



SIGNS, MARKINGS & DELINEATION

Topics in this presentation:

Types of road signs

Signing principles – the 8 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

Regulatory Signs



Compulsory (Stop)



(Height) limit



Prohibitory (No
Left Turn)



Mandatory (Turn Left)





PRIVILEGE
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नेशनल कोचिंग सेंटर
कोचिंग सेंटर



Regulatory Sign



Warning Signs – two international standards

- 1 American
- 2 European



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



**NEXT
24 km**





European warning signs –
triangular, red, black and white







China has
another
standard for
warning signs

Temporary (Roadworks) Signs



Colour: Black on yellow (fluoro red/orange for worker)

Shape: Rectangular

Temporary (Roadworks) Signs

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

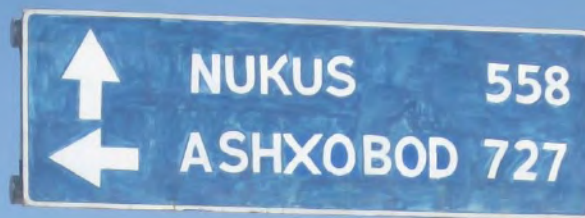


Source: 1968 United Nations Economic and Social Council Convention on Road Signs and Signals, commonly known as the Vienna Convention on Road Signs and Signals.

Guide (Direction) Signs



Guide (Direction) Signs



Good practice



行 车 道
Roadway Carriageway

120

90

行 车 道
Roadway Carriageway

100

60

紧 急 停 靠
Emergency Lane





Guide (Confirmation) Signs



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

Guide (Confirmation) Signs



Guide (Confirmation) Signs

Guide Signs

TAAL LAKE

Tourist signs - white on brown





Services Signs



Colour: White on blue

Traffic Instruction Signs



Colour: Black on white

Traffic Instruction Signs



Traffic Instruction Signs



Information Signs



Colour: Black on white

Blue on white (related to enforcement)



Hazard Markers



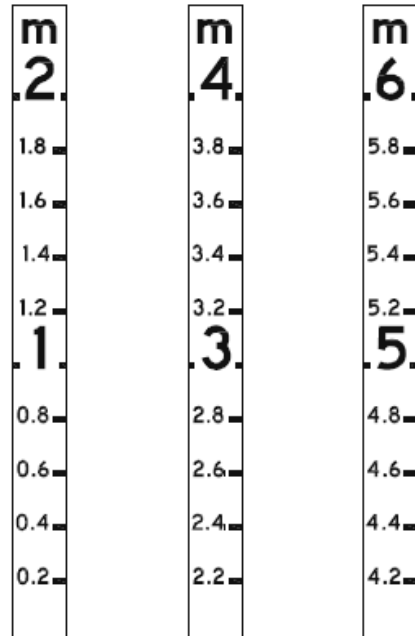




Guide (Traffic Information)



4.10.6.10 *Depth Indicator (G9-22)*



G9-22-1

G9-22-2

G9-22-3

Depth Indicators shall be used where floodwaters across the road are likely to rise to an unfordable depth.

The G9-22-1 indicator shall be used at all fords, floodways and low level bridges. It shall be displayed so as to be clearly visible to drivers before reaching the flooded part of the road. Where necessary, separate indicators should be provided on each approach. The zero mark shall be set at the lowest pavement level on the section of road liable to flooding.

Where flood depths in excess of 1.5 m or 3.5 m are expected, the G9-22-2 and G9-22-3 indicators shall be erected on progressively higher ground.

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 – 8 C's

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



ДКОФАРН



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



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- **Compliant**
- **Correct**



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**
- **Concise**
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- **Consistent**
- **Compliant**
- **Correct**

GMR OSE HUNGUND HOSPET HIGHWAYS PVT. LTD.
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1. THE MINISTRY OF DEFENCE INCLUDING THOSE WHICH ARE ELIGIBLE FOR EXEMPTION IN ACCORDANCE WITH THE PROVISIONS OF THE INDIAN TOLL (ARMY, AIR FORCE AND NAVY) ACT, 1901
2. THE CENTRAL AND STATE ARMED FORCES IN UNIFORM INCLUDING PARA - MILITARY FORCES AND POLICE
3. AN EXECUTIVE MAGISTRATE
4. A FIRE FIGHTING DEPARTMENT OR ORGANISATION
5. THE NHAI OR ANY OTHER ORGANISATION OR PERSON USING SUCH VEHICLE FOR INSPECTION, SURVEY, CONSTRUCTION OR OPERATION AND MAINTENANCE

