Smart Safety Systems for Safer Kolkata City Roads

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Kolkata city accident research initiative

• Jointly initiated by Kolkata Traffic Police, CII, ITC and JPRI.
• On-site crash investigation of fatal accidents with the support of Kolkata traffic police since November 2014.
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Results of one year study

- 316 Fatal accidents
- Fatal accidents are widely spread around Kolkata city.

Note: 316 fatal accidents notified to JPRI from Nov’ 2014 to Nov’ 2015.

Source: Google maps
Pedestrians, hit & run vehicles, and two wheelers are most often involved (68%) road users in fatal accidents.

Total number of road users involved: 601

Source: Kolkata city fatal accident study report 2014 - 2015
Results of one year study
Percentage distribution of road users affected

Pedestrians, two wheelers and bicyclists account for 90% of fatalities.

Total number of road users affected: 326
Source: Kolkata city fatal accident study report 2014 - 2015
Focus on pedestrians

182 pedestrian fatality (56%)

In Kolkata city, one pedestrian dies every second day!
## Results of one year study
### Contributing factors for pedestrian accidents

<table>
<thead>
<tr>
<th>Human (81%)</th>
<th>Vehicle (100%)</th>
<th>Infrastructure (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speeding more than 30Kmph (77%)</td>
<td>Pedestrian knocked down to the ground (66%)</td>
<td>Poor pedestrian infrastructure – crossing (72%)</td>
</tr>
<tr>
<td>Driver inattention / Distraction (8%)</td>
<td>Pedestrian run over (34%)</td>
<td>Poor pedestrian infrastructure – walking alongside (28%)</td>
</tr>
<tr>
<td>None</td>
<td>Vision obstruction due to vehicle interiors (8%)</td>
<td>None</td>
</tr>
</tbody>
</table>

*Source: Kolkata city fatal accident study report 2014 - 2015*
Infrastructure factors leading to fatal pedestrian crossing accidents

- 72% of fatal pedestrian accident occurs when pedestrians are trying to cross the road.
- 76% of fatal pedestrian crossing accident occurs at or near junctions.

Source: Kolkata city fatal accident study report 2014 - 2015
Example fatal pedestrian crossing accident

Source: Kolkata Traffic Police

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Smart pedestrian traffic lights

Source: You tube
Smart pedestrian traffic lights

Source: You tube
Smart pedestrian crossing with refuge island

Source: www.itdp.org
Smart pedestrian crossings at intersections

Pedestrian crossings at all sides

Raised pedestrian crossings allowing the vehicles to slow down

Pedestrian crossing and the pavements should be connected

Source: www.itdp.org
Smart pedestrian infrastructure crossing solutions

1. Proper pedestrian signals.

2. Refuge island.

3. Proper pedestrian crossing.

4. Perpendicular intersections.

Pedestrian crossing accidents can be mitigated with the smart pedestrian crossing infrastructure solutions

Source: www.itdp.org
Infrastructure factors leading to fatal pedestrian walking alongside accidents

- 28% of fatal pedestrian accident occurs when pedestrians are walking alongside the road.

Source: Kolkata city fatal accident study report 2014 - 2015
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Example fatal pedestrian walking alongside accident

Source: Road Accident Sampling System India (RASSI)

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Example fatal pedestrian walking alongside accident

Poor pedestrian pavement facilities

Source: Road Accident Sampling System India (RASSI)
Smart pedestrian infrastructure walking alongside solutions

1. Proper pedestrian pavements.
2. Minimum 2 meters.
3. No pavement encroachments

Pedestrian walking alongside accidents can be mitigated with the basic smart pedestrian walking alongside infrastructure solutions

Source: www.itdp.org
Example: Vehicle factor (Knock down)

**Knock down:** Pedestrians when impacted by another vehicle, lose balance due to shift in CG and fall down on the ground, resulting in injuries to the pedestrian.

*Source: Kolkata Traffic Police*
Vehicle factors (Knock down accidents)

- Two of every three (66%) pedestrian fatalities is a knock down.

Source: Kolkata city fatal accident study report 2014 - 2015
Smart solutions (Knock down)
Autonomous Emergency Braking System (AEBS)

Source: YouTube
Smart solutions (Knock down)
Autonomous Emergency Braking System (AEBS)

Source: YouTube
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Smart solutions (Knock down)
Blind spot assist system

Source: YouTube
Example: Vehicle factor (Run over)

Run over: In an event of impact, pedestrians will be knock down to the ground and are run over by the wheels of the accident vehicle (usually a bus or a truck). This usually occurs due to a large ground clearance between the vehicle and the ground.

Source: Kolkata Traffic Police
Vehicle factors (Run over accidents)

- One of every three pedestrian fatalities is a run over

**Source:** Kolkata city fatal accident study report 2014 - 2015
Smart solutions (Run over)
Vehicles with low ground clearance

- No run over accidents seen so far in Kolkata city with buses of low ground clearance.
- Introducing more buses of this type will subsequently mitigate pedestrian run over accidents in Kolkata city.

Source: Google
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Basic smart solutions (Run over)
Vehicles with run over protection device

Source: http://www.s1gard.com/videos.html
Conclusions

• One pedestrian dies every second day in Kolkata city roads.

• For a safer pedestrian journey in Kolkata city roads:

  1. Pedestrian infrastructure problems need to be addressed.
     • Proper pedestrian traffic lights.
     • Reduce the pedestrian crossing distance by refuge islands.
     • Intersections with proper pedestrian crossings.
     • Proper pedestrian pavements without encroachments.

  2. Pedestrian vehicle problems need to be addressed.
     • Autonomous Emergency Braking Systems (AEBS).
     • Blind spot assist system.
     • Buses and trucks with low ground clearance.
     • Run over prevention device.
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Thank you

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Download the road accident study report: http://www.jpresearchindia.com/papers.html