

Analysis of Un-signalized T-Junctions using Traffic Conflict Technique

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Flow of Presentation

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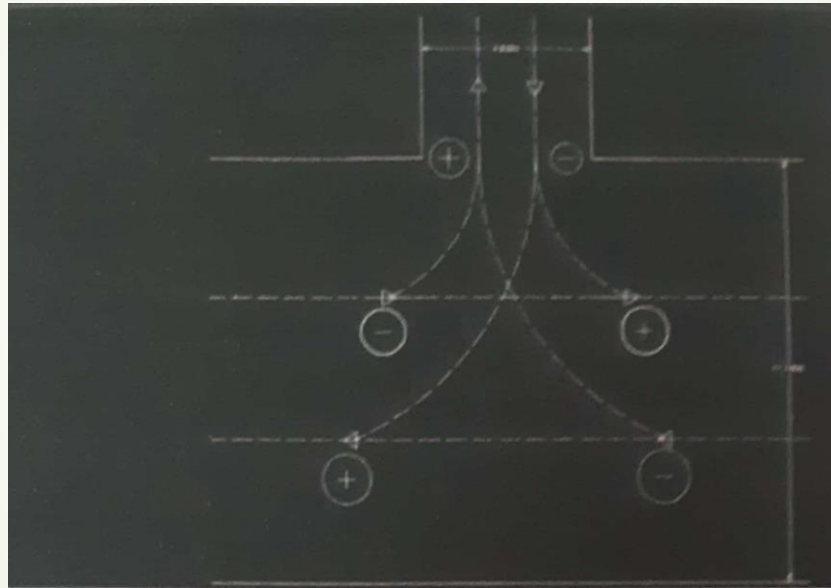
- Introduction – need for study
- Objectives
- Why Conflict Technique - in
- Data & Data acquisition
- Methodology & Flow
- Results
- Conclusions

Introduction – Need for Study

- ▶ Traffic safety constitutes a major health problem in developing countries
- ▶ Prioritizing unsafe locations and focusing improvement strategies is a popular approach to enhance safety.
- ▶ Prioritization of unsafe locations mainly requires crash data
- ▶ There are a few popular proactive measures for prioritization of unsafe locations

Introduction – Need for Study

- Conflict Technique is a popular method for assessing safety



- It do not incorporate the hazard severity induced by conflict partners in mixed traffic situation.

Objectives

- ▶ Analyse the safety of un-signalized T-junctions using traffic conflict technique in the city of Patna, Bihar, India
 - ▶ Incorporating the hazard severity induced by conflict partners.
 - ▶ Percentage of Critical conflicts (compared to total conflicts)

Methodology

T- junction details

- Identification of critical conflicting movements
- Demarcation of conflict zones in field
- Marking trap lengths in field

