

Case Study

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Summary (High Level Detail)

Date of Incident	11 th July 2003
Time of Incident	Approximately 1400 hrs
Location of the Incident	National Highway 6, Deori Village, India approx.1030 kms east of Mumbai
Outcome	3 fatalities – Driver & assistant of Castrol Contractor & Driver Assistant of the oncoming vehicle

INVESTIGATION TEAM

Stuart Smith	Investigation Manager, Technology VP, Fuels & Lubricants
Sam Singh	Master RCA Specialist, Total Quality Manager, UK Logistics
B. Murali	India Supply chain Convenor, Castrol India – Transcon
V. Srikanth	Manager – Road Safety, HSSE, Castrol India
Shashank Singh	Manager-Road Safety, Castrol India, Supply Chain

Background

The local investigation team reached the site the next day of the incident and the full investigation team subsequently after a week. This helped the team in gathering valuable details around people, parts, position and Road user behavior at the accident site.

People, Paper, Parts and Position

In **People** three of the key witnesses have died in the incident severely compromising the quality of evidence. The licensed driver of third party vehicle disappeared without providing authenticated statement.

In **Paper** the police & post-mortem reports have been collected. However the police investigation did not reveal any quality information.

In **Parts**, the team could visually inspect both vehicles involved in the accident, though the maintenance records for the 3P vehicle were not available to come to a conclusion.

In terms of **Position** evidence, though tyre marks could be observed at the site of accident – no clinching evidence could be obtained to prove the exact position of both vehicles at the time of collision. Though the team consulted with accident reconstruction expert who didn't visit the site but gave his opinion based on the photographs and the telecon we had with him – conclusive details with respect to the speeds of the vehicles at the time of collision could not be ascertained, as no data on the 3P vehicle were available. The Bilaspur-Indore transport co. was not interested in offering us any assistance in our investigation.

The team also recorded conflicting statement from the "licensed driver" of third party vehicle as to who was indeed driving the vehicle. There is reasonable cause for concern that issue around insurance cover may have had an impact on the statement given by the "licensed driver" of the 3P vehicle.

Summary

On 11th July '03 at 1400 hrs, a contractor (M/s. Assam Transport) truck collided with an on-coming truck on NH6 near Deori Village, Chattisgarh approx. 1030 kms east of Mumbai.

The driver and assistant of truck sustained injuries as a result of the accident. Both the driver and driver assistant later succumbed to the injuries they sustained. The driver assistant of the 3P truck involved in the accident also died at the site of the accident.

The containerised contractor truck was carrying Castrol F/G materials from 3P plant, M/s. Crest Packaging, Mumbai and proceeding to Castrol warehouse at Calcutta, India. From Nagpur (830 kms from Mumbai) – the truck was going in a convoy with two other trucks belonging to the same contractor.

The accident occurred around a left hand side curve on National Highway 6 as the Contractor truck was going towards Calcutta. The contractor collided with the third party truck resulting in fatalities. The impact also resulted in rollover of the contractor truck. The driver side of the contractor truck impacted with the driver side of the oncoming 3P truck resulting in a head-on / side-on collision.

The third truck in convoy (vehicle 9173), belonging to M/s. Assam transport reached the accident site approx.5 minutes after the incident. The driver and his assistant of 9173, transferred the injured driver & assistant on to their vehicle and drove them to Rajnandgaon hospital, 60 kms away. After reaching Rajnandgaon town, they transferred the accident victims to a 3-wheel Auto rickshaw, as the approach road to the hospital was narrow. The driver succumbed to his injuries on the way to hospital, while the driver assistant died soon after reaching hospital.

The post mortem was conducted by the hospital and the report is made available to us. The cause of driver's death was rib injury resulting in lung lacerations while the driver assistant died due to lung puncture and internal bleeding.

The 5-member Investigation team was formed, headed by Stuart Smith (Technology VP, Fuels & Lubricants) and the detailed investigation and RCA was carried out from 16th to 18th July '03.

Based on the facts and evidence gathered, the following Critical Factors have been identified.

Critical Factor 1:

The design of the road

Immediate causes

The layout of the road at the accident site had four shortcomings:

- No sign indicating a bend towards left.
- No solid white line around the bend, indicating no overtaking or crossing over line
- Crescent shaped hard shoulder was very misleading. It leads drivers to believe that the road is wider than what it actually is.
- No sign indicating it was an accident black spot – despite police confirming 3 fatal accidents at same spot in the last 2 months.

