

RSPR Project – Junction design

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Safety Issue

Urban areas - higher risk of accidents:

- Many junctions and accesses
- Different traffic modes and traffic mix
- Combination of transit and local traffic

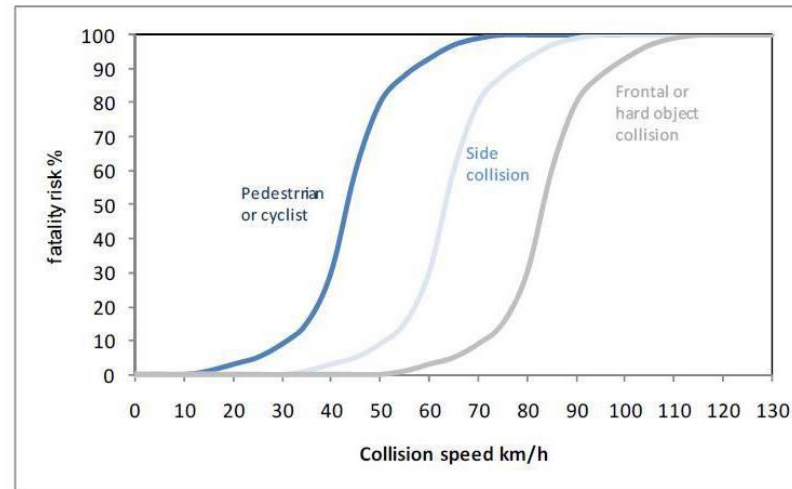
Most common accident types in urban areas are:

- Accidents at junctions
- Single/one vehicle accidents
- Accidents involving vulnerable road users



Speed management

- In general - in urban areas speed limit is 50 km/h – however on many places speed limit should be 30 km/h
- Road design should be self explanatory and should prevent speeding – enforcement by design
 - Narrow lanes
 - Separation of vulnerable road users
 - Roundabouts
 - Side walks
 - Speed calming



Source: Wramborg, P. (2005). *A New Approach to a Safe and Sustainable Road Structure and Street Design for Urban Areas*. Paper presented at Road Safety on Four Continents Conference, Warsaw Poland.



Junctions

Junctions are located where different traffic streams conflict and cross.

The **main objective of junction design** is to increase convenience, comfort and safety of all road users, at the same time enhancing their efficient movement.

Typical problems in junctions:

- Generally most risky part of networks because of speed differences and different directions
- Sudden stops
- Turning movements
- Mix of traffic modes



Junctions

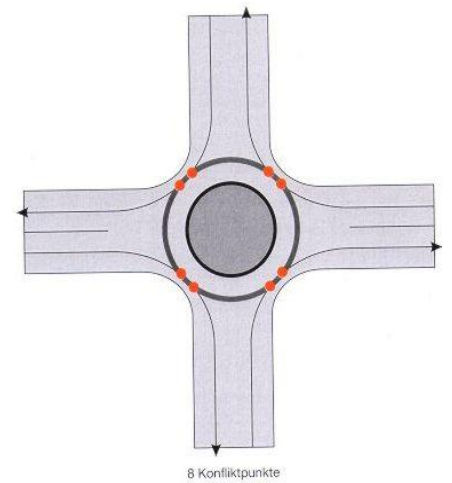
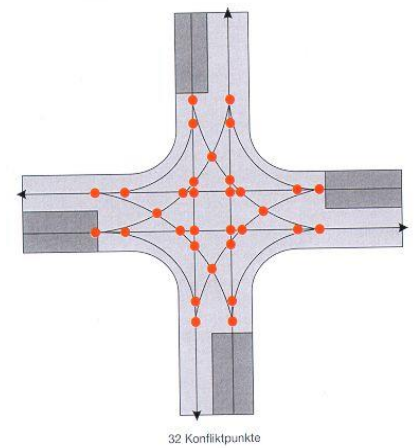
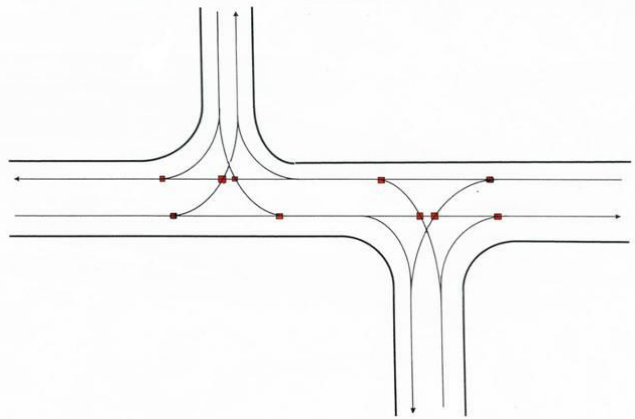
The **main design principles** for junctions include:

- Minimization of traffic conflicts locations
- Sufficient sight distances
- Longitudinal section and transverse gradients design
- Left turning / U turn movements

The **choice of a junction design** depends upon several factors (traffic safety, road type and function, number of concurring legs, traffic volume and type, design and operating speed, priority setting, terrain, available space, adjacent land use, network considerations/design consistency, environmental concerns, cost)



Conflict points



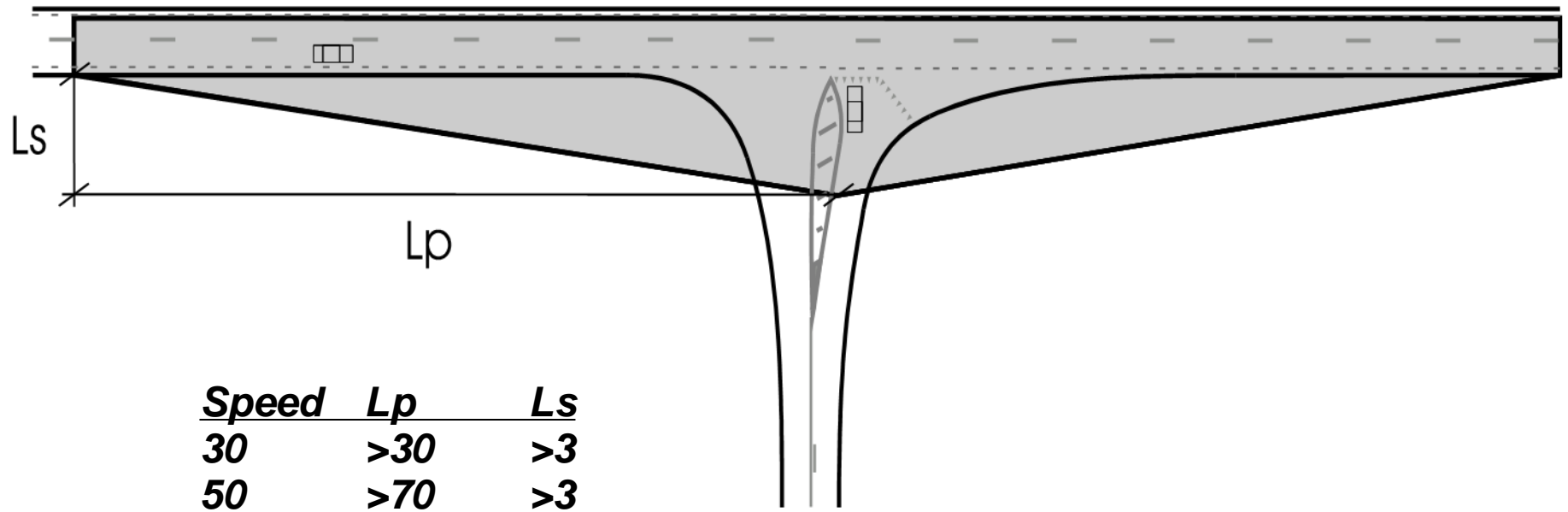
Total number 18
Primary, serious
conflicts 10

Total number 32
Primary, serious
conflicts 14

Total number 8
Primary, serious
conflicts 4



Sight distances



<i>Speed</i>	<i>Lp</i>	<i>Ls</i>
30	>30	>3
50	>70	>3
60	>85	>3
70	>110	>3



Junctions

The **choice of a junction type**:

- Priority junction controlled by STOP or GIVE WAY signs
 - low traffic flows
 - secondary network
- Junction controlled by traffic signals
 - separation of vulnerable road users
 - high traffic flows
- Roundabout
 - have a speed reducing effect compared to junctions
 - high traffic flows



