



Statens vegvesen



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Road Markings in Curves for Motorcyclists

Norwegian Public Roads Administration

Hans Olav Hellesøe and Therese Rudlang
Traffic Safety Department



Foto: Therese Rudlang

Motorcycle Crash Statistics - Norway

Motorcycles make up 5% of the vehicle fleet in Norway.

In addition, most motorcycles are only used for half of the year.

Nevertheless, motorcycle fatalities account for 20-25% of all road traffic deaths.

Approximately half of all fatal motorcycle crashes are run-off-road crashes.

Many of these occur on curves, most often left-hand curves.



Foundation of the pilot project

National Road Safety Action Plan 2026-2029:

As part of the high-risk curves project, the Norwegian Public Roads Administration will assess the use of special road markings to encourage safer road positioning and appropriate speed choice among motorcyclists in curves (Measure no.121).

Similar measures have been implemented in Austria and Scotland with positive results. Before any permanent implementation in Norway, the suitability of the road markings for Norwegian conditions will be carefully evaluated through a pilot project on selected road sections, involving relevant stakeholder organizations.

Measure no.121: *The Norwegian Public Roads Administration will evaluate the use of special road markings to encourage safer road positioning and appropriate speed choice for motorcyclists in curves.*

Ellipses as road marking

The concept is based on research conducted in Austria by KfV (the Austrian Kuratorium für Verkehrssicherheit), where elliptical road markings were found to positively influence motorcyclists' riding behaviour by encouraging better line choice and more appropriate speed adaptation in curves.

The project reported significant reductions in crash numbers after the markings were introduced.



Gateway road markings

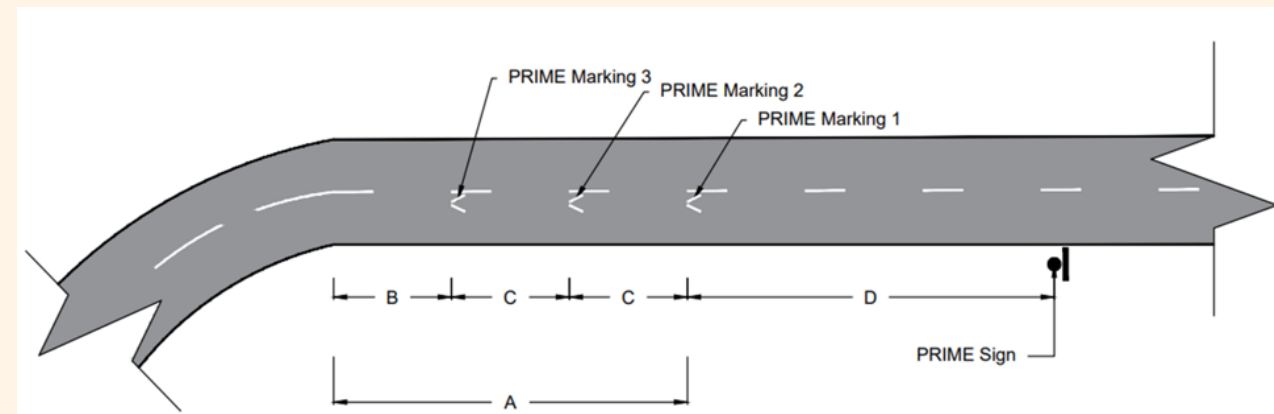
The PRIME (Perceptual Rider Information for Maximising Expertise and Enjoyment) project in Scotland used gateway markings to encourage safer riding lines through curves.

The work focused on developing PRIMEs to assist motorcyclists approaching demanding curves where it is important that:

- speed is suitable for the conditions
- lane position is optimised for negotiating the curve
- motorcyclists do not have to initiate braking whilst negotiating the curve.

The PRIME gateway markings resulted in improved rider behaviour at several sites, including:

- Lower speeds in some curves
- Improved rider positioning
- Reduced braking before curves
- increased use of safer riding lines



Curve Selection Criteria



Characteristics of High-Risk Motorcycle Curves

- Limited sight distance (curve exit not visible)
- Blind S-curves
- Long tangent section before a sharp curve (speed selection)
- Varying curve radius (decreasing-radius curves)
- Changes in superelevation through the curve
- Poor visual guidance (lack of delineation, centreline markings, edge lines, guardrails, etc.)
- Poor road surface condition affecting lane positioning
- Hazardous roadside environment

Road Marking Trial Locations



Road Marking Trial Locations

National Road 22 (RV22) – no.1

Left-hand curve

Long straight approach

Limited sight distance through the curve (blind curve)

120 m curve radius

Two fatal crashes in 2025

Chevron alignment signs

Motorcycle underrun protection

Centerline markings

Speed limit: 80 km/h

Cracking in the road surface

Relatively high motorcycle traffic

Ellipses as road markings



Road Marking Trial Locations

National Road 22 (RV22) – no.2

Series of left-right-left curves

Long straight approach

Limited sight distance through the curves (blind curves)

Curve radii ranging from 90 m to 120 m

Chevron alignment signs

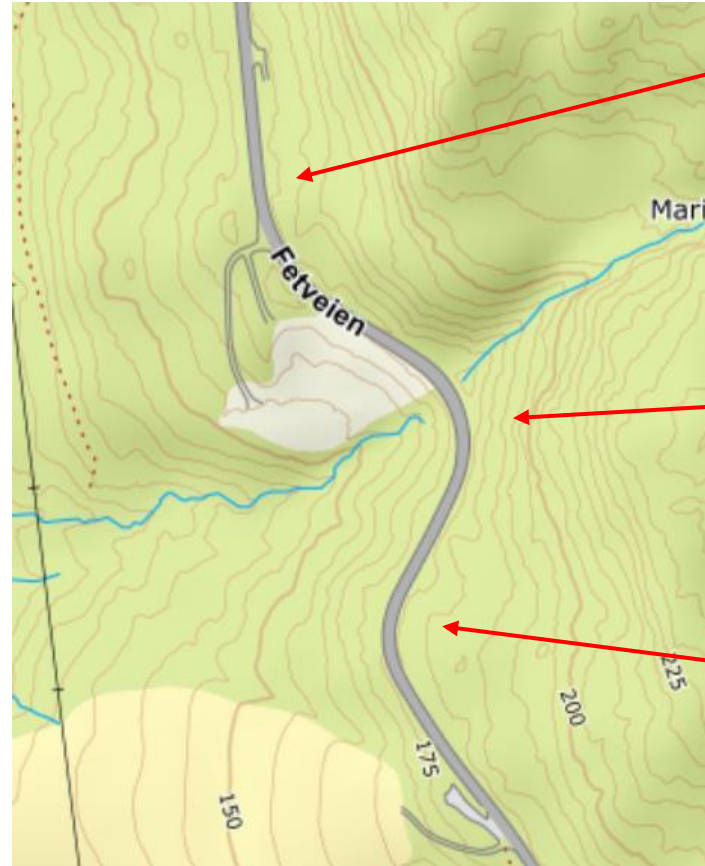
Centerline markings

Speed limit: 80 km/h

Relatively high motorcycle traffic

Ellipses as road markings

Road markings were installed in the left-hand curves



National Road 22 (RV22) Trial Location





Road Marking Trial Locations

European Route 39 (E39):

Series of left-right-left curves

Long straight approach to the curve with a gentle downhill gradient

Limited sight distance through the curve

Motorcycle fatal crash in 2024

Speed limit: 60 km/h, although many riders appear to travel at higher speeds

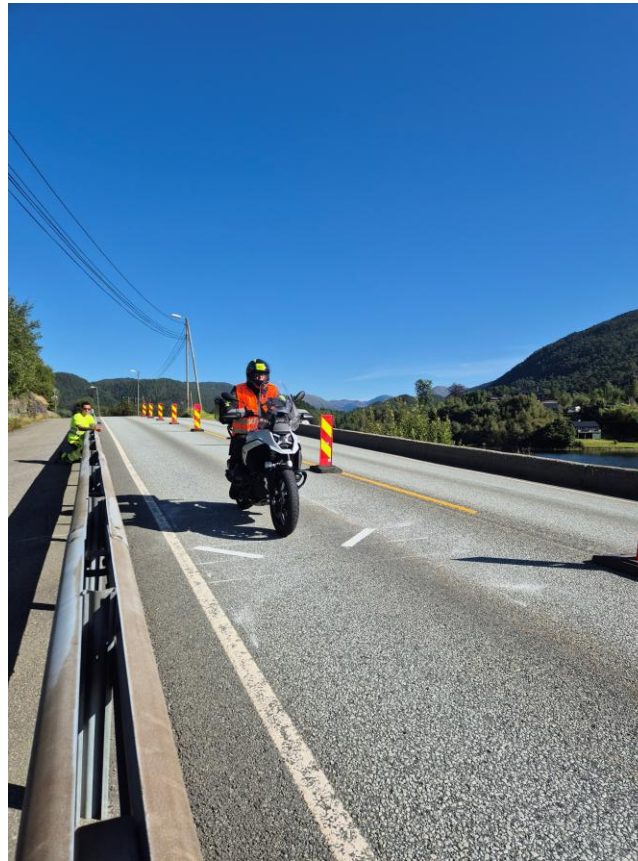
Relatively high motorcycle traffic

Angled gateway markings applied as road markings



European Route E39 Trial Location

A fourth gateway marking was installed at the curve entrance



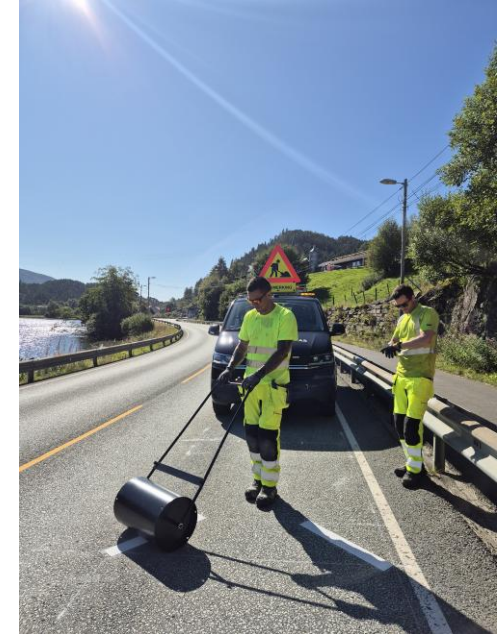
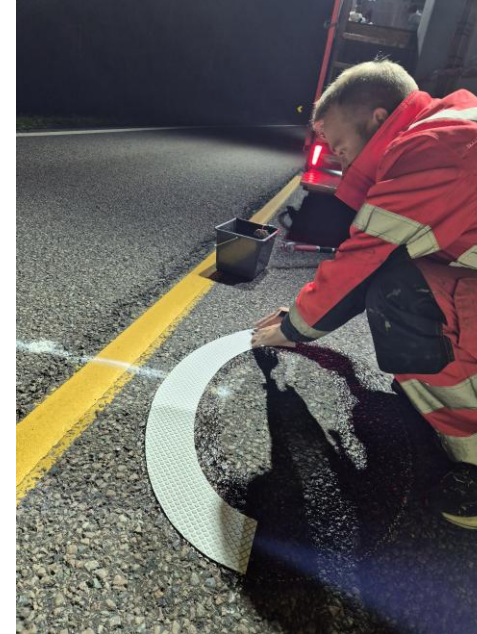
Road Marking Material

Material: 3M STAMARK A380ESD

Very high skid resistance (0.8)

Good skid resistance under wet conditions

Good retroreflectivity