(C) USED AS AMBULANCE

- 1) प्रसंगिक कार्य निमित्त
- 1904 का विधम के अनुसार भारतीय टोल सड़क इलाक़ों में विद्यमानि का प्रौढव्य पाने कटुन (सैन्य, वादुलेय, बैका सेवा)
- समयसम से खने जयज अले केंद्र सैन्य, वैद्य निमित्तारी, और पोलिस
- निरीक्षण व्यावसायी
- अग्निशमक और अन्य संस्था
- प्रौढीकरण कार्य, निरीक्षण कार्य, निर्देशक और कार्यलय के निमित्त संचार करने इन्ड्रैकचरुहू और अन्य संस्थाएं और कोई भी व्यक्ति के कटने सि। अनुमति का कटने

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 कर्नाटक - 581461
संपर्क : 88539-202 600

TOLL GATE AHEAD
 500m

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



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- **Clear**
- **Concise**
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- Credible
- Consistent
- Compliant
- Correct

KOSOVA
KUKESI 133
SHPALI 20

LURA 58
KROI I BARDHE
RRESHENI 2

Which way would you go?

TIRANA 73

DURRESI 

RINASI 



KOSOVA
KUKESI 133
SHPALI 20



- **Conspicuous**
- **Clear**
- **Concise**
- **Comprehensible**
- **Credible**
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- **Correct**





- **Conspicuous**
- **Clear**
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- **Compliant**
- **Correct**





ಅಪಘಾತ ವಲಯ
ACCIDENT ZONE



DRIVE SLOWLY

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



- **Conspicuous**
- **Clear**
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- **Compliant**
- **Correct**

Tamworth A513

National Memorial Arboretum



Lichfield
(A38) 







City Bypass

ELIZABETH
STREET

PEEL STREET

City

Dandenong
Frankston
Footscray



Flemington
Road

QUEEN VICTORIA MARKET
VIA PEEL ST



Location and Placement of Signs

Longitudinal placement

Lateral placement including clearances

Vertical clearances

Road layout, environment and
topography

Orientation of the sign face relative to
drivers

Advance Sign Placement

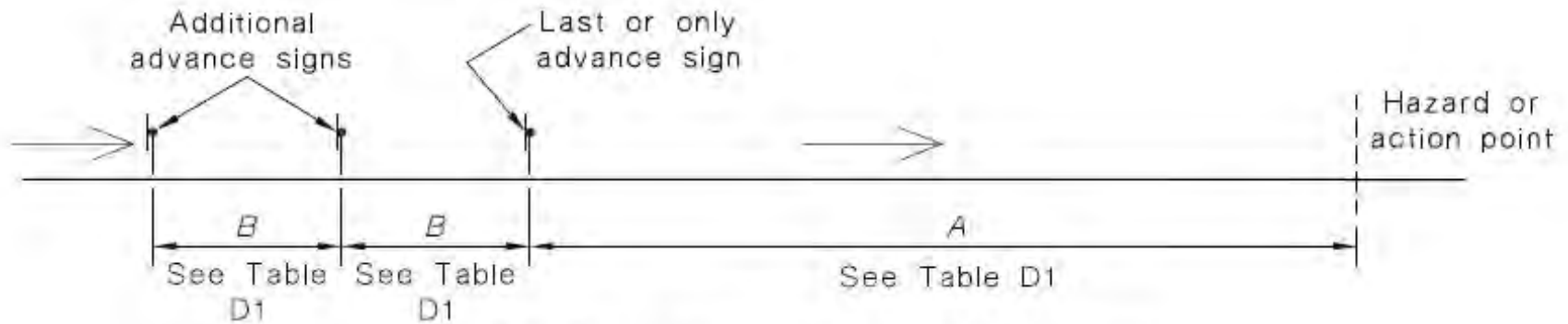


FIGURE D1 ADVANCE SIGN DISTANCES

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

LOCATION OF WARNING SIGNS IN ADVANCE OF A HAZARD

metres

Dimension	Situation	V ₈₅ , km/h			Typical examples
		<75	75–90	>90	
Dimension A	(i) Must or may need to stop	80–120	120–180	180–250	W3-2 Give Way Sign Ahead W3-1 Stop sign Ahead W2-3 T junction (sign on minor road) W5-7 FLOODWAY W4-8 LOW CLEARANCE __ m
	(ii) Significant speed reduction required	60–80	80–120	120–180	Signs in the Turn Sign Zone in Figure 4.5 W5-20 Slippery W2-7 Roundabout ahead
	(iii) Low to moderate speed reduction required – or no speed reduction	40–60	60–80	80–120	Signs in the Curve Sign Zone in Figure 4.5 W5-3 Aircraft W4-4 Divided road Intersection warning signs located on straight major road

