JABATAN KERJA RAYA MALAYSIA

REKABENTUK PERSIMPANGAN
DESIGN CONTROL-

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DESIGN CONTROL

1. Priority Control
2. Traffic
3. Design Speed
4. Design Vehicles
    1. P Design
    2. SU Design
    3. WB-15 Design
5. Selection of Intersection Type
    1. Roundabout
    2. Signal Controlled Intersections
    3. Grade Separated Intersection (Interchanges)
6. General Control of Intersections

1. Priority Control

- Priority road – higher design standard
  - higher traffic volume
  - through traffic
- Two roads of the intersection referred as Major Road (priority road) and Minor Road.

2. Traffic

- Detailed traffic forecast in design years (10 @ 20 years after construction) must be carried out for large traffic volume.
- Shall be at least LOS C throughout forecasted years.

3. Design Speed

- ≤ 90km/h – at-grade intersection
- ≥ 90km/h – interchange / grade separated

TABLE 2.1: LEVEL OF SERVICE DEFINITIONS FOR SIGNALISED INTERSECTIONS

Level Of Service (LOS)	Intersection Conditions
A	Very short delay and most vehicles do not stop as result of favorable progressions, arrival of most vehicles during green phase, and short cycle length
B	Short delay and many vehicles do not stop or stop for short time as a result of short cycle lengths and good progression
C	Moderate delay, many vehicles have to stop, and occasional individual cycle failures as a result of some combination of long cycle lengths, high volume to capacity ratios, and unfavorable progression
D	Longer delays; many vehicles have to stop; and a noticeable number of individual cycle failures as a result of some combination of long cycle lengths, high volume to capacity ratios, and unfavorable progression
E	Long delays and frequent individual cycle failures result from one or both of the following: long cycle lengths or high volume to capacity ratios, which, in turn, result in poor progression
F	Delays considered unacceptable to most drivers occur when the vehicle arrival rate is greater than the capacity of the intersection for extended periods of time

Source – AASHTO 2011, chapter 9 – table 9-1

4. Design Vehicle

- P Design
  - absolute minimum turns
  - local street intersections
  - low volume
  - occasionally turn
- SU Design
  - Recommended minimum for all roads
  - Major highways with important movements
- WB-50 Design
  - should be used where truck combinations will make turning movement repeatedly.
  - to provide channelization to reduce paved area

*TABLE 2.2: DESIGN VEHICLES FOR INTERSECTION DESIGN

Area	Category Of Road	Design Vehicle
Rural	Expressway	WB-15
	Highway	
	Primary	
	Secondary	SU
	Minor	SU / P
Urban	Expressway	WB-15
	Arterial	
	Collector	SU
	Local Street	SU / P

(a) For intersections formed by roads of different design vehicles, the higher design should primarily be chosen. However, if the frequency of turns made is small, the lower design vehicle may be used.

(b) Design vehicle P is normally applicable only to intersections of two local streets or minor roads carrying low volumes.