Root or System Causes

(10-1, 10-2 & 10-9)

Design of hard shoulder misleads drivers.

The median (centre line) in the road for such a bend was inadequate. The median was a broken line instead of a solid line thus it did not discourage overtaking around the bend.

Critical Factor 2:

Driving towards centre of the road by one or both the vehicles.

There were no direct eyewitnesses to this incident to provide evidence. Also two witnesses of 3P involved in accident have “disappeared” without giving evidence. This critical factor was based on our site visit, our interpretation of skid marks and inferences drawn from other secondary evidences.

Immediate Causes:

- 4.1 Improper decision making or Lack of Judgment
- 4.8 Routine activity without thought

Either one or both of the trucks must have crossed the centreline to cause the accident. Although there is no clinching evidence to prove this, the road width necessitates vehicle travelling in both directions to drive towards centre. Additionally this is a typical driving behaviour observed at the site.

Root or System Causes

(6-1, 6-4)

The driver had 6 years of driving experience along the same highway. He had joined contractor in May'03 and had not completed his defensive driving training at Castrol.

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The Proposal for corrective actions address the following

1. All drivers belonging to dedicated fleet owners (Primary & Bulk) will complete DDT before carrying castrol goods – **By 1st October '03**
2. 50% of secondary transport fleet drivers will undergo DDT – **By December '03**
3. Communicate learning's to all drivers at all locations through toolbox talks. – **Within a week from report release.**
4. Contact National Highway authority to make modifications to the road design (concerned site) and influence through the NGO called IRTE – **Within a week from release of report.**

Recommendations

We have focussed on the causes of the accidents, the recommendation below relate to corrective or preventative actions in relation to reducing risk of death or serious injury.

- The impact of the accident resulting in death could have been avoided if not for the wooden cabin of truck 4410. Replace wooden cabin with metal or fibre glass cabin
- For all manor routes, drivers must have access to details of the nearest emergency centre – because it took 2 ½ hours to reach the injured to the hospital. This delay may have contributed to the fatalities.
- The local management must re-iterate the importance of wearing seat belts, as it is considered that the ejection of the driver assistant of 4410 during the impact would not have occurred if he was wearing one.

GHSEr

Elements Affected are,

- Risk Assessment (Root cause 6-1)
- People, Training & Behaviour (Root cause 6-4)
- Facilities, design & Construction (Root causes 10-1, 10-2)

Golden Safety Rule affected

Driving Safety

MAIN BODY

BACKGROUND

On 7th July '03 a contractor truck belonging to M/s. Assam Transport (AT), bearing registration No. MH04 F4410 was contracted by Castrol India to transport finished goods from third party filler M/s. Crest Packaging, Mumbai to Castrol Warehouse at Calcutta, a distance of 2200 kilometres.

The 18 ft container was carrying finished goods and loaded onto the trailer truck. The truck arrived at the 3P filler plant at around 0900 hrs on 7th July 2003 and finished loading by 1630 hrs the same day. During the day the driver of the truck, Mr. Adhesh Dubey, was briefed about Castrol's HSSE policies. The loading supervisor completed the mandatory truck pre-loading checklist procedure and approved the truck for loading.

The truck left for Calcutta from Crest Packaging at approx. 1630 hrs. The driver assistant Mr. Shraavan Kumar Yadav accompanied the driver on his journey. The driver covered a distance of 850 kms in 2½ days (which is the normal practise) before reaching the transport contractor's office at Nagpur on 10th July '03.

Nagpur is the midpoint in the journey between Mumbai and Calcutta. It is the practise among the drivers of the transport contractor to stop at this location to carry out any minor repair work and also collect some cash for their onward journey.

The driver Avdesh Dubey, after reaching Nagpur office complained to the manager about the need to replace the windshield seal as water was entering the driver cabin due to a crack in the rubber beading. The complaint was promptly attended and the windshield rubber beading was replaced by noon on 10th July '03.

Around afternoon, the same day, Avdesh Dubey met two other drivers belonging to the same transport contractor driving vehicles 9173 and 6615. As all the three drivers were proceeding towards Calcutta they decided to leave in a convoy. All three vehicles (4410, 9173 & 6615) left contractor's office at Nagpur at around 1700 hrs. They stopped to rest that night at a **Dhaba** (restaurant & rest stop) after travelling 25kms from Nagpur.