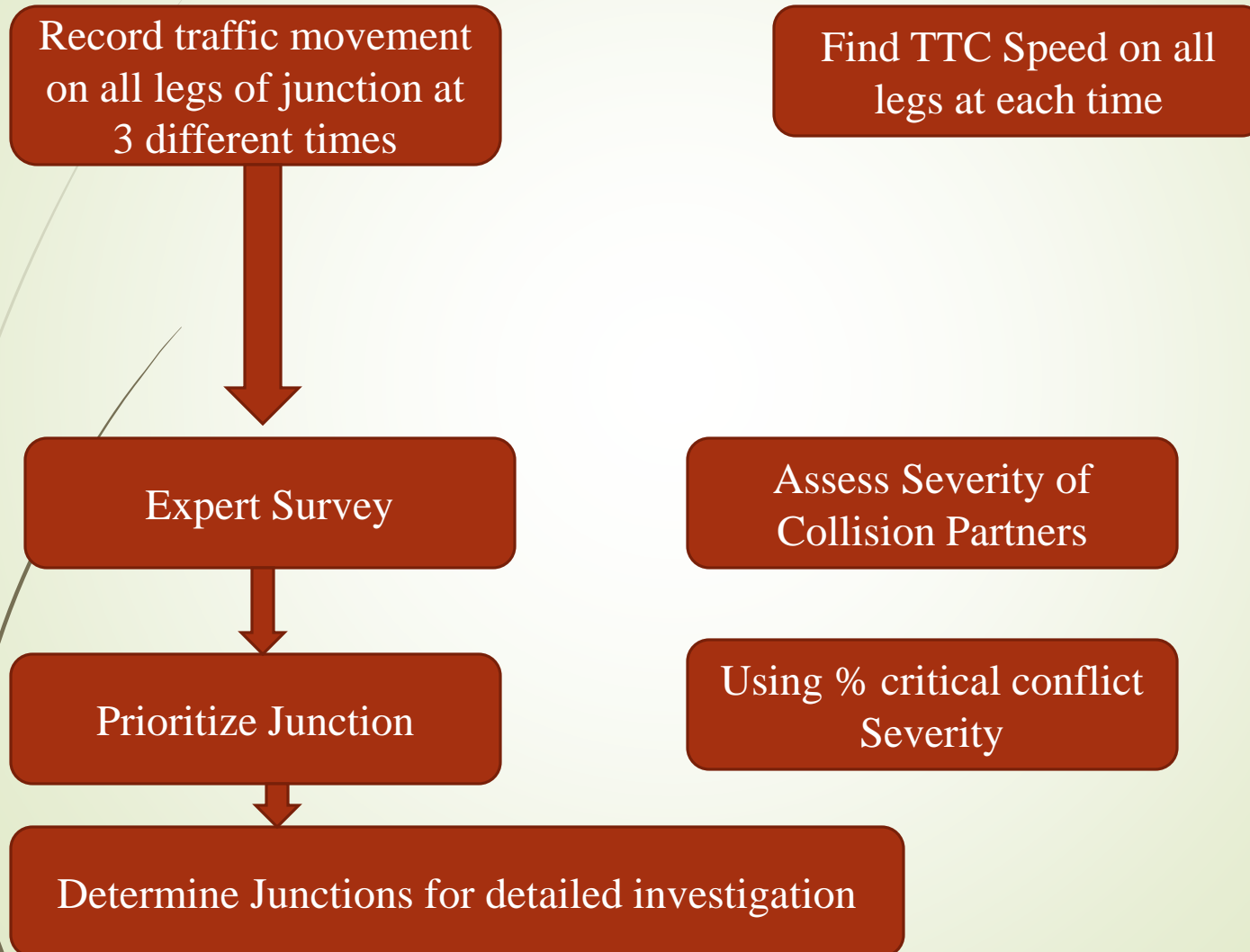
Conflict Study

- Recording detailed traffic video for each movement for peak & off peak hours
- Extracting TTC & Speed of Colliding vehicles
- Extracting Conflict Partners
- Extracting Traffic volume & composition

Junction prioritization

- Determining % of collision in critical zone
- Determine conflict severity (with conflict partner)
- Prioritizing junctions based on critical conflict & conflict severity

Methodology – Flow



Data – Requirement

- ▶ T-intersection Geometry Details
- ▶ Identified & marked major conflict zones
- ▶ Traffic video at conflict zones
 - ▶ Time to Collision (TTC)
 - ▶ Speed of following vehicle before application of brake
 - ▶ Traffic volume & composition of each leg
- ▶ Conflict partners

Data – T-Junctions Chosen

1. Kendriya Vidyalay, Patna Road No. 2 Junction
2. Defence Colony Junction
3. Jaleswar Mandir Road Junction
4. Sachiwalaya Colony Junction
5. Kankarbagn PNB Junction
6. Seikhpura Junction
7. Professor Colony Junction
8. Rajini Path Junction
9. Rajendra Nagar Road No 10. Junction
10. Shalimar Sweet Junction