Longitudinal Separation

Locate signs a minimum $0.6 \times$ design speed
apart

Urban areas: $0.6 \times 50 \text{ km/h}$: 30 m

Rural areas: $0.6 \times 80 \text{ km/h}$: 48 m

Freeways/highways: $0.6 \times 100 \text{ km/h}$:
60 m

Rule of thumb – 2 seconds of travel time

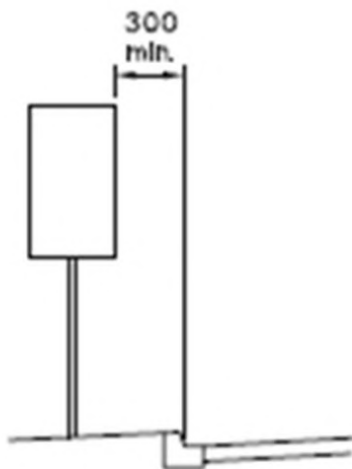


Longitudinal separation – as a rule of thumb –
separate signs by 2 seconds of travel time



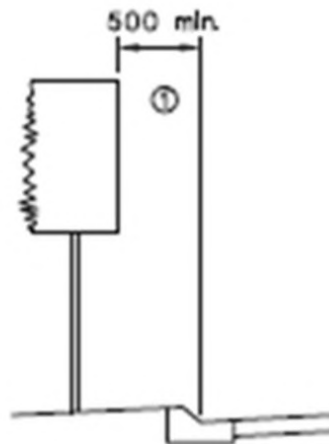
Lateral Placement

Near edge of road with minimum clearance.

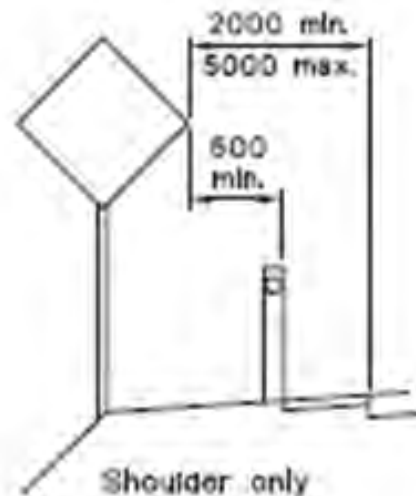


Barrier kerb

(a) Side mount - kerbed roads (urban)

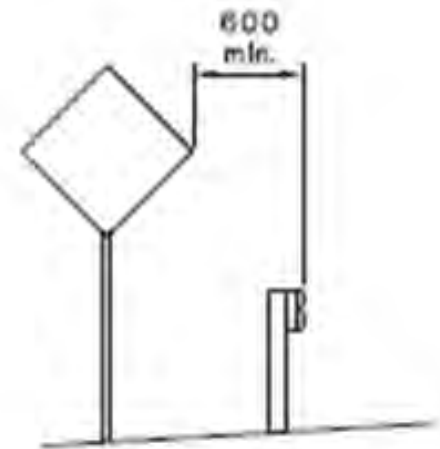


Fully or semi-mountable



Shoulder only

(b) Side mount - unkerbed roads (rural)



Behind safety barrier

Lateral Placement

Meets road safety requirements

Does not obstruct sight distance

Is not an obstruction to pedestrians and cyclists



Overhead Mounting

Overhead mounting

On urban arterial roads – high volume of large trucks

- narrow footpath, verandas, vegetation

- multilane carriageways

On urban motorways

On arterial roads – access points to motorways

At important rural interchanges

Height

Measured to bottom of sign

No pedestrians – 1.5 m clearance above road pavement

Pedestrians and parked vehicle

- 2 m over verges

- 2.5 m over pathways

Above roadway – 5.3 m (absolute minimum)

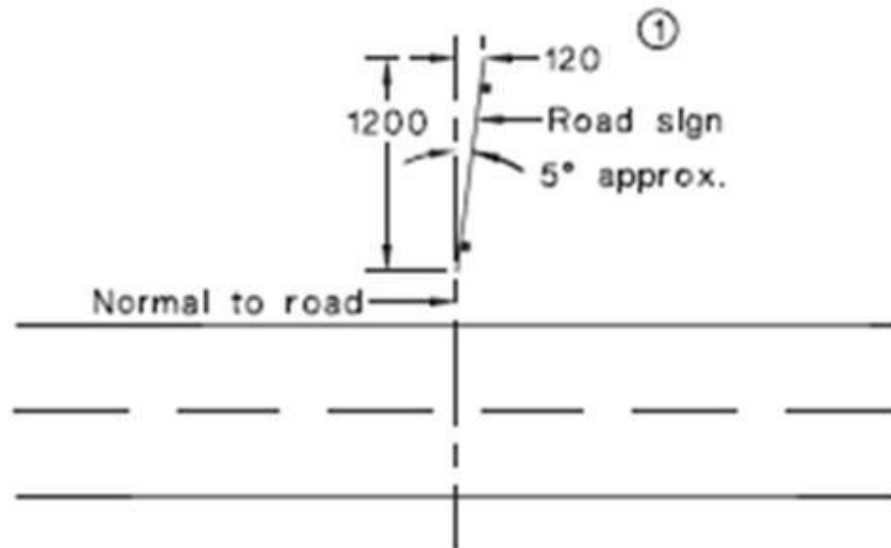
Exception: KEEP RIGHT sign and hazard markers, which are mounted low