On 11th July '03, all three vehicles left the **Dhaba** at 0830 hrs and proceeded towards Raipur. Their plan for that day is to cover a distance of 330 kms and reach the city of Raipur for their night stay. Around noon, they reached the Deori Village and stopped to purchase some ingredients to prepare their lunch. They then left the village by around 1245 hrs and reached the Maharashtra state border at 1300 hrs. The convoy stops 1 km after the check post for a break for ½ hour.

Vehicle 6615 left the place first – 5 minutes later 4410 leaves and 5 minutes later 9173 leave the place. They all decide to meet at a pre-determined spot ahead.

After travelling a distance of 5 kms, at 1400 hrs, the vehicle 4410 collides with an oncoming truck no. 5113, belonging to M/s. Bilaspore-Indore Transport co (BI), laden with

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Iron Ingots. Impact occurred to front right side of both trucks (driver side) and the right side of the container of AT vehicle is crushed. Both the vehicle travels a distance of full-length of each other, rubbing alongside each other.

Due to sudden retardation of speed on its right side, 4410 swivels clockwise 110 deg and then overturned on its left side (driver assistant's side). The AT truck's cabin, constructed in a combination of wood and steel, completely crashed due to the impact. The BI vehicle stopped after travelling 5 metres on the correct side of the road. Due to the impact, the front wheels and axle of BI vehicle gets dislodged from the vehicle.

Avdesh Dubey sustained injuries to his ribs, face and legs due to the impact and was unconscious though alive. The driver assistant, Shравan kumar, gets thrown out of the vehicle and sustains injuries to his head, feet, hand, chest and stomach. He was alive and lying approximately 10-12 feet away from the vehicle but moaning in pain.

At 1405 hrs, the third truck in the convoy (9173) of AT arrives at the accident scene. The driver, Mr. Duleep Kumar Choubey and his assistant of 9173 parks their vehicle parallel to the BI truck after seeing the accident. They rushed to assist Avdesh Dubey and Shравan Kumar. They transferred both the victims onto their vehicle. They decided not to turn back towards Deori as the traffic was building up behind them. They proceeded towards Rajanadgaon for medical help. They also see the driver of BI truck crushed onto his seat and motionless.

Meanwhile the driver of 6615 (the first vehicle in the convoy), having lost sight of vehicle 4410 pulls up his vehicle to the roadside. He travels back in another vehicle leaving his vehicle in the custody of his assistant. On his way back, he meets the vehicle 9173 and gets on to the truck. All 5 (Avdesh Dubey, Shравan Kumar, Driver & assistant of 9173 and Sunil Pandhay driver of 6615) travel in the cab of the vehicle 9173 towards the nearest medical centre.

En-route they stop at a medical centre and asked the doctor for help. As the condition of the injured was serious they were advised to proceed to Rajnandgaon Government Hospital, 60kms away from the accident site.

At 1600 hrs the vehicle 9173 arrives at Rajnandgaon town and parks up his vehicle. As the approach road to the hospital was very narrow, they transfer the accident victims to a 3- wheeler Auto rickshaw. Avdesh Dubey dies at the time of transfer while Shравan Kumar was still alive. The auto rickshaw reaches hospital at 1615 hrs and the residing doctor attends to Shравan Kumar who succumbed to his injuries soon after.

The post mortem was conducted by the hospital and it was found that the death of the Avdesh Dubey was due to fracture of ribs, causing laceration of the lungs, while the driver assistant dies as a result of lung puncture and internal bleeding

On notification of the incident a local investigation team was established. Investigation team leader Stuart Smith and Master RCA specialist Mr. Sam Singh provided guidance and assistance. They arrived on the morning of 16th July '03 and the investigation was completed on the evening 18th July '03.