Data – Vehicle Types

- Vulnerable Road Users – pedestrians & cyclists – (VRU)
- Motorised two wheelers (TW)
- Autos (Au)
- Cars (C)
- Big vehicles – Busses & Light Commercial Vehicles (LCVs) – (HV)

Data – Speed – TTC

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Kendriya Vidyalay, Patna Road No. 2 Junction; Survey Date & Time: 11/2/2018 9:30-10:30 AM

Sl. No.	Leading Vehicle (LV)	Following Vehicle (FV)	Speed Of FV (Km/hr)	TTC (Seconds)
1	Bus	Bike	25	1.42
2	Auto	Auto	22	1.48
3	Auto	Car	26	1.3
4	Bike	Car	15	1.39
5	Bike	E-rikshaw	25	1.42
6	Auto	Bike	21	1.53
7	Car	E-rikshaw	24	1.56
8	Cycle	Auto	9	1.55
9	Rikshaw	E-rikshaw	7	2.38
10	Auto	E-rikshaw	21	1.78
11	Car	Auto	31	1.49
12	Bike	Auto	19	1.84
13	Car	Auto	23	1.7
14	E-rikshaw	Car	22	1.72
15	Bus	Car	34	1.7
16	Auto	Cycle	18	2.38
17	Auto	Auto	17	1.89
18	Cycle	Car	21	2.04
19	Bike	Bike	32	1.56
20	Auto	Bike	17	2.31

20 Conflicts observed in one lane

Data – Conflict Partners

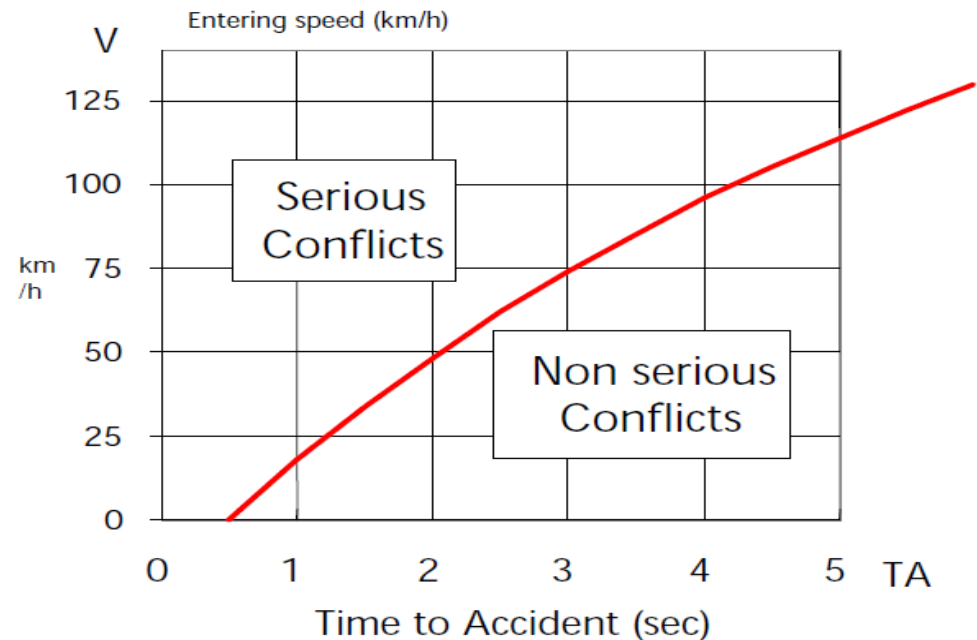
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Average of Severity taken from expert opinion survey (5 experts)

Conflict Partner	Severity (1 – 9 Scale)
VRU – TW / VRU – Au	7
VRU – C	8
VRU – HV	9
TW – Au / TW – C	6
TW – HV	9
Au – C	5
Au – HV	8
C – HV	7
TW – TW	7
C – C / Au – Au	5
HV – HV	5

Speed – TTC Comparison

- Speed – TTC standard plot used for comparison



Source: Hyeden Report (Swedish Conflict Technique)