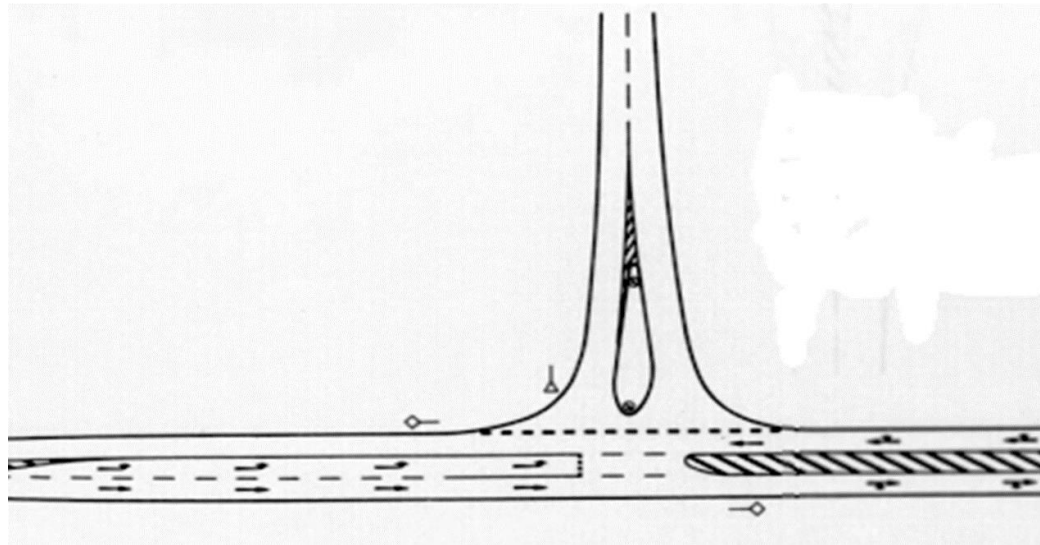
Priority junctions (T junction)

Advantages

- limited land-use
- limited resources for construction, operation and maintenance

Disadvantages

- problems to accommodate high traffic flows from side roads
- difficult to reduce speed on primary road



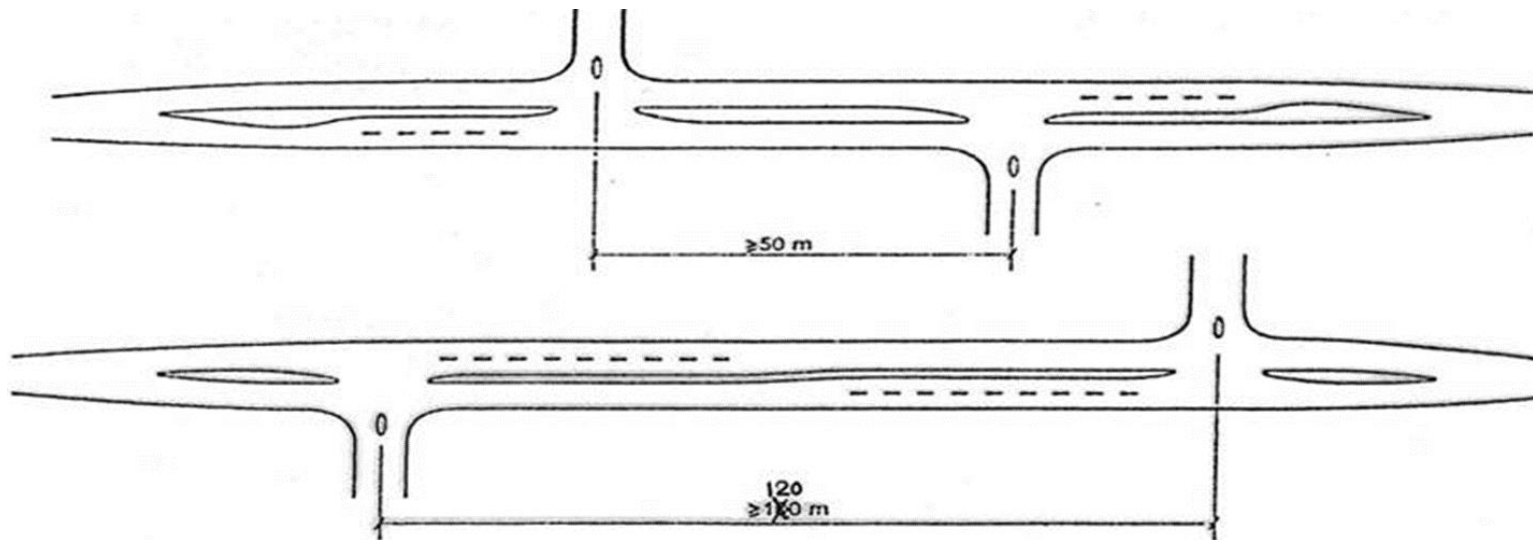
Priority junctions (Staggered junction)

