bhopal. The accident had taken place on a straight track. The location of derailed coaches were explained to me with the help of photographs and sketch prepared by joint team of supervisors. In all six coaches had derailed from the rear end. There were four coaches numbering CR 03706 GSLRD, CR 99435 GS, CR 89217 WGSCN & CR 92227 WGSCN lying off the track near the accident site. The track had been restored. The last coach which was an RA had been taken to Sanchi station after re-railment while sixth and seventh coaches from the rear had been kept at Sumer station. The sixth coach from the rear had derailed by its rear trolley while the front trolley was on rail. The seventh coach from rear had not derailed but was kept at the Sumer station because it could not be dispatched with the front 15 coaches of the train after the accident as the rear coupling hook of the 15<sup>th</sup> coach had broken in the accident and the train had parted after 15<sup>th</sup> coach. These two coaches were later on brought to sick line in Bhopal for detailed inspection, where these were inspected after running out the trolleys.

I also visited BMHRC & Railway Hospital at Bhopal where injured passengers were admitted for treatment. I enquired about their treatment/ care from the attending doctors and family members of the patients. Proper medical care was being given to the patients. I was accompanied by CSO, DRM, Bhopal and CMS during hospital visit.

Notification for holding the enquiry was published by issuing advertisement in the news papers. Bhopal Division officials also informed Civil & Police Authorities of the enquiry. Following officers were present during the enquiry:

1. Mr. B.Deva Singh CSO/WCR/JBP
2. Mr. R.K. Meena, CTE/WCR/JBP
3. Mr. Jagdish Prasad, CCM(PS)/WCR/JBP
4. Mr. E.S.Marcus, CRSE/WCR/JBP
5. Mr. A.K. Tiwari, CRSE/CR/CSTM
6. Mr. Ghanshyam Singh, DRM/BPL.
7. Mr.M.P. Mehta,CTPM/WCR,JBP

Divisional officers were called in as and when required. Evidences of 58 witnesses were taken.

### **1.2.2. Preservation of Clues at the site of Accident:**

The joint note regarding the accident was prepared by senior supervisors of Bhopal Division after reaching the accident site.

Railway Administration had taken still photographs of the site, damaged track and affected coaches involved in the accident. Videography of the site was also done.

A sketch of the accident site was prepared and signed by Divisional Authorities showing the details of the site of accident.

The recording of the speedometer of electric locomotive No. 21334 WAM4 (BSL) was preserved by the Division and a print out with a technical note by Sr. DEE made available during enquiry.

The broken left and right rail in the rear of derailed coaches was also kept in the custody of Sr.DSO and shown to me during enquiry. The broken rails were sent to RDSO for chemical and metallurgical testing along with broken draw bar hook of 15<sup>th</sup> coach No.CR 03247 WGSCN.

### **1.3. The Accident:**

- 1.3.1. Train No.12173Dn Udyognagari Express, (LTT-PBH) an air braked broad gauge train started from BPL Station at 05.25 hrs. and passed through Sorai Station at 06.13 hrs. The train had derailed at Km. 900/16-24 on Dn Main line at about 06.18 hrs. 6 coaches having number CR 03275WGSCN, CR 92227 WGSCN, CR 89217 WGSCN, CR 99435 GS, CR 03706 GSLRD & NR RA-1 RDSO had derailed. Due to high bank at site four coaches had capsized. The train had parted between 15<sup>th</sup> & 16<sup>th</sup> coach as the rear draw bar hook of coach No. CR 03247 – 15<sup>th</sup> from engine-BPL end had broken (this coach had not derailed).
- 1.3.2. ‘Right’ and ‘Left’, ‘Ahead’ ‘Before’ ‘After’ and ‘Rear’ referred in this report are with reference to the direction of the train movement.

### **1.4. The Nature of weather:**

The weather at the time of the accident was clear and visibility was good.

### **1.5. Casualties:**

I regret to report that as a result of the accident, 02 passengers lost their life, 10 were grievously injured and 32 passengers sustained simple injury.

### **1.6. Passenger occupancy:**

The 12173 Dn Udyognagari Express (LTT-PBH) express train was running with a load of 22=44 coaches. The occupancy of the train was 1380 against the capacity of 1452.