Results

Speed – TTC merged over standard plot

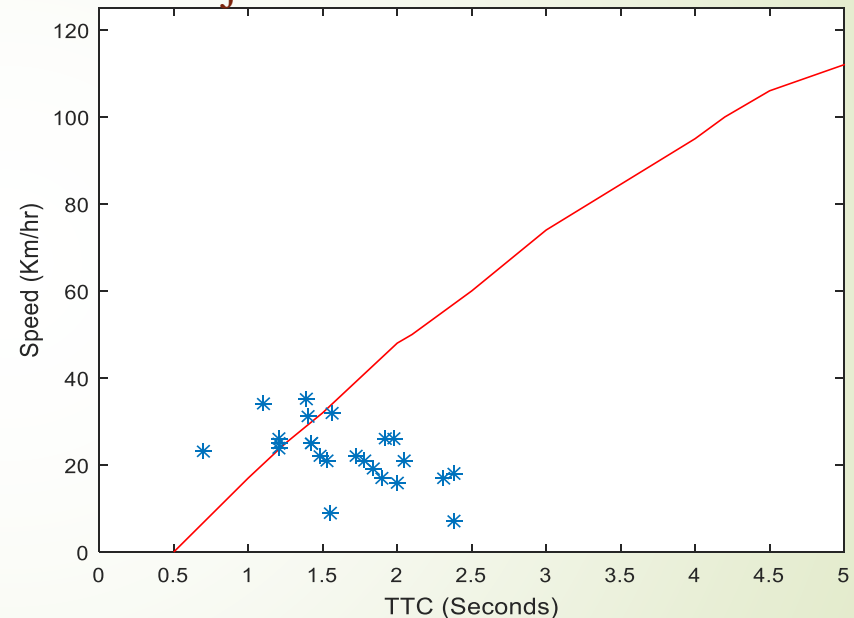
Location: Defence Colony Junction

Survey Time: 9:30 – 10:30 AM

Major Lane conflict zone

Conflict Partner for Major Conflicts

Sl. No.	Conflict Partner	Severity
1	VRU – C	8
2	VRU – C	8
3	C – C	5
4	Au – Au	5
5	TW – C	6
6	TW – Au	6
Total Severity		38



Percentage Serious Conflict: 25%

Total Conflict Severity: 38

Results

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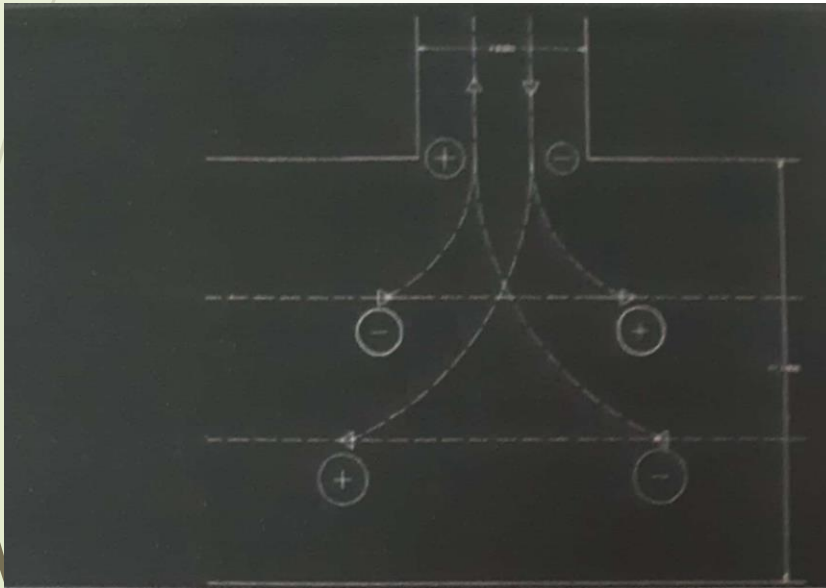
- Percentage of conflicts in serious conflict zone is obtained for each junction
- Total severity of serious conflicts is calculated depending on collision partners
- Junctions Prioritised based on % of serious conflicts & total severity

