



SIGNS, MARKINGS & DELINEATION

Topics in this presentation:

- Types of road signs
- Signing principles – the 6 C's
- Placement of signs
- Delineation
- Pavement markings



Signs assist road users with their decision making (to make correct decisions, quicker)

Use

Use standard applications

- Follow your country's standards
- But always question whether "standards" are safe
- Judgment

Be

Be consistent across the road network

- Consistent use of signs and symbols
- Consistent level of signage: not too little or too much

Put

Put yourself in the shoes of the road user

- Help them in the driving task
- Consider the unfamiliar driver
- Do not forget pedestrians & cyclists

Types of road signs

1. Regulatory (compulsory, mandatory)
2. Warning (cautionary)
Temporary – such as road works
3. Guide (information)
 - Direction
 - Tourist
 - Services
 - Traffic instruction
 - Traffic information







What is road safety engineering?

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Warning Signs – two international standards

- 1 American
- 2 European

Colour:	US: Black on yellow
Shape:	US: Mostly diamond



China has another standard for warning signs





European
warning signs
– triangular,
red, black and
white



Temporary (Roadworks) Signs



Figure 9: Some Typical Road Work Signs Used in CAREC Countries



Source: 1968 United Nations Economic and Social Council Convention on Road Signs and Signals, commonly known as the Vienna Convention on Road Signs and Signals.

Guide (Direction) Signs



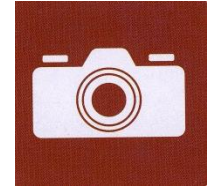


QO'QON	75
NAMANGAN	131
ANDIJON	199
O'SH	245
QASHG'AR	907

Guide
(Confirmation) Signs

Guide Signs

Tourist signs - white on brown





Services Signs

Colour: White on blue



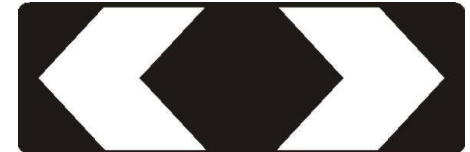
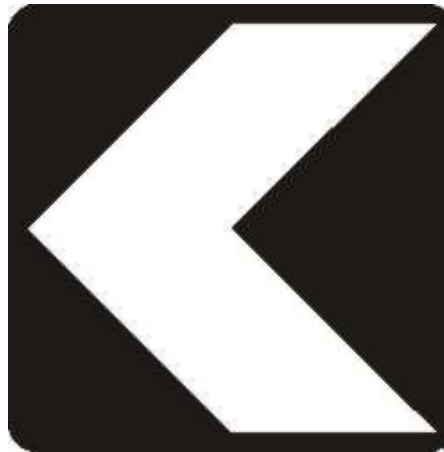
Hazard Markers



Chevron alignment markers may be black on yellow, red on white, or a similar color combination. Having a good contrast between the two colors is an important safety requirement.



Hazard markers (of whichever pair of colors) are used to highlight curves and other hazards on the road ahead.









Signs can:

- Regulate road use
- Warn of a hazard
- Inform the road user
- Help the road user navigate; **but also:**
- Distract the road user
- Be a hazard
- Provide incorrect or inconsistent information



Signs cannot:

- Educate the road user
- Physically prevent an action from occurring
- Be 100% effective
- Replace necessary civil works

Signing Principles – 6 C's

- **Conspicuous** - easily seen
- **Clear** - legible, able to be read in ample time
- **Comprehensible** – understood
- **Credible** – believed
- **Consistent** - same symbols, and placements, across the network
- **Correct** – the sign must be correct





- **Conspicuous**
- **Clear**
- **Comprehensible**
- **Credible**
- **Consistent**
- **Correct**



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Too far from the curve!