## II. RELIEF MEASURES

### 2.1. **Intimation:**

After the accident, Loco Pilot of Train No. 12173 informed about the accident at 06.22 hours to TLC. Guard of the 12173 Dn Udyognagari Express, informed all concerned on mobile phone and also the adjacent SMs on walkie talkie, about the accident at 06.25 hrs.

### 2.2. **Medical attention and relief:**

- 2.2.1. ARME/ARMV Scale-1 is available at ET & BIN and ARMV Scale -2 at BPL stations of Bhopal Division. They all left to the accident site as under:

ET-ARMV - Left ET at 07.07 hrs. – Sorai Arrl. 09-10 hrs. and stabled.

BPL-ARMV- Left BPL at 06.50 hrs.- Reached site 08-40 hrs.

BIN-ARMV- Left BIN at 06.50 hrs. – Arrl. at site 07.50 hrs.

CMS/BPL along with Doctors and paramedical team left BPL by road and reached site at 8.20 hrs.

MS/BIN along with Doctors and paramedical team reached site at 7.45 hrs.

A Team of non-Railway Doctors from Civil Hospital, Vidisha reached site at 7.15 hrs. Local people, police and civil authorities organized road vehicles and ambulance at the site and transported injured passengers to the District Hospital, Vidisha & Bhopal.

- 2.2.2 Movement particulars of various ARTs are as under: -

S.N.	Event	ART – ET	ART – BPL	ART- BINA
1.	Time of Ordering	06.25	06.25	06.25
2.	Time of Departure	07.08	07.15	07.17
3.	Time of arrival at Sorai	11.35	08.15	-
4.	Time of departure from Sorai	12.31	09.55	-
5.	Time of arrival at Sumer	-	-	08.43
6.	Time of departure from Sumer	-	-	15.33
7.	Time of arrival at Site	12.55	10.15	15.55
8.	Time of work started	16.10	11.00	17.20
9.	Time of work closed	23.15	12.00	23.15
10.	Time of departure from Site	01.15 (10.5.11)	15.00 (9.5.11)	01.20 (10.5.11)

- 2.2.3. Relatives of the injured passengers were informed through local police station as well as by passengers themselves who arrived at hospital. Help line service was also opened and telephone numbers were displayed on local news channels.
- 2.2.4. Disaster management cell of BPL division and Station Master of Sorai and Sumer station, informed the civil authorities Vidisha immediately.
- 2.2.5. Tea, water and biscuits were arranged and served free of cost to the injured passengers at site and hospital.
- 2.2.6. Details of the accident and the list of injured passengers was given to the media.

#### **2.2.7. Ex-Gratia Payment:**

Following Ex-gratia was announced:

(a) Death case	:	Rs.5 lakh
(b) Grievous injury	:	Rs. 1 lakh
(c) Simple injury	:	Rs. 25,000/-

A total amount of Rs.18, 00, 000 had been paid as ex-gratia by the division. Remaining amount should also be paid expeditiously.

#### **2.3. Restoration:**

- 2.3.1. The front portion of the train No. 12173 Dn left the accident site with 15 coaches at 8.18 hours and reached Sumer station at 8.25 hours. The train left Sumer at 11.05 hours with the passengers and arrived Bina at 14.15 hours. The 15<sup>th</sup> coach was detached at Bina station and 5 more coaches of coaching special were attached to this train. The train left Bina at 17.25 hours for Pratapgarh. Coaching Special was run from Bhopal at 9.05 hours which collected stranded passengers from Vidisha and Sorai stations and arrived BIN at 15.20 hours. Up line was given fit at 7.30 hours. ARME Bina was the first train which was sent on the Up line from Sumer Station at 7.45 hours. Dn track was given fit at 3.40 hours on 10.05.2011 after removing derailed coaches and repairing the track. Dn OHE was given fit at 3.40 hours and the first train No.12615 passed through accident site at 04.15 hours.

#### **2.3.2. Interruption of passenger traffic:**

No. of trains cancelled: 01

No. of trains short terminated: 03

No. of trains diverted: 16

Detention to trains:

Up Direction 33= 52 hrs.      Dn Direction 28 = 41 hrs.