Results

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Top 3 hazardous T-junctions:

1. Kendriya Vidyalay, Patna Road No. 2 Junction

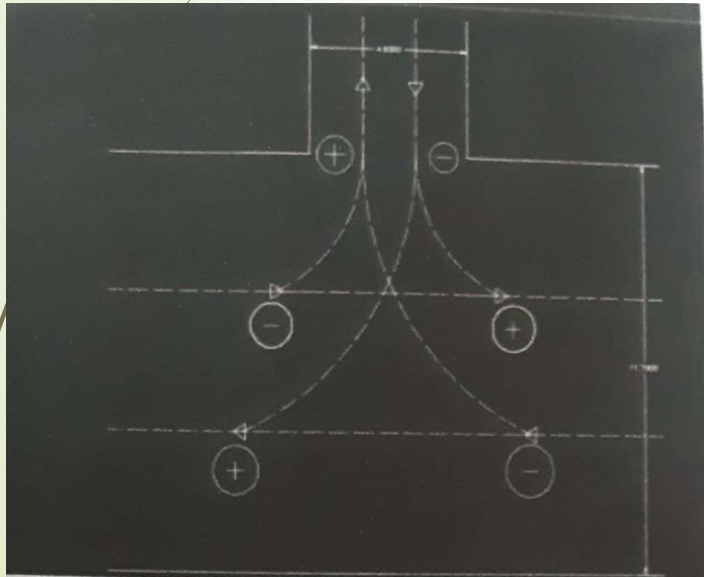


Results

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Top 3 hazardous T-junctions:

2. Professor Colony Junction

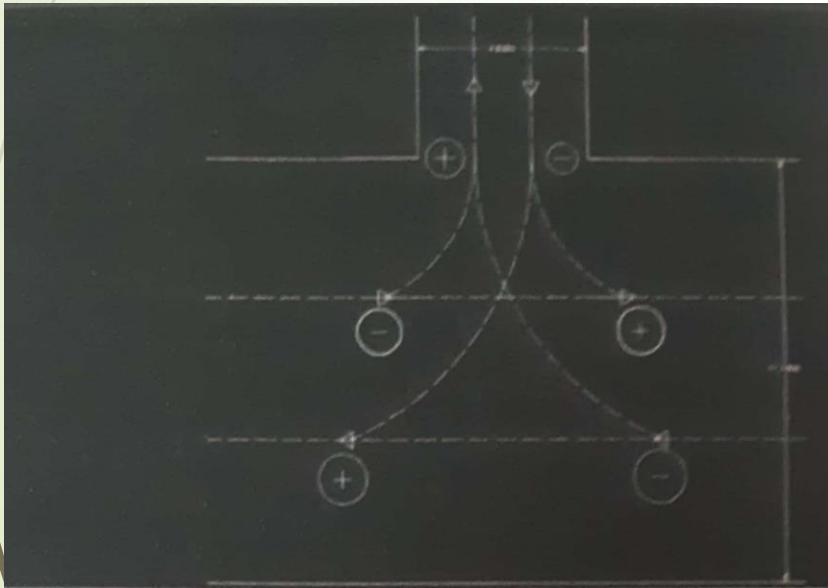


Results

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Top 3 hazardous T-junctions:

3. Shalimar Sweet Junction



Conclusions

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- Focuses to combine the effect of traffic volume and composition with the established surrogate safety measure of TTC and velocity.
- Helped to identify and prioritize the T junctions of the basis of TTC and velocity and conflict partners.

Conclusions

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- The conflict partners like vulnerable road user – heavy vehicle is given highest severity number whereas conflict between two vulnerable road users is given the lowest priority number.

Conclusions

- The top three locations were identified for physical investigation and of critical safety hazard.

Thank You