From 16th July onwards, as a part of the investigation, the following people were interviewed:

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Mr. Sanjay Sharma: Owner of Assam Transport
Mr. Dileep Kumar: Driver of vehicle 9173
Mr. Sardar Yadav: Driver assistant of Vehicle 9173
Mr. Sunil shukla: Manager of AT, Nagpur

Other people contacted were:

Doctor in charge at government hospital – for medical report
Police Inspector at Bagnadi police station – knowing about accident black spot

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Time Line				
Item No	Date	Time	Detail	Source
1	07/07/2003	Unknown	4410 is loaded at Crest Packaging in Mumbai destined for Calcutta	Assam Transport
2	07/07/2003	16:30	Loading completed and vehicle leaves Crest Packaging	Assam Transport Packaging
3	07/10/2003	Approx. 12:00	Vehicle had traveled approx 850 kms and reached Nagpur	Assam Transport - Nagpur Office
4	07/10/2003	Approx. 12:00	Driver speaks to Sunil Shukla to complain of a crack in the rubber beading of the windscreen	Driver of 4410
5	07/10/2003	Approx. 12:00	4410 driver meets the drivers of the other two vehicles in convoy - 9173 and 5113	Driver of 4410
6	07/10/2003	17:00	Convoy leaves Assam Transport Office in Nagpur	Assam Transport - Nagpur Office
7	07/10/2003	19:30	Convoy travels 25 Kms east of Nagpur along NH6 and stops at a roadside Dhaba. Stays at Dhaba that night.	Driver of 9173
8	07/11/2003	0845 hrs	Left Banarasi Dhaba (Food & rest point). Convoy planned to cover 330 kms that day to reach Raipur.	9173 driver
9	07/11/2003	Approx. 12:00	Reached Deori village. Stopped & purchased some ingredients to prepare lunch.	9173 driver
10	07/11/2003	Approx. 12:30	6615 & 4410 proceeded & left 9173 behind (wanted to have a shave). Planned to meet at a point after check post.	9173 driver
11	07/11/2003	Approx. 13:00	Convoy arrives at check post	9173 driver
12	07/11/2003	Approx. 13:15	All three vehicles stop approx. 1 kms after check post for 1/2 hour.	Driver 9173
13	07/11/2003	Approx. 13:45	6615 leaves, 5 min later 4410 leaves. 9173 left after another 5 minutes	Driver 9173
14	07/11/2003	Approx. 14:00	After traveling another 4 kms 4410 crashed with third party vehicle	Driver 9173
			AT truck collides with BT truck head-on. Impact occurred to front right side of both trucks & the container of AT vehicle is crushed.	Photos 68, 73, 77 & 83
			Both vehicles travel a distance of full-length of each other, rubbing alongside each other.	Photos 239, 233,236 & 285
			AT truck swiveled clockwise 110 deg and then overturned on its left side.	Photos 68, 73, 77 & 83
			BI vehicle stopped after traveling 5 meters on the correct side of the road.	Photos 67, 71 & 72
			Front wheels & axle of BI vehicle have come off the vehicle.	Photos 67,71 & 72
			AT truck has a completely crashed cab and the container dented on the top right corner.	Photos 68, 73, 77 & 83
15	07/11/2003	Approx. 14:05	9173 vehicle arrives at the scene	Driver 9173
16	07/11/2003	Approx. 14:06	9173 parks alongside 3rd party vehicle.	Driver 9173