Advantages

- good with high proportion of through traffic
- good speed reduction of through traffic
- Safer than 4-leg junction

Disadvantages

- require a lot of space
- problems to accommodate high traffic flows from side road and left turning from primary road
- seems complicated if distance between two T-junctions is short



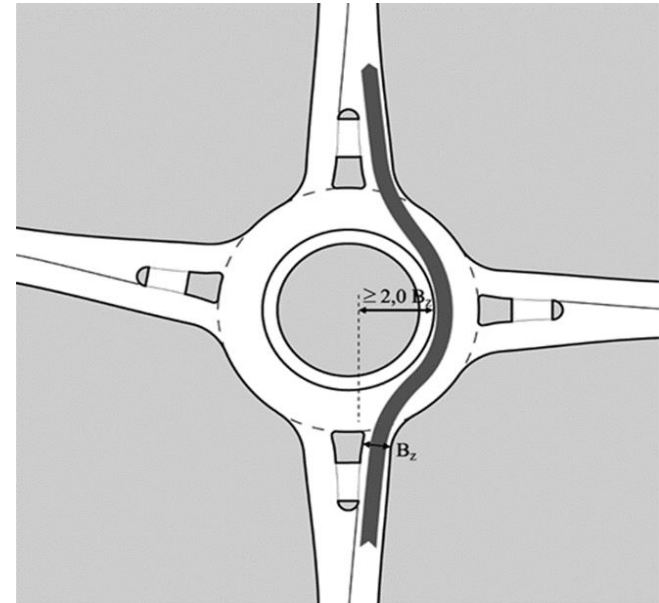
Roundabouts

Advantages

- reduces speed
- less conflict points
- gives good access to the side traffic
- good for junctions with 4 or more legs
- good at change of type of road

Disadvantages

- not good if traffic is high on main legs and very low on "side" legs
- requires more space centrally
- access for long vehicles
- high costs



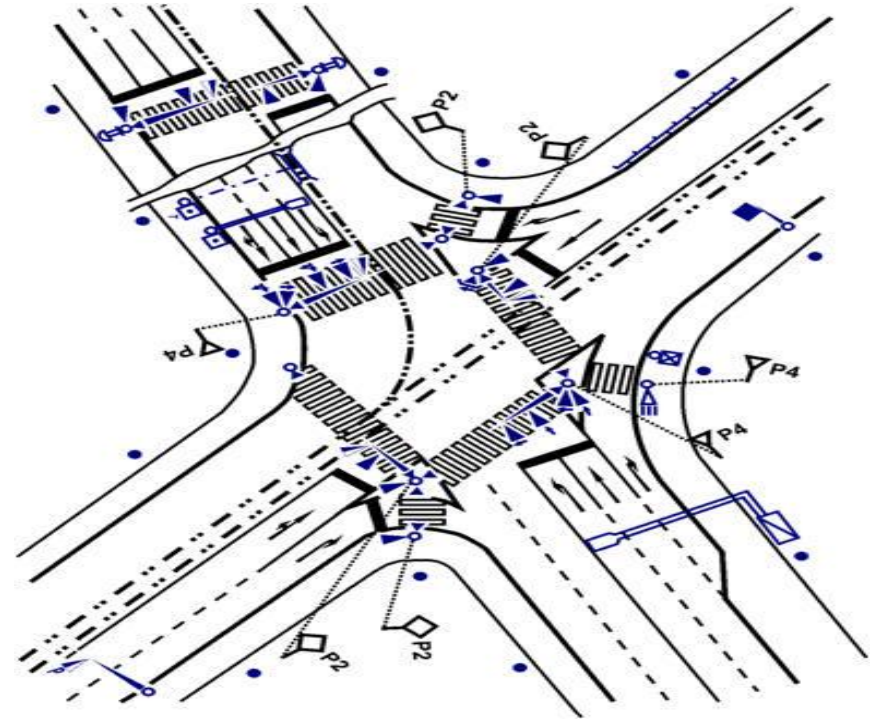
Road Signals controlled junctions

Advantages

- good with large traffic flows
- several through lanes
- prioritization of traffic flows
- separation for vulnerable road users

Disadvantages

- long waiting time for side roads and during low traffic periods
- red-light driving
- expensive



Thank you

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