Orientation

All signs should face the road user for whom the message is intended

KEEP RIGHT – angled to face left turners

Road signs **facing** traffic – rotate 5° away from traffic to reduce headlight reflection



Summary of factors to consider in sign placement

Vegetation

Trees with canopies

Other infrastructure/buildings

Distracting background (advertising, signs, shopfronts)

Street lighting, other poles

Bus stops

Public utility services

Side streets, driveways

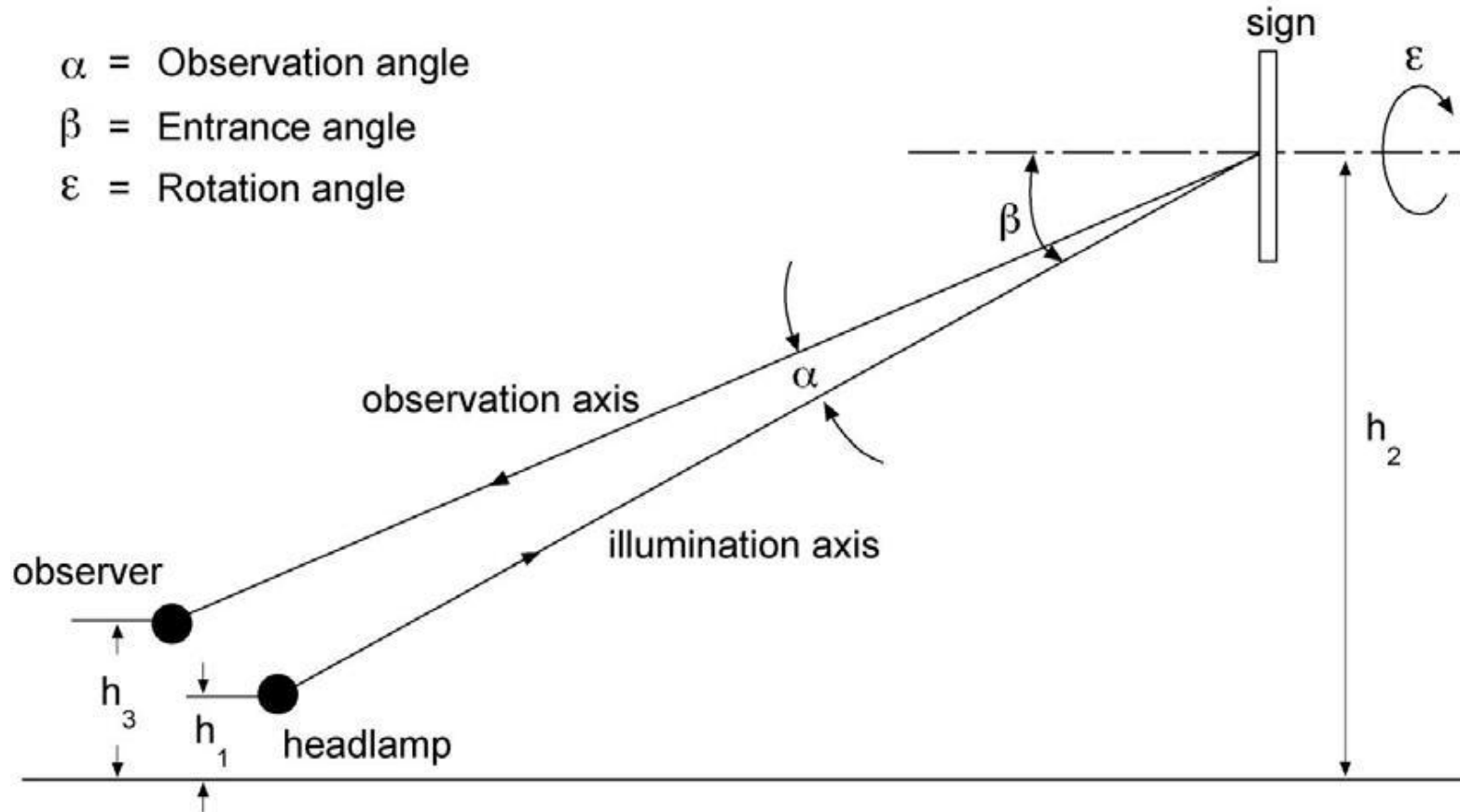






Direction signs must be seen or drivers may become lost

Retroreflectivity angles



Elevation view of overhead sign

Delineation

- Guide Posts & Delineators



- Raised Reflective Pavement Markers (cats eyes)