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17	07/11/2003	Approx.14:15	9173 stops. Driver & Assistant tries to remove driver of 4410 in driver seat unconscious, cleaner of 4410 moaning and lying on the road.	Driver 9173
18	07/11/2003	Approx. 14:15	Driver & assistant of 9173 transfers both Driver & cleaner of 4410 to their vehicle and proceeds towards Rajnandgaon (60 kms away)	Driver 9173
19	07/11/2003	Approx. 14:15	9173 driver also see driver of BI vehicle crushed in his seat. Observes another person trying to get out of the left side of BI vehicle	Driver 9173
20	07/11/2003	Approx. 14:10	6615 loses site of 4410 in the convoy, stops & pulls to one side. Leaves cleaner behind and travels back in another vehicle towards incident site.	Driver 9173
21	07/11/2003	Approx 14:20	6615 driver meets 9173 vehicle. All jump into 9173 and travel 60 kms to reach Rajnandgaon (5 people in the cab)	Driver 9173
27	07/11/2003	Approx 14:30	Driver of 3691 arrives at accident scene.	Sanjay, AT
22	07/11/2003	Approx. 14:45	Enroute crosses Chichola RTO check post & Sales tax point	Driver 9173
23	07/11/2003	Unknown	Vehicle 9173 stops at medical center to seek advise. Told no facility available. They were asked to proceed to Rajnandgaon hospital	Driver 9173
	07/11/2003	Approx 15:10	Informs Sanjay, AT, Mumbai through telephone that there was an accident.	
	07/11/2003		Sanjay advises the driver to go back to the accident site and collect further details of the whereabouts of Driver & cleaner of 4410	Driver 3691
24	07/11/2003	Approx. 16:00	9173 arrives at Rajnandgaon market and parks up. Transfers victims to an auto rickshaw. The driver died at that time and cleaner still alive.	Driver 9173
25	07/11/2003	Approx. 16:15	Auto rickshaw arrives at hospital. - 3 kms away	Driver 9173
26			Doctor sees both victims. Goes back in to get some injections. After coming back, pronounces the cleaner of 4410 dead.	Driver 9173
28	07/11/2003	Approx.1620	Driver of 9173 calls up Sanjay, AT and confirms death of 3 persons in the accident. 2nd call to Castrol informing 3 fatalities - 2 of AT and 1 of Third party.	Sanjay, AT
30	07/12/2003	Whole day	9173 driver and Cleaner stay near hospital at Rajnandgaon.	Driver 9173
31	07/12/2003	Approx. 13:00	Accident Investigation team arrive at site	
32	07/12/2003	Approx. 13:15	Attempt to talk to BI staff - no co-operation	
33	07/12/2003	Approx. 13:30	Interviewed Kuldeep Singh of BI	Investigation team
34	07/13/2003	Unknown	Informal cleaner meeting at incident site. Cleaner spoke to the cleaner of BI. Driver of BI was driving too fast, possible collision with another vehicle.	cleaner 9173
35	07/13/2003		BI cleaner was hurt below the left eye.	cleaner 9173

EVIDENCE

Dilip Kumar Chobey
Driver – Assam Transport Service
Vehicle 9173
16/07/03
15:05

Present
Sanjay Sharma – Assam Transport Service
Sam Singh – BP
Stuart Smith – BP
Shashank Singh – BP

We (the driver and cleaner of vehicle 9173) left the border check post at approx 13:00/13:30, vehicle 4410 had left the check post approx 5 minutes before us. We had all agreed to meet and eat approx 1km after the check post. We stopped for a period of approx half an hour, then the vehicles started on the journey again. Vehicle 6615 was in front, followed by 4410 and then us; the distance between us must have been 1km. We approached the accident scene at approx 14:00, I noticed the collision, the location of the third party vehicle was on the right hand side of the road, on the road and 4410 had tilted on its left side behind the Bilaspur Indur (BI) vehicle. The driver in the BI truck was trapped behind the wheel and I could see the cleaner of his vehicle on the passenger side. We parked our vehicle alongside the BI, in front of 4410, our main priority was to attend to our colleagues. I saw the cleaner of 4410 lying on the road behind 4410, he must have been flung from the vehicle. The driver of 4410 was still in the cab that was very badly damaged. We manually lifted the mangled cab to one side to get the driver out. Another BI truck at this time had parked up close to the BI truck that was involved in the accident and their people were tending to the injured in their vehicle. They were using ropes to prise open the cab to extricate the driver of the BI vehicle. By this time traffic was building up in both directions and those that could get past were going past and not stopping. We then put the driver and cleaner of 4410 into our vehicle (9173). I then reversed 9173 and drove past the BI truck to proceed east along NH6. I did not turn the truck back towards Deori (location of nearest hospital because the traffic was very dense and it would have been dangerous to do a U turn). I must have travelled approx 3km before an on coming vehicle halted me. Sunil Pandhay, the driver of 6615 had hitched a lift back towards the incident site after he became concerned that he had lost sight of our vehicle and that something must have happened. The driver of 6615 then jumped into our vehicle and now there were 5 of us travelling towards the Chichola border, approx 22km away. We stopped at the RTO (Region Traffic Office) for approx 5 minutes and then at the Sales Tax Office to show paperwork again another 5 minutes. This process was quickened after the border officials had seen the injured driver and cleaner of vehicle 4410. We crossed the border and headed towards Rajnandgoan, another 38km approximately, once there we transferred the driver and cleaner of 4410 into an auto rickshaw and took them to the hospital which was located approximately 3kms away. We arrived at the hospital at approximately 16:00hrs, the driver of 4410 had died on arrival and the cleaner died approximately 5 minutes thereafter.