### III. THE TRAIN

#### 3.1. Composition and Marshalling Order of the train:

##### (i) Locomotive of 12173 Dn Udyognagari Express.

The train No. 12173 Dn Udyognagari Express (LTT-PBH) was hauled by Loco No. 21334 WAM4 (BSL) weighing 112.8 tonnes. The loco was manufactured at CLW and was commissioned on 14.05.1982. The locomotive was provided with head light, speedometer, speed recorder, flasher light and all were in working condition. After the last IOH on 20.11.2010, its last trip inspection was done on 05.05.11 at Igatpuri. It had earned 90000 Kms up to 22.04.11 since IOH.

##### (ii) Coaches: The train No. 12173 Dn Udyognagari Express (LTT-PBH) was running with the load 22=44 coaches, the marshalling order and other details are given below:

S.No.	From the Engine	Coach No.	Built by	Year built	Date of last POH	Date of Return
1.	1 <sup>st</sup>	CR 95709GSLR	BEML	1995	MTNS/15.12.10	7/2011
2.	2 <sup>nd</sup>	CR02416GS	ICF	2002	MTNS/09.01.10	8/2011
3.	3 <sup>rd</sup>	CR07439GS	ICF	2007	MTNS/07.01.11	8/2012
4.	4 <sup>th</sup>	CR03054WGACCW	ICF	2003	MTNS/31.03.10	11/2011
5.	5 <sup>th</sup>	CR08148 WGACCN	RCF	2008	MTNS/02.03.11.	10/2012
6.	6 <sup>th</sup>	CR04102 WGACCN	RCF	2004	MTNS/19.12.09	07/2011
7.	7 <sup>th</sup>	CR96105 WGACCN	RCF	1996	MTNS/04.11.10	06/2012
8.	8 <sup>th</sup>	CR09251WGSCN	BEML	2009	BEML/08.09.09	09/2011
9.	9th	CR97808 WGSCN	ICF	1997	MTNS/11.12.09	07/2011
10.	10 <sup>th</sup>	CR87242 WGSCN	ICF	1987	MTNS/01.04.10	11/2011
11.	11 <sup>th</sup>	CR04201 WGSCN	ICF	2004	MTNS/01.06.10	01/2012
12.	12 <sup>th</sup>	CR10234 WGSCN	BEML	2010	BEML/01.01.11	01/2013

13.	13 <sup>th</sup>	CR06220 WGSCN	BEML	2006	MTNS/01.06.10	01/2012
14.	14 <sup>th</sup>	CR07254 WGSCN	BEML	2007	MTNS/16.11.09	06/2011
15.	15 <sup>th</sup>	CR03247 WGSCN	ICF	2003	MTNS/27.07.10	03/2012
16.	16 <sup>th</sup>	CR06229 WGSCN	ICF	2006	MTNS/24.03.10	10/2011
17.	17 <sup>th</sup>	CR03275 WGSCN	RCF	2003	MTNS/18.02.10	09/2011
18.	18 <sup>th</sup>	CR92227 WGSCN	RCF	1992	MTNS/20.02.10	09/2011
19.	19 <sup>th</sup>	CR89217 WGSCN	ICF	1989	MTNS/23.10.10	05/2012
20.	20 <sup>th</sup>	CR99435 GS	ICF	1999	MTNS/09.01.10	08/2011
21.	21 <sup>st</sup>	CR03706 GSLRD	ICF	2003	MTNS/23.10.10	05/2012
22.	22nd	NRRA-1 RA/RDSO	RCF	2004	AMVM/30.11.10	01/2013

- (a) Total length of coaches/train excluding engine –  $22.297 \times 22 = 490.53$  mtr
- (b) Whether fully braked or not: Fully air braked.

The brake power of the train was 100% as per BPC and also the joint note prepared after the accident.

### 3.3. Damage and disposition:

Four coaches were totally damaged and were put off the track. The cost of the damage worked out by Railways is as under :-

- 3.3.1. Coaches (C&W) - 60.10 lakhs
  - 3.3.2. Signaling & telecommunication – 00.50 lakhs
  - 3.3.3. Engineering - 10.00 lakhs
  - 3.3.4. Traction distribution (TRD) – 00.20 lakhs
- Total cost of damage - Rs.70.80 lakhs.

## **IV-LOCAL FEATURES:**

### **4.1. The Section and Site:**

- 4.1.1. The accident took place at Km 900/16-24 on BPL-BIN double line electrified broad gauge section between Sorai and Sumer stations in BPL division of West Central Railway falling in the civil district of Vidisha in the state of M.P. The track runs through open cultivated plain land. The accident took place on the level straight track.
- 4.1.2. The track at the site of accident runs in the south to north direction. The track standard details are as under:
- Rail 60 Kg/M, year of rolling 1998,
  - Year of laying – 2000 with MBC sleepers
  - Density 1660 sleeper per KM.
  - LWR Track.

### **4.2. Signaling & System of working:**

The signals are MACL and stations have standard II(R) interlocking. Trains are worked under absolute block system.

### **4.3 Important Kilometerage of stations/locations :**

The Kilometerage of various points are mentioned in this report as reckoned from BPL Railway Station are as under:

Bhopal	836.78
Sorai	895.57
Accident Site	900/16-24
Sumer	903.90
Bina	975.15

### **4.4. Permissible speed and speed restrictions :**

Maximum permissible speed on Bhopal-Bina section is 120 Kmph for Rajdhani Express. There are 06 permanent speed restrictions in the section with no permanent speed restriction between Sorai and Sumer and on the day of accident

there were no temporary speed restrictions in force between Sorai and Sumer stations.

**4.5. Head quarters:**

Track	: Sr. DEN (N)/BPL ADEN/BIN & SSE/P-Way/BHS
S&T	: Sr.DSTE/BPL, DSTE (Sig)/BPL
TI	: TI/BPL
Control Office	: BPL

## **V-SALIENT FEATURES**

**5.1. Time of Accident:**

The train had passed through Sorai station at 06.13 hours. As per Guard of the train he felt a jerk at 06.18 hours. As per the speed recorder chart of the Loco, the train speed started dropping at 06.18 hours. Thus the time of the accident can be taken as 06.18 hours.

**5.2. Speed of the Train:**

As per the speed recorder chart the train was coasting at a speed of 100 KMPH when the speed started dropping. Thus the speed of the train at the time of derailment can be taken as 100 KMPH. The possibility of over speeding can be ruled out from the speed recorder chart.

**5.3 Hanging part in train:**

A team of supervisors had inspected the track behind the point of drop of the wheel for a distance of 90 Mtrs. but there was no hit mark on the track before the point of drop of wheel. This fact has been recorded in the joint note also.

**5.4. Condition of track:**

- 5.4.1 The first point of drop was noticed at a distance of 48.03 Mtrs. after KM Post 900/16 inside the left rail on the sleeper next to the multiple weld failure on the left rail. No point of mount was noticed on rail in the vicinity of point of derailment by the joint team of supervisors.
- 5.4.2 As per the joint note, multiple fractures were seen in the left rail in the weld zone (No.18/1 left AT weld) and the rail had broken into four pieces in multiple plains. A gap of 920 mm had been created in the left rail. A piece of rail head 240 mm

long had completely detached from the rail in the weld zone. The bottom piece of the rail had fractured from the bolt hole in the leading rail. Two fish plate bolts were also found nearby, one of which was bent and other was broken. This weld joint was under observation and had been provided with joggled fish plates.

- 5.4.2 Examination of failed weld joint revealed that the inner joggled fish plate was not supported on the fishing plane as the riser surface was protruding and there were shiny marks on the spot indicating that the fish plate was not properly assembled due to the protrusion. There were marks on the four corners under the broken rail head indicating that the rail head was supported on four spots only by the fish plates instead of the whole fishing plane.
- 5.4.3 Right side rail had also broken through AT weld joint (No.18/1 right AT weld) at a distance of 6.1 meter after the failed weld joint on the left rail. A gap of 620 mm was seen between the broken parts of right rail after fracture. An old flaw was visible on the rail top table which was 25 mm deep and 70 mm wide. The head of the right leading rail had marks of hammering on the fractured face.
- 5.4.4 The PSC sleeper next to the welded joint (No.18/1 left AT weld) was badly crushed at the first point of drop where the left wheels had dropped inside the rail and only reinforcement wires were visible. The sleepers had got shifted to the left side and ERCs on the right rail had come out.
- 5.4.5 There was extensive damage to the track for a length of 109 meters in which 5 rear most coaches had derailed completely while the 6<sup>th</sup> coach from the rear had derailed by rear trolley only.
- 5.4.6 During inspection of track on 10.05.2011 along with railway officials it was seen that fitment of joggled fish plates on defective welds/rail was not being done in the prescribed manner. Following discrepancies were common:-
  - a) Fastening with two bolts on the same side of the weld
  - b) Not fastening with two far end bolts
  - c) Use of ordinary fish plate with gas cut instead of rolled joggled fish plate
  - d) Nuts not fully tightened on bolts but tightened on a few threads only due to damaged threads of bolts.

### 5.5 Condition of Rolling Stock:

- 5.5.1 No damage was seen on the locomotive.
- 5.5.2 The first 16 coaches and the locomotive were on track even after derailment without any damage. Train parting had taken place between 15th and 16<sup>th</sup> coaches due to breakage of rear draw bar hook of the 15<sup>th</sup> coach.

- 5.5.3 No hanging part was noticed in the 15<sup>th</sup> and 16<sup>th</sup> coach. The derailment had started from the 17<sup>th</sup> Coach No. CR-03275. Only rear trolley of this coach was in derailed condition. On the front trolley rear left wheel of this coach there were 7 dent marks on the flange periphery. The curvature of some of the dent marks was similar to the damage caused by hitting on pendrol clip or a round bolt. Fresh rubbing marks were seen on the outer face of this wheel rim. One mark had bluish appearance as if it had rubbed against hard steel possibly rail face. The axle box loop safety strap and safety lug of the rear trolley of 17<sup>th</sup> coach which had derailed were found freshly broken and had detached from the trolley.
- 5.5.4 During wheel measurement of 16<sup>th</sup> & 17<sup>th</sup> coach it was observed that some wheels were under size as per 13mm root radius gauge.

## **VI- PROVISIONAL FINDINGS**

**6.1 Findings:**

Having carefully considered the details of joint observations, inspection of site, discussion with various sources, factual, material and circumstantial evidence, at my disposal so far, I have come to the conclusion that most probably the derailment of 12173 Dn Udyognagari Express at KM 900/16-24 between Sorai-Sumer stations on Bhopal-Bina Section of W.C. Railway on 09.05.2011 was caused due to failure of AT weld.

The accident is classified under the category “**Failure of Equipment – Permanent Way**”.

## **VII – IMMEDIATE RECOMMENDATIONS**

- 7.1 Railway should use only standard fittings for joggling of rails and welds. Field staff should be properly equipped to ensure this.
- 7.2 It should also be ensured that the joggled fishplates are supported on the fishing plane only and not on the metal protrusion of weld riser.

( P.K. Bajpai )  
Commissioner of Railway Safety,  
North Eastern Circle,  
Lucknow

No. SAC/01/2011-12/WCR/

Dated: 25.05.2011

**Copy to:**

**The General Manager, West Central Railway, Jabalpur.**

**The Secretary (Safety), Ministry of Railways, Railway Board, Rail Bhawan,  
New Delhi.**

( P.K. Bajpai )  
**Commissioner of Railway Safety,  
North Eastern Circle,  
Lucknow**

## **LIST OF ABBREVIATIONS USED**

ADEN	Assistant Divisional Engineer
ARME	Auxiliary Relief Medical Equipment
ART	Accident Relief Train
BG	Broad Gauge
BSNL	Bharat Sanchar Nigam Limited
BPC	Brake Power Certificate
CCRS	Chief Commissioner of Railway Safety
CSO	Chief Safety Officer
CMPE	Chief Motive Power Engineer
CCM (PS)	Chief Commercial Manager (Passenger Service)
CMS	Chief Medical Superintendent
CRSE	Chief Rolling Stock Engineer
CTE	Chief Track Engineer
CUG	Closed User Group
DRM	Divisional Railway Manager
DMO	Divisional Medical Officer
Dn	Down
Dy	Deputy
ERC	Elastic Rail Clip
GM	General Manager
HQ	Head Quarter
Loco	Locomotive
MBC	Mono block concrete
M.P.	Madhya Pradesh

POH	Periodical Overhauling
Sr.DEN	Sr. Divisional Engineer
Sr. DSTE	Senior Divisional Signaling & Telecom Engineer
Sr.DMO	Senior Divisional Medical Officer
SSE	Senior Section Engineer
SLR	Coach with compartments for second class
S&T	Signaling & Telecommunication
TI	Traffic Inspector
VHF	Very High Frequency
WAM-4	Type of Loco

**Station code:**

BSL	Bhusawal
BIN	Bina
BPL	Bhopal
LT	Lokmanya Tilak Terminus
PBH	Pratapgarh
SORI	Sorai
SUMR	Sumer