Saving lives through accident research!

Crash Investigation

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State Level Road Safety Workshop
Rajasthan Agricultural Research Institute, Jaipur

28th December, 2016
About JP Research India Pvt. Ltd. (JPRI)

- A subsidiary of JP Research, Inc. (California USA)
- Began operations in 2006
- Traffic safety research and consulting firm.
  - Specialization in on-site crash investigations

- **Offices in 5 Cities in India**
  - Coimbatore, Pune, Ahmedabad, Kolkata and Jaipur.
- **Over 4500** accidents investigated by JPRI.
An in-depth crash database containing detailed crash data collected through on-site crash investigations with the cooperation of the police. The crash data, including reconstruction and injury information, is shared by a consortium of OEMs for scientific crash analysis.

**Sampling Locations**
- Coimbatore, Tamil Nadu
- Pune, Maharashtra
- Ahmedabad, Gujarat
- Kolkata, West Bengal
- Jaipur, Rajasthan

**RASSI Consortium Members**
- JP Research, Inc.
- Bosch
- Daimler
- Nissan
- Renault
- Hyundai
- Honda
- Autoliv
- Maruti Suzuki
- Toyota
- Tata Motors

Website: www.rassi.org.in
Email: rassisupport@jpresearchindia.com
Current Locations and Characteristics

- Coimbatore (South India): National/State Highways and Rural roads
- Pune (West India): Mumbai – Pune Expressway
- Ahmedabad (West India): City roads
- Kolkata (East India): City roads
- Jaipur (North India): City roads
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RASSI – A Public Private Partnership

Accident Notification Support

Financial and Technical Support

Crash Data/Analysis Reporting

Engineering Data for Vehicle Safety Development

Government

Industry

12/29/2016
Contents

• Crash Investigation Methodology
  • Case Study

• Monthly Accident Research Study
  • Top Factors
What is a Road Accident?

A primer...!
What is a road accident??

Definition:

When a motorized vehicle that is moving along a roadway collides with another vehicle, pedestrian, animal, or objects, such as tree or utility pole or starts rolling itself.
Accident Investigation in India

• Mostly focuses on “Who did it?”
  − Driver error

• Lack of focus on “How/Why did it happen?”
  − Influence of infrastructure and vehicle factors
  − Injury causation

• Focusing on driver errors alone will not help mitigate road accidents and injuries.
Crash Investigation Methodology
Crash Investigation Methodology

- Crash Notification
- Crash Investigation
- Crash Reconstruction
- Injury Analysis

**Scientific Data Collection Process**

**Examination**
- Crash Scene
- Crash Vehicles

**Engineering Data**
- PC Crash
- Speed Estimations
- Delta - V

**Injury Data**
- AIS (AAAM)
- Injury Correlation

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29 December 2016
Accident Research Study - Jaipur (East Zone)
Case Study
Crash Notification Phase

• Crash details:
  • Accident date: 21\textsuperscript{st} October, 2016. 1900 hrs.
  • Accident Location: B2-Bypass, Taron ki Koot
  • Vehicles involved: M2W, Pedestrian

• Notification details:
  • Notification date and time: 21\textsuperscript{st} October, 2016. 1905 hrs.

• Response details:
  • Investigation time: 21\textsuperscript{st} October, 2016. 1945 hrs.
Crash Investigation Phase

Vehicle Examination

Scene Examination
Crash Summary

- Unit 1 (Motorbike [M2W], 1 occupant) was travelling towards south on NH-52 near B2 Bypass. Unit 101 (Female pedestrian) was using a pedestrian crossing, talking to a friend, in the travel lane of M2W. On seeing the pedestrian, rider of motorbike tried to avoid impact by braking. The avoidance was unsuccessful and the motorbike impacted the pedestrian.