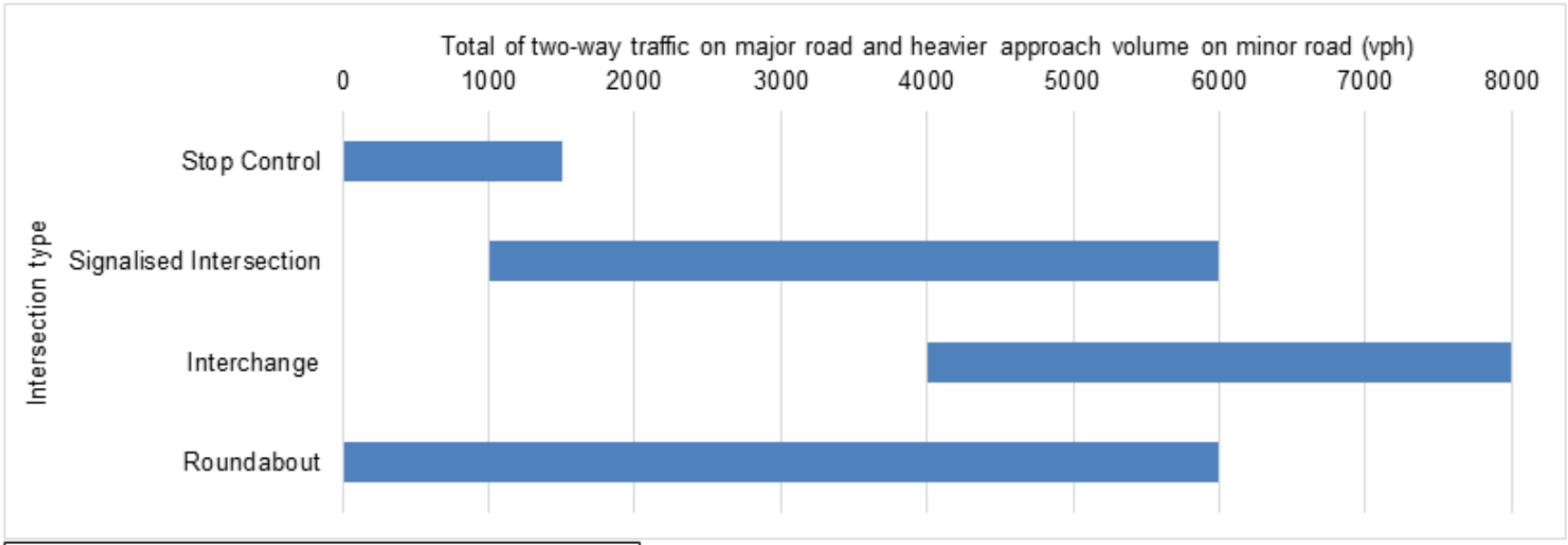
5. Selection of Intersection Type

- Roundabout
  - total traffic volume (sum of all direction) of up to 6000 veh/hr
  - disadvantage:
    - speed reduced because obstruction caused by central island
    - Required large area, depends on capacity

- Signal Controlled Intersections
  - high traffic volume of 8000 veh/hr or more
  - can handle heavy traffic

- Grade Separated Intersection or Interchanges
  - serve very heavy traffic volumes
  - design speed exceed 90 km/hr

*TABLE 2.3 (A): SELECTION OF INTERSECTION TYPE



Note:

Roundabouts are usually ranged in types as follows:
1. Mini-roundabouts
2. Single-lane roundabouts
3. Multi-lane roundabouts

*Refer chapter 4 for further explanation

*TABLE 2.3 (B): SELECTION OF INTERSECTION TYPE

According To Category Of Roads Crossing

Rural Area

Expressway	Highway	Primary	Secondary	Local	
I.C	I.C	I.C	-	-	Expressway
	I.C	I.C/S.I	S.I/SC	S.C	Highway
		S.I	S.I/SC	S.C	Primary
			S.C	S.C	Secondary
				S.C	Local

Urban Area

Expressway	Arterial	Collector	Local Street	
I.C	I.C	-	-	Expressway
	I.C/S.I	S.I	S.I/SC	Arterial
		S.I	S.C	Collector
			S.C	Local Street

LEGEND

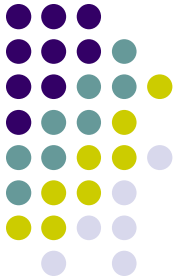
I.C : Interchange

S.I : Signalised Intersection

S.C : Stop Control

6. Geneal Control of Intersection

- Local service roads should not be linked directly to the major road but should be connected to collector road or combined together into one and then linked to the major road at a proper location.
- Local streets should not be linked to the major road near major intersections. If this is unavoidable, only left-turning movements should be allowed. Right turns from the major road and from the cross road should be physically prevented with continuous kerbed median and remodel the entrance to the minor road.
- When a new major road is being planned over an existing road network, coordination and adjustment on the layout and spacing of intersections which would be created along the road must be done. Relocation of existing roads and systematic traffic control may be required.



THANK YOU