Evidence

Sardar Yadav
Cleaner – Assam Transport Service
Vehicle 9173
16/07/03
15:42

Present
Sanjay Sharma – Assam Transport Service
Sam Singh – BP
Stuart Smith – BP
Shashank Singh – BP

We left Deori at approx 11:45 and travelled to the check post at the border, we arrived at the border approximately 12:30. All three vehicles 6615, 4410 and 9173 were in convoy and we did not stop. We took approximately half an hour to get through the border. After the border we had decided to meet and eat, this happened at approx 13:00, we were now approximately 3 to 5 kms away from the accident site. 6615 and 9173 had left and we followed shortly afterwards. As we approached the accident scene, we recognized our vehicle 4410 from the container and stopped.

Same story as driver – some inconsistency with timings, after a period of silence the cleaner had to re-evaluate the times to coincide with what exactly happened at what time.

We stopped at a medical centre near Chichola border, but they could not help us, and advised us that the nearest hospital would be that in Rajnandgoan, so we proceeded towards the RTO and Sales Tax point at Chichola Border. I got out, we must have stopped for approximately 15/20 minutes to show paper work, and this process was quickened due to the injured driver and cleaner of 4410. Once we arrived in Rajnandgaon, we parked the truck at the market and transferred the driver and cleaner to an auto rickshaw and took them to hospital. The driver of 4410 died on arrival and the cleaner of 4410 died approx 5 minutes thereafter.

Evidence (Continued)

Kuldeep Singh
Licensed driver of truck 5113
Date interviewed: 12th July '03
Time 13.30

People present:

B. Murali – Castrol India
V. Srikanth – Castrol India
Shashank singh – Castrol India

I was driving the truck and my assistant Avtar Singh was sleeping on the upper bunker bed inside the cabin. The accident happened between 1.30 p.m. to 2 p.m. A containerized truck was coming in the opposite direction. The vehicle was coming towards me at high speed. I was on second gear and was driving slowly.

When I knew that the other vehicle is going to collide with me, I jumped to my left side on to the engine when collision happened. My right leg got injured otherwise I survived.

Avtar singh, who was sleeping on top, due to the impact fell from top and landed in driver's seat and got killed because of the impact. Avtar Singh is married and has two children..

The investigation team couldn't cross-examine the witness as the place and timing for having the discussion was not appropriate. We met Kuldeep Singh at the accident site along with 10 other members belonging to the same transport company. They were transporting the body of Avtar Singh and were in a hurry to leave for the native town. This account of Kuldeep Singh gave rise to many questions among the investigation team members,

- a) *How is it possible for Avtar Singh to slide from the bunker bed at the top and land right into the driver seat to have got killed in the impact?*
- b) *Was Avtar Singh actually driving the vehicle, while Kuldeep Singh was sitting along side, which is the reason why he survived?*
- c) *Was Avtar Singh having any license?*

People

Driver

Name:	Avdesh Dubey
Age:	25 years
Marital Status:	Unmarried
License No.:	WB-25-051561/95
Experience:	8 years of experience
Date of Joining:	13 th May 2003 at Calcutta & 23 rd May '03 at Mumbai
No. of trips done:	11 trips for the transport contractor before accident

Driver Assistant

Name: Shравan Kumar Nisath
Age: 20 years
Marital Status: Unmarried
Date of joining: 7th July '03

Parts

Vehicle number: MH04 F4410
Date of Regn: 1998
National Permit no: 24551/MH04/3.02 valid upto 19/03/2007
Fitness certificate validity: 08th March 2004
Insurance validity: 19th March 2003
Road Tax: 31st August 2003

Position

The Road (National Highway no: 6) & Crescent shaped hard shoulder:

Width of the Highway: 7 m
Type of traffic: Single lane for both the sides of traffic movement
Road markings: Dotted white line (median), Continuous yellow line marking on both sides of the road.
Traffic Density: Medium

Observation by Investigation team:

The width of the road is 7 m along the highway and the width of every truck is approx. 2.5 m. That leaves theoretically 2 m width between two vehicles crossing each other. However it is a general tendency in India among truck drivers, not to drive towards the side of the road due to various reasons - height difference between road and shoulder, villagers walking alongside the highways, stray cattle along road side and so on. Typically every trucker leaves 0.75 m of space to his left while driving, which leaves just half a meter gap between two oncoming vehicles - at relative speeds exceeding 80kmph. On a normal stretch of road, a driver is expected to factor this allowance and drive slower than normal around a bend. However at this site, due to the presence of hard shoulder, the road appears wider than normal viewed from the direction of travel of vehicle 4410 (increasing from 7m to 12 m approaching towards the center of crescent (kindly refer photos in appendix 1) which leads drivers not only in driving over centerline but also in continuing at the same speed around the bend.

