ASSESSING SAFETY LEVEL OF BUS STOPS IN THE ABSENCE OF CRASH DATA

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Objective:
• Development of a methodology to assess the safety level of bus stops in the absence of crash data

Motivation
• Bus stops act as interfaces where the pedestrians interact with transit vehicles
• Safety level of bus stops in urban India have declined significantly due to the absence of necessary design and management measures
• It is essential to develop a methodology to prioritize bus stops, so as to carry out safety improvement works in different phases
• Availability of reliable and comprehensive accident database is highly limited in emerging countries
• Therefore, it is necessary to develop a methodology to prioritize the bus stops in terms of safety in the absence of crash data

Study Area
• A corridor of 8.2 km in Kolkata city, India is selected for application
• Corridor includes 45 bus stops

Methodology

<table>
<thead>
<tr>
<th>Literature study</th>
<th>Identification of unsafe acts and causal factors</th>
<th>Classification of causal factors</th>
<th>Model for assessing safety level</th>
</tr>
</thead>
</table>

Unsafe Acts and Causal Factors

<table>
<thead>
<tr>
<th>Causal Factor</th>
<th>Unsafe Act</th>
<th>Resulting Unsafe Act</th>
<th>Resulting Unsafe Act</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management deficiency</td>
<td>Vehicle not stopping before crossing</td>
<td>Inadequate dwell time</td>
<td>Improper signal</td>
</tr>
<tr>
<td>Design deficiency</td>
<td>Absence of lighting</td>
<td>Unreasonable higher</td>
<td>On-street parking</td>
</tr>
<tr>
<td>Design deficiency</td>
<td>Absence of drainage</td>
<td>Inadequate width</td>
<td>Maintenance</td>
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<td>Maintenance</td>
</tr>
</tbody>
</table>

Results and Discussion

• Weightage of causal factor (w) = contribution index (ci) x degree of danger (di)
• c and d were established using Analytical Hierarchy Process (AHP) and Rating technique respectively
• X values were obtained through field investigation

Conclusions
• Most common deficiencies associated with bus stops are:
  - Vehicle not stopping at a safe distance from crosswalk
  - Presence of street vendors along the sidewalk
  - On-street parking near the bus stops
  - Absence of inadequate waiting area
  - Management deficiencies in and around the bus stops are dominant over design deficiencies
• Nearly 40% of the bus stops have a safety level less than 7.5