- Hazard Markers



- Chevron Alignment Markers (CAMs)



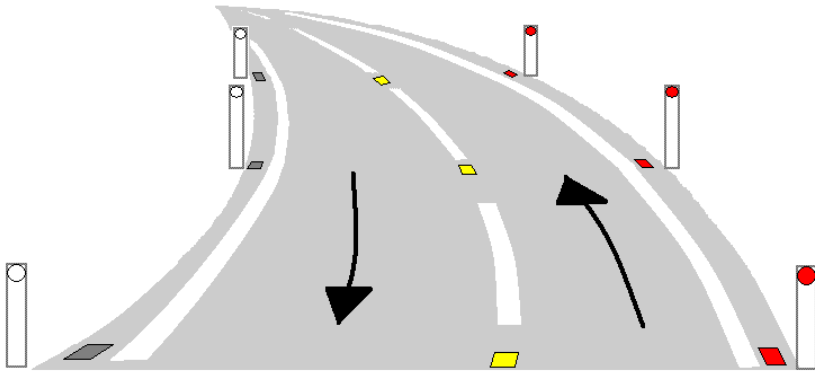
Guideposts

- 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

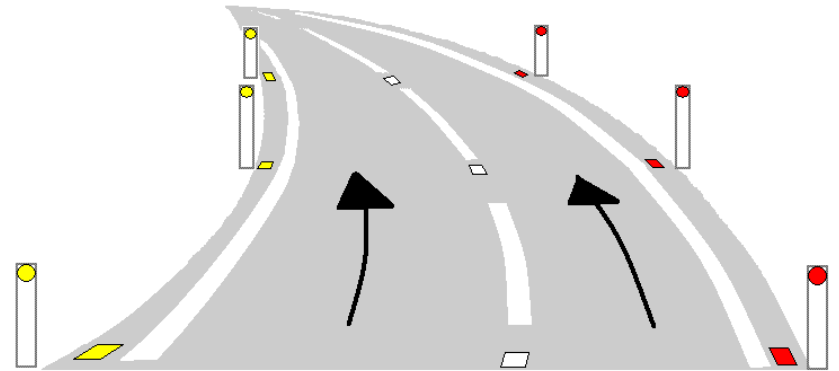




RRPM and guidepost delineator colours



Two-way roadway



One-way roadway

Guideposts

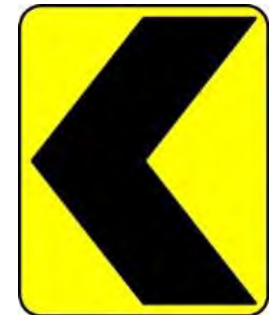
- Longitudinal spacing:

	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

- 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

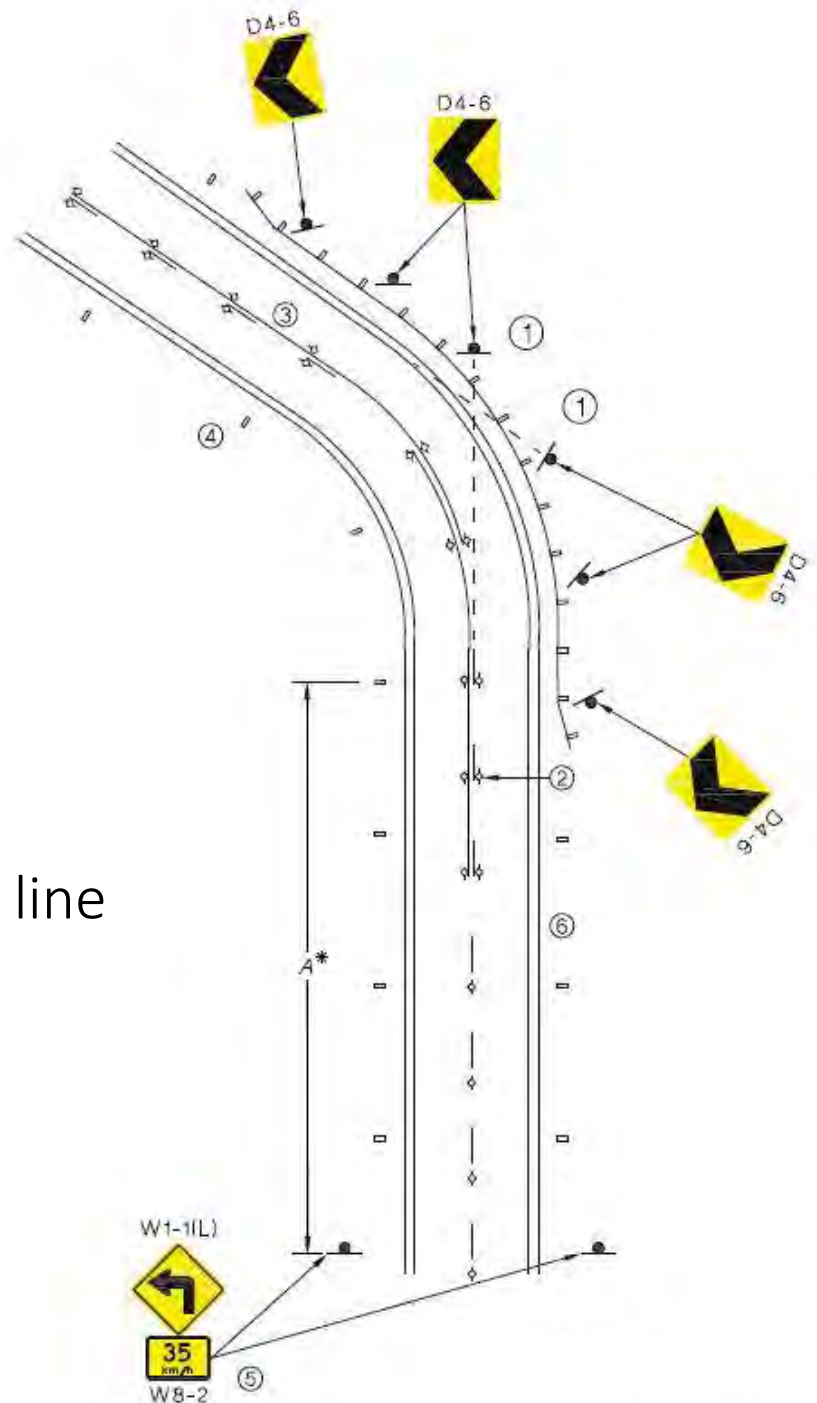
- Longitudinal spacing on curves:

	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



Chevron Alignment Markers

- Left-hand curve: first CAM on prolongation of centre line
- Right-hand curve: first CAM on prolongation of left-hand edge line





Reserved for sub-standard curves only





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



Chevron Alignment Markers

Reserve CAM's for substandard curves only
Only place on outside of curve

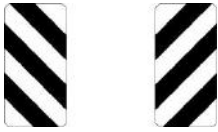
Always show CAM's for both directions

Minimum of 3 CAM's in each direction

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

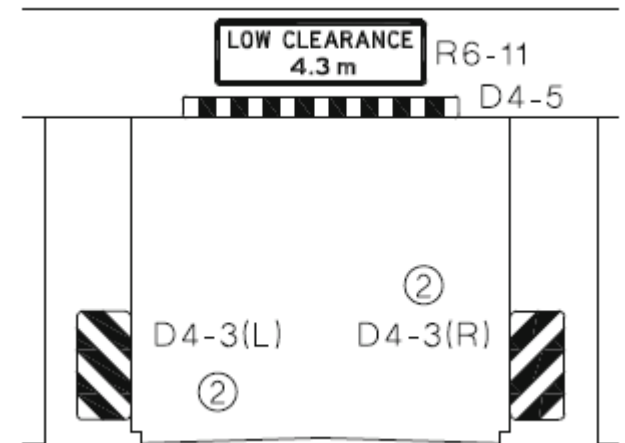
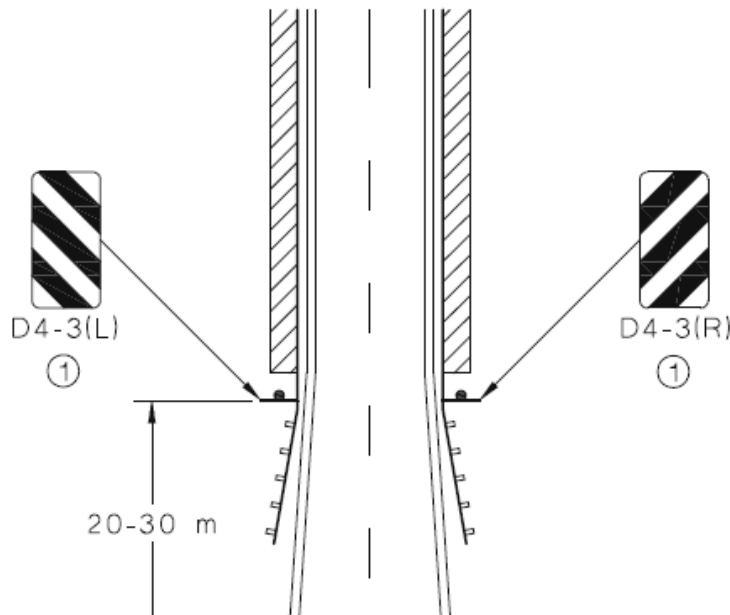
Space them evenly (but avoid driveways, lanes, other obstructions)





Width Markers

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











PAINSWICK



Fairtrade





Be consistent along a route
and across a region



Be consistent along a route
and across a region



Be consistent along a route
and across a region



Be consistent along a route
and across a region



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.

ХУШ ОМАДЕД БА ҲИСОРИ ШОДМОН

4.5



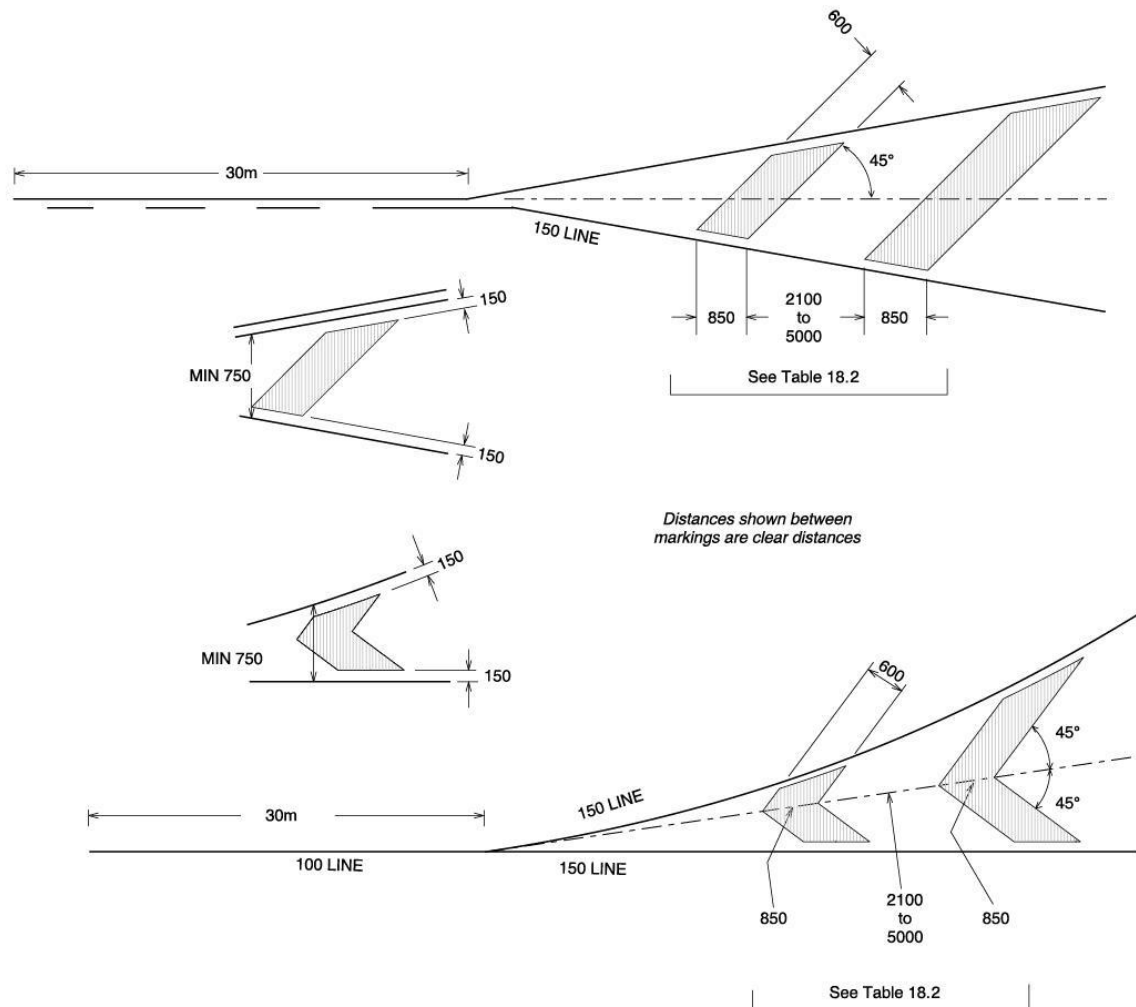
Good edge lines – help to delineate highways. Wider paved shoulders help too.



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



Stripes and Chevrons



Raised pavement markers

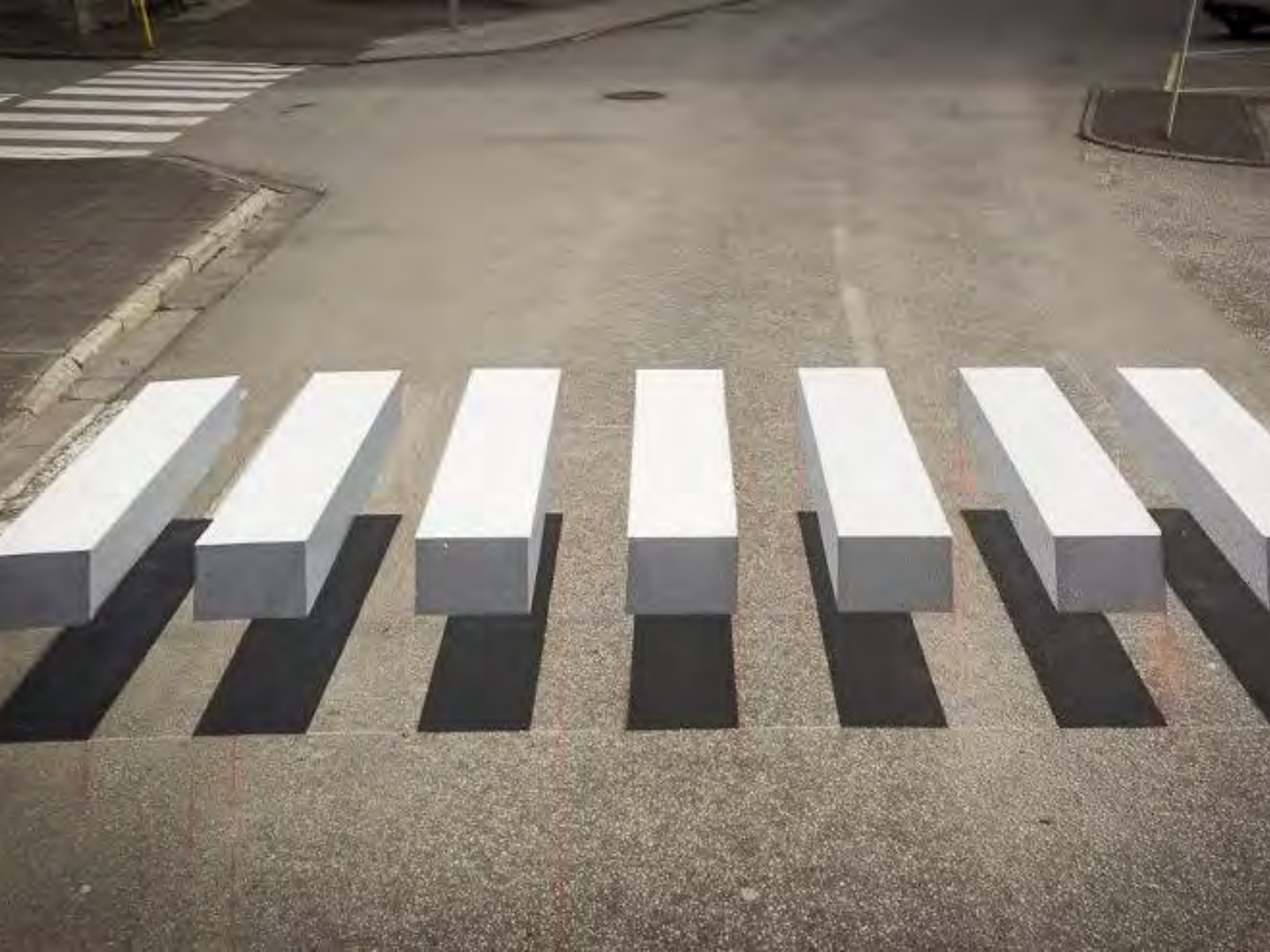


Raised pavement markers









Conclusion

- Signs and markings are important to regulate, warn and guide road users
- Remember the 8 C's:
Conspicuous, Comprehensible, Concise, Clear, Credible, Consistent, Compliant and Correct
- The signs can be hazards in themselves – make them as forgiving as possible

Keep your signs “positive” - tell drivers what they can or must do when possible

- Bad signing leads to driver distraction, lack of warning, misunderstanding

Engineers can do much in road safety!

Signs are low cost

Follow national codes of practice – but also know when to question them

Keep it simple, and positive

Always think of your “customers”

Maintain what you have.....

YOU CAN IMPROVE ROAD SAFETY AT LITTLE COST

**THANK YOU –
QUESTIONS WELCOMED**