A continuous centerline indicating "no crossing at all times" was absent around the bend we are referring. The investigation team felt that such markings on the center of the road would have alerted/warned the drivers around the bend and have separated them from coming onto each other's path.

Driving Behavior at the site:

The investigation team visited the accident site and observed the traffic behavior at the bend near the accident site. Out of 20 vehicles observed (10 from each side) - we observed more than 70% of vehicles are driving past the centerline. This led us to come to the conclusion that the crescent shaped hard shoulder is misleading vehicles coming from Mumbai that the road is much wider than what it actually is...

Approximate relative speeds

The investigation team noticed skid marks. From the accident reconstruction expert we have in India, whom we had a telecon with after sending him photographs of skid marks and vehicle positions, the relative speeds (approximately) in his opinion could be in excess of 120 kmph. We couldn't any inputs about the 3P truck to scientifically interpret the skid marks and come to a conclusive data on speed. The contractor truck was not fitted with tachograph or any other speed measuring devices.

CLC ANALYSIS (SYSTEM CAUSES)

Numbering according to Root Cause Analysis tool 'Comprehensive List of Causes'.

Critical Factor

1: "The design of the road"

Immediate causes

The layout of the road at the accident site had four shortcomings:

8-5 – Inadequate workplace (road) layout

No sign indicating a bend towards left

8-5 – Inadequate workplace (road) layout

No solid white line around the bend, indicating no overtaking or crossing over line.

8-1 – Congestion or restricted motion

Crescent shaped hard shoulder was very misleading. It leads drivers to believe that the road is wider than what it actually is.

8-5 Inadequate workplace layout

No sign indicating it was an accident black spot – despite police confirming 3 fatal accidents at same spot in the last 2 months.

Possible System Causes

10.1 Inadequate Technical Design

Design of hard shoulder misleads drivers.

10.2 Inadequate standards, specifications and/or design:

The median in the road for such a bend was inadequate and there was inadequate signage. The median was a broken line instead of a solid line thus it did not discourage overtaking around the bend.

10.9 Other - No warning signs

History of accidents at this site makes the requirement for special hazard warnings self-evident.

2. Driving towards centre of the road by one or both of the trucks

There were no direct eyewitnesses to this incident to provide evidence. Also two witnesses of 3P involved in accident have "disappeared" without giving evidence. This critical factor was based on our site visit, our interpretation of skid marks and inferences drawn from other secondary evidences.

Immediate causes

Either one or both of the trucks must have crossed the centre line to cause the accident. Although there is no clinching evidence to prove this, the road width necessitates vehicle travelling in both directions to drive towards centre. Additionally this is a typical driving behaviour observed at the site. The team observed over 20 vehicles crossing the site from both directions in trying to understand the driving behaviour. Over 70% of the vehicles crossed the centre line as they crossed the accident site. We have photographic evidence to prove this.

Action

- 4.1 **Improper decision-making or lack of judgement**
- 4.8 **Routine activity without thought**

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Possible System Causes

- 6.1 **Inadequate assessment of required skills**
- 6.4 **Lack of coaching on skill**
The driver had 6 years of driving experience along the same highway. He had joined contractor in May'03 and had not completed his defensive driving training at Castrol.

Proposals for Corrective Actions

1. All drivers belonging to dedicated fleet owners (Primary & Bulk) will complete DDT before carrying castrol goods – By 1st October '03
2. 50% of secondary transport fleet drivers will undergo DDT – By December '03
3. Communicate learning's to all drivers at all locations through toolbox talks. – Within a week from report release.
4. Contact National Highway authority to make modifications to the road design (concerned site) and influence through the NGO called IRTE – Within a week from release of report.

Recommendations

We have focussed on the causes of the accidents, the recommendation below relate to corrective or preventative actions in relation to reducing risk of death or serious injury.

- The impact of the accident resulting in death could have been avoided if not for the wooden cabin of truck 4410. Replace wooden cabin with metal or fibre glass cabin
- For all manor routes, drivers must have access to details of the nearest emergency centre – because it took 2 ½ hours to reach the injured to the hospital. This delay may have contributed to the fatalities.
- The local management must re-iterate the importance of wearing seat belts, as it is considered that the ejection of the driver assistant of 4410 during the impact would not have occurred if he was wearing one.