- The pedestrian suffered serious injuries to the leg in the crash.
Crash Reconstruction

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Travel Speed</th>
<th>Impact Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorbike</td>
<td>28 kph</td>
<td>18 kph</td>
</tr>
</tbody>
</table>

![Crash Reconstruction Diagram](image-url)
1. Fractured left tibia/fibula: caused due to impact with front tyre of M2W
2. Abrasion on Left elbow: caused due to impact with windshield of M2W
JPRI approach

- **Contributing Factors**
  - Factors influencing the accident

- **Accident**

- **Contributing Factors**
  - Factors influencing fatal or serious injuries

- **Injury**

**Studying accident and injury factors separately is important to identify effective measures in mitigating accidents and injuries.**
Venn diagram analysis

Each of these factors can influence an accident or injury causation independently or as a combination.

For e.g.
Human and Vehicle factors, Human and Infrastructure factors, Vehicle and Infrastructure factors, or all three together.

Coding Sheet.
Coding Manual.
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Apply it to the crash (Accident factors)

1. Human.
   • Pedestrian inattention

2. No vehicle factors.

3. Infrastructure.
   • Poor pedestrian infrastructure - Crossing

Human and infrastructure (H-I) factors contributed to the accident.
Apply it to the crash (Injury factors)

1. Human.
   - No human factors.

2. Vehicle.
   - Pedestrian knockdown

3. No infrastructure factor.

Only vehicle factors contributed to the injury.
Apply it to the M2W crash (Overall)

All three primary factors contributed to the accident and injury causation.

1. Human.
   • Pedestrian inattention.

2. Vehicle.
   • Pedestrian knockdown.

3. Infrastructure.
   • Poor pedestrian infrastructure - Crossing.
Monthly Accident Research Study
JPRI Operations in Jaipur City

• JPRI started crash investigation in Jaipur city with the support from Centre for Road Safety and Jaipur City Traffic Police.

• Since the start of October, JPRI has investigated 38 cases in the East Zone of Jaipur city Police Commissionerate.

• An Accident Research Study report containing a detailed analysis of the accidents investigated in October and November was submitted to Centre for Road Safety.
### Top Factors Leading to Accidents

<table>
<thead>
<tr>
<th>Human (84%)</th>
<th>Vehicle (8%)</th>
<th>Infrastructure (40%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disobeyed traffic signal (16%)</td>
<td>Defective brakes (4%)</td>
<td>Poor road signage/markings (20%)</td>
</tr>
<tr>
<td>Driver inattention (16%)</td>
<td>Overloading people (4%)</td>
<td>Poor pedestrian infrastructure – Crossing (12%)</td>
</tr>
<tr>
<td>Improper lane change/lane usage (12%)</td>
<td>-</td>
<td>Poor street lighting (8%)</td>
</tr>
</tbody>
</table>

*Note: The above conclusions are based on 25 cases investigated from October 2016 to November 2016.*
No/Improper Road Markings

Factor:
No road markings on undivided roads.

Intervention:
Road markings on all sides with thick double yellow lines in median.
Poor Placement of Pedestrian Crossings at Intersections

Factor:
Pedestrian crossings placed further away from intersections.

Intervention:
Shifting Pedestrian crossings closer to intersections.
Shifting of Pedestrian Crossings at Intersections
Traffic Calming Measures Before Pedestrian Crossings on Straight Roads

Factor:
No devices to slow down traffic before pedestrian crossings on straight roads.

Intervention:
Raised pedestrian crossings with signage to improve pedestrian safety.
## Top Factors Leading to Injuries

<table>
<thead>
<tr>
<th>Human (12%)</th>
<th>Vehicle (84%)</th>
<th>Infrastructure (17%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helmet not used (11%)</td>
<td>Knockdown (61%)</td>
<td>Object impact - road side - manmade structures (11%)</td>
</tr>
<tr>
<td>-</td>
<td>Run-over (39%)</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>Passenger compartment Intrusion - Other (6%)</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note: The above conclusions are based on 18 cases investigated from October 2016 to November 2016.*
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Flower Pots Placed on Roadside/Median

Factor:
Flower pots act as rigid objects for vehicles and occupants, increasing severity.

Intervention:
Reducing size of flower pots placed inside median.
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Thank You!

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