Advance Sign Placement

Location of advance warning signs before the hazard or action point:

Urban areas, 50 km/h :
80 to 120 m

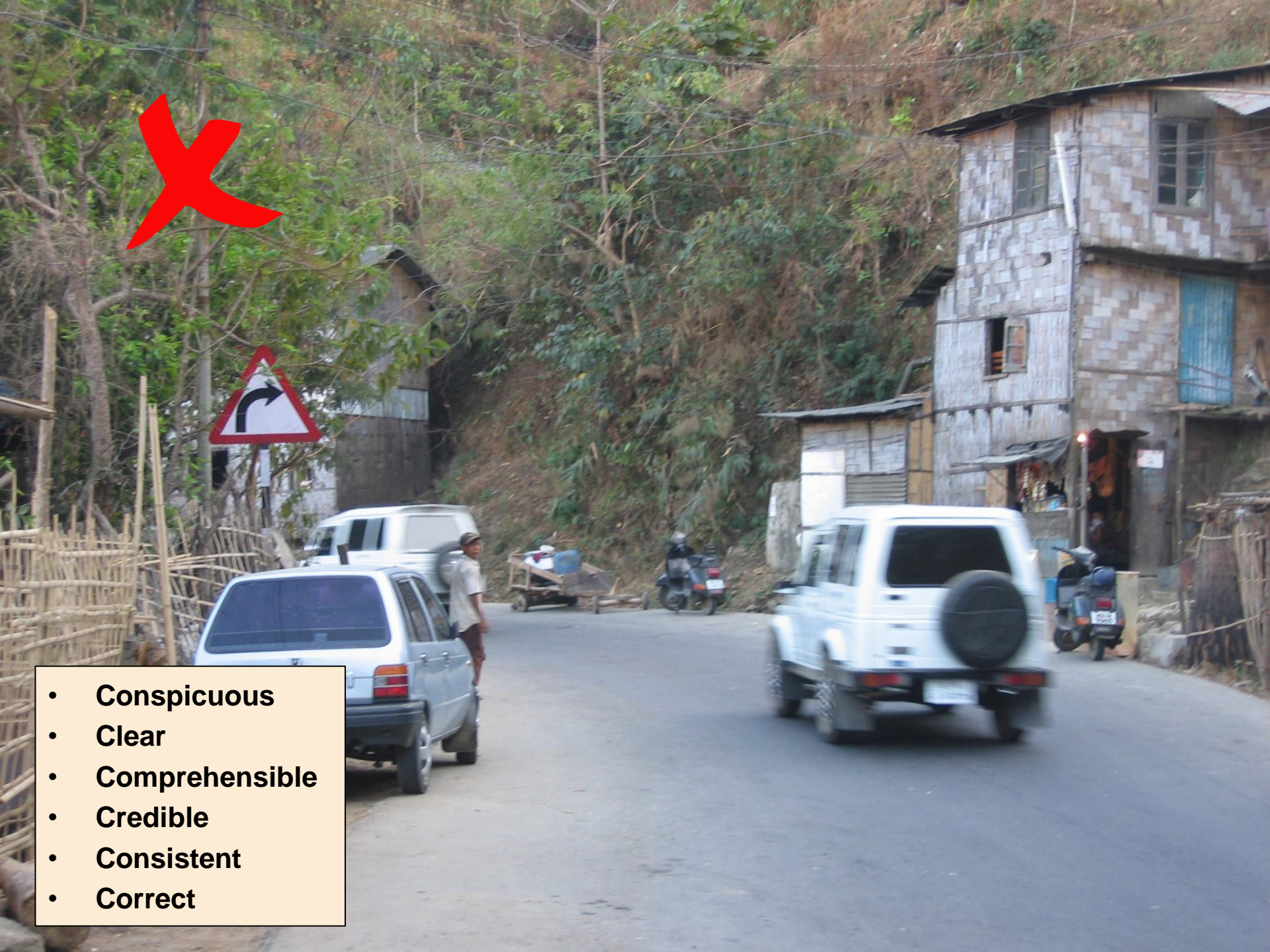
Rural areas, 80 km/h:
120 to 180 m

Freeways/highways, 100
km/h: 180 to 250 m





- **Conspicuous**
- **Clear**
- **Comprehensible**
- **Credible**
- **Consistent**
- **Correct**





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- **Clear**
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Longitudinal separation – as a rule - separate signs by 2 seconds of travel time



Delineation

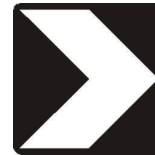
- Guide Posts & Delineators



- Raised Reflective Pavement Markers (cats' eyes)



- Hazard Markers



- Chevron Alignment Markers (CAMs)



Guideposts

- White post 1 metre high, 100 mm wide
- Double sided on a two-way road
- Retro-reflective delineator
- Red on the drivers side (right)
- White on the opposite side (left)
- Lateral placement:
 - 150 mm clear of outer edge of shoulder
 - 1.2 to 3.0 m from edge of traffic lane
 - Keep the lateral space consistent







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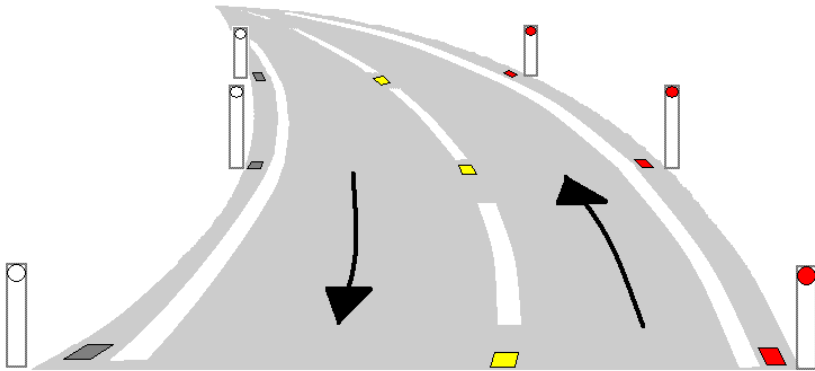
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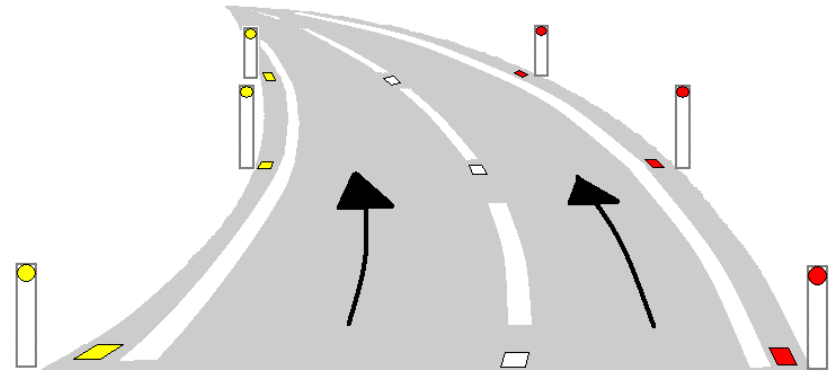
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RRPM and guidepost delineator colours



Two-way roadway



One-way roadway

Guideposts

- Longitudinal spacing:

	Spacing of Guideposts	
Curve radius	Outside of curve	Inside of curve
<100 m	6 m	12 m
100 – 199 m	10 m	20 m
200 – 299 m	15 m	30 m
300 – 399 m	20 m	40 m
400 – 599 m	30 m	60 m
600 – 799 m	40 m	60 m
800 – 1199 m	60 m	60 m
1200 – 2000 m	90 m	90 m
> 2000 m and straights	150 m	150 m





Chevron Alignment Markers

Reserve CAM's for substandard curves only

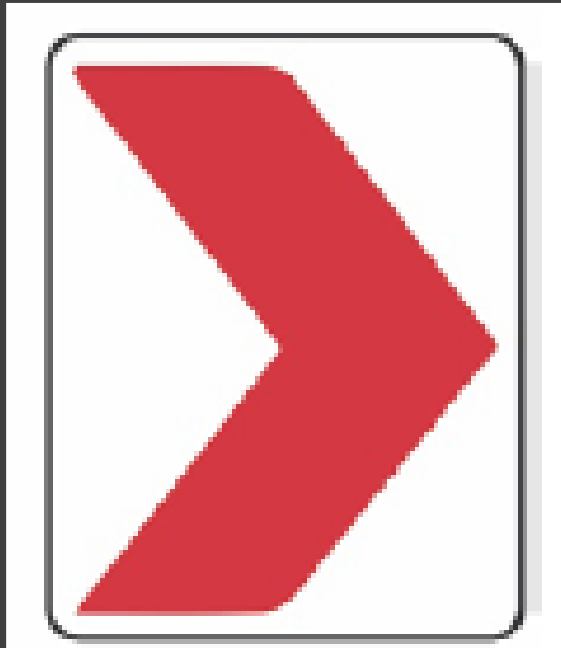
Only place on outside of curve

Always show CAM's for both directions

Minimum of 3 CAM's in each direction

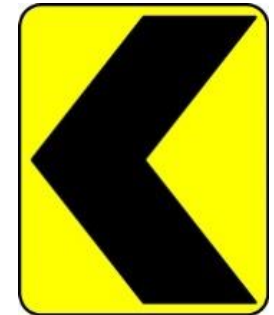
Drivers should be able to see 3 CAM's at all times

Space them evenly (but avoid driveways, lanes, other obstructions)



Chevron Alignment Markers

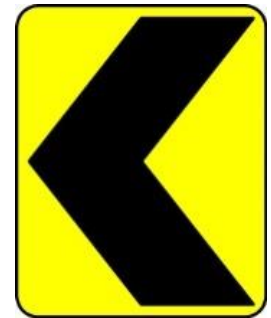
- Lateral placement:
 - min 600 mm clear of road shoulder
 - 2 m to 5 m from edge of traffic lane
- Height to bottom of sign:
 - 1.2 m to 1.5 m above road surface
 - Arrange height to give smooth appearance



Chevron Alignment Markers

- Longitudinal spacing on curves:

	CAM Spacing	
Curve radius	Approach speed < 85 km/h	Approach speed ≥ 85 km/h
< 50 m	10 m	6 m
50 – 99 m	12 m	8 m
100 – 149 m	18 m	12 m
150 – 199 m	24 m	16 m
200 – 249 m	30 m	20 m
250 – 299 m	36 m	24 m
> 300 m	40 m	26 m



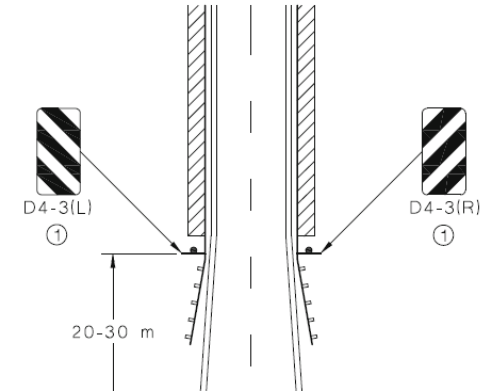
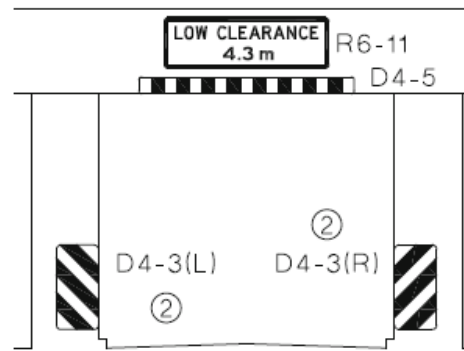
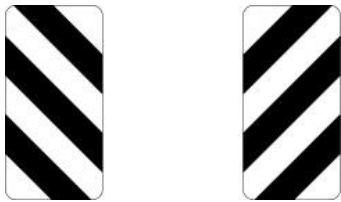




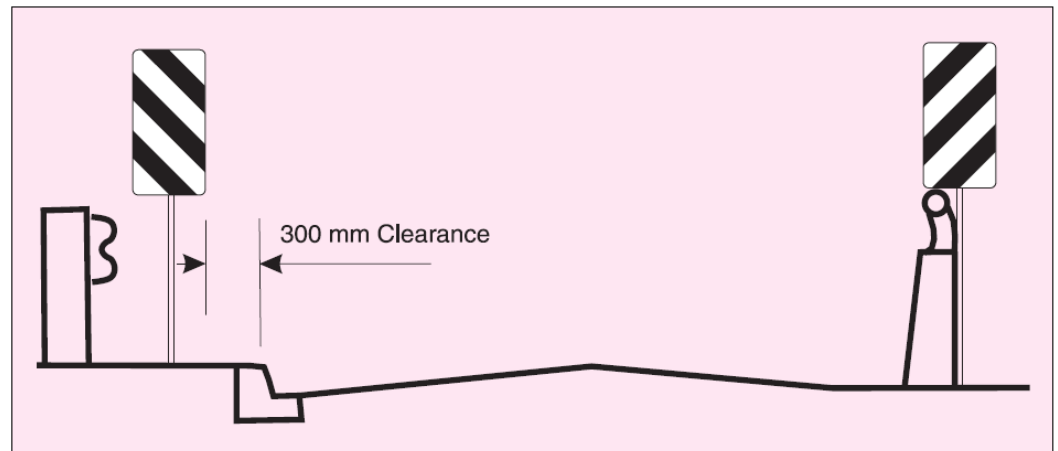


CAM's are for use around the outside of curves – not on inside!

Width Markers



- Culverts
- Bridge piers
- Bridge end posts
- Railway level crossings





LINE MARKING


- Provides longitudinal and also lateral guidance for drivers/riders
- Guides them along the road, guides them to turn, instructs them where to stop and where NOT to stop
- Usually thermoplastic
- Can also be tactile



Pavement Markings

- Dividing lines (centre lines)
- Lane lines
- Edge lines
- Pavement arrows
- Stripes and chevron markings
- Words
- Symbols

- Materials:
 - Paint
 - Thermoplastic
- Retro-reflective glass beads



Good line marking
is a valuable
safety tool!

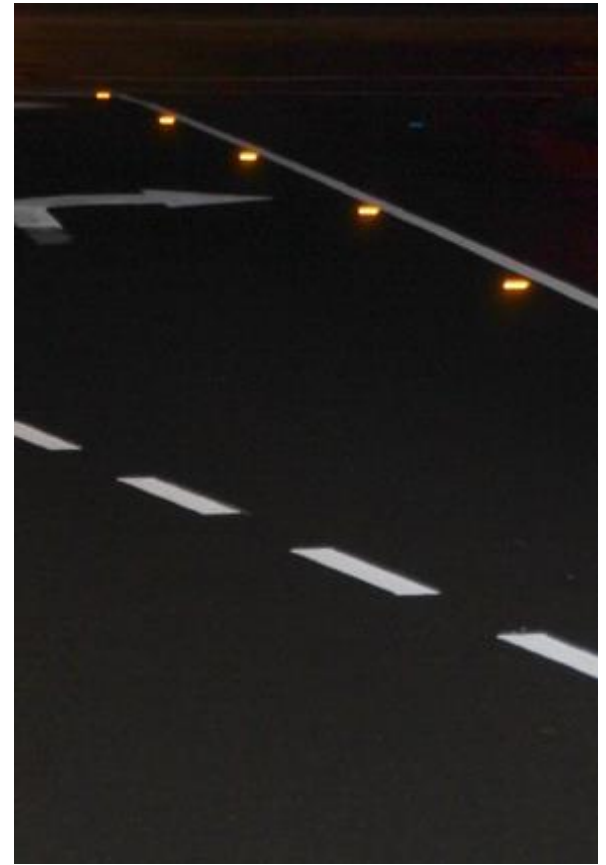


Faded (or no) line markings make it difficult for drivers to safely retain their location on high speed roads.



Tactile edge lines – can help to alert drivers when they start to drift off high speed roads.





Raised pavement markers



Raised pavement markers



Conclusion

- Signs and markings are important to regulate, warn and guide road users
- Remember the 6 C's:
Conspicuous, Comprehensible, Clear, Credible, Consistent and Correct
- The signs can be hazards in themselves – make them as forgiving as possible
- Bad signing leads to driver distraction, lack of warning, misunderstanding

THANK YOU –
QUESTIONS WELCOMED