SIGNATURE PAGE

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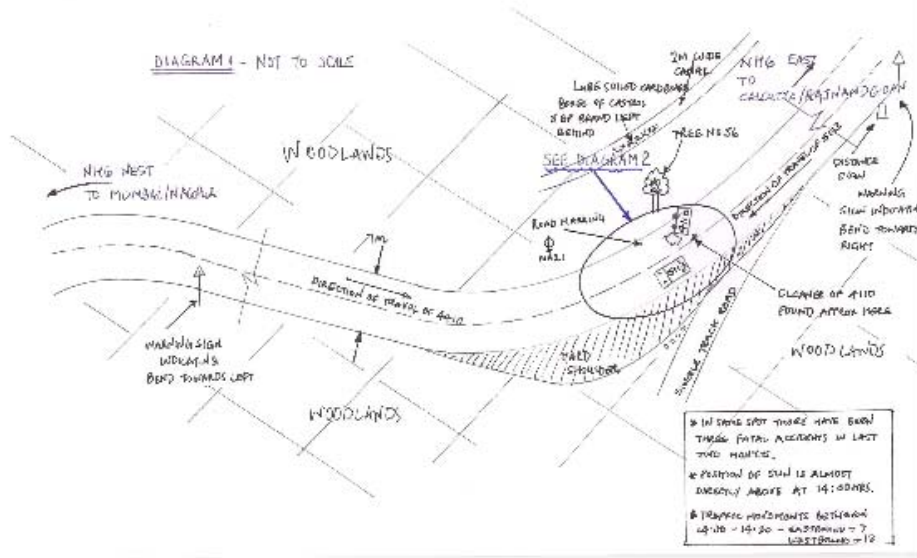
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Appendix 1- photos/ Pictures

Vehicle 4410



Accident photo (5113 facing us) & 4410 at the back



Sketch of the road and accident site – Not to scale



Crescent shaped shoulder

View from the direction of travel of 4410. View of crescent shaped shoulder misleading.



A close up photograph showing the Road shoulder.

Photos



Close up photograph of the hard shoulder...



A truck pictured as it approaches left hand curve. Typical behavior (crossing center line) - Observed at site



Trucks crossing center line - Driving behavior at the site. (crossing center line)

Appendix 2

Police FIR (First Information Report)

Dated July 24, 2003

The summary of the police Investigation report is As follows

Name of the Deceased : Mr Avadesh Kumar Dubey , Age around 25 years, Son of Bibhuti Brahman, resident of Azamgarh, Uttar Pradesh.

Date of the Incident : 11th July 03

Place of Incident : G E Road, Village Chabhuknala Mor, Police Station Chinchola, District Rajnandgaon, State Chattisgarh

Date of Information : 11th July 03

Details of the Accused : Driver of Truck no MP09-KC5113 Mr. Avtar Singh, Son of Mr. Hardip Singh of Bhilai, Dist Durg, State Chattisgarh

Summary of the Incident :

It was reported to the Bagnadi Police Station by Mr Ramprakash Kuwar, age around 40 years, resident of Chabuknala, that on 11/07/03 at around 3pm truck no MP09-KC5113 (3P Vehicle) and MH04-F4410 (Contractor Vehicle) have had a collision and also that the injured have been taken to hospital and the driver of MP09-KC5113 (3P Vehicle) is dead and trapped between the steering wheel.

Primary investigation findings are that the accident was caused due to reckless driving by the driver of Vehicle no MP09-KC5113 (3P Vehicle) due to which he collided with vehicle no MH04-F4410 (Contractor Vehicle).

As a result of the collision the driver of MP09-KC5113 died on the spot and the occupants of the vehicle MH04-F4410 Mr. Sharavan Kumar Yadav and Mr Avdesh Kumar Dubey were injured and taken to hospital.

The Driver of Vehicle MP09- KC5113 has been accused of a Criminal Offence, It was confirmed from the Police out post at the district Hospital in Rajnandgaon that Mr. Sharavan Kumar Yadav and Mr Avadesh Kumar Dubey were brought at 3:50 pm and were declared dead.

As the accused has died in the accident the incident is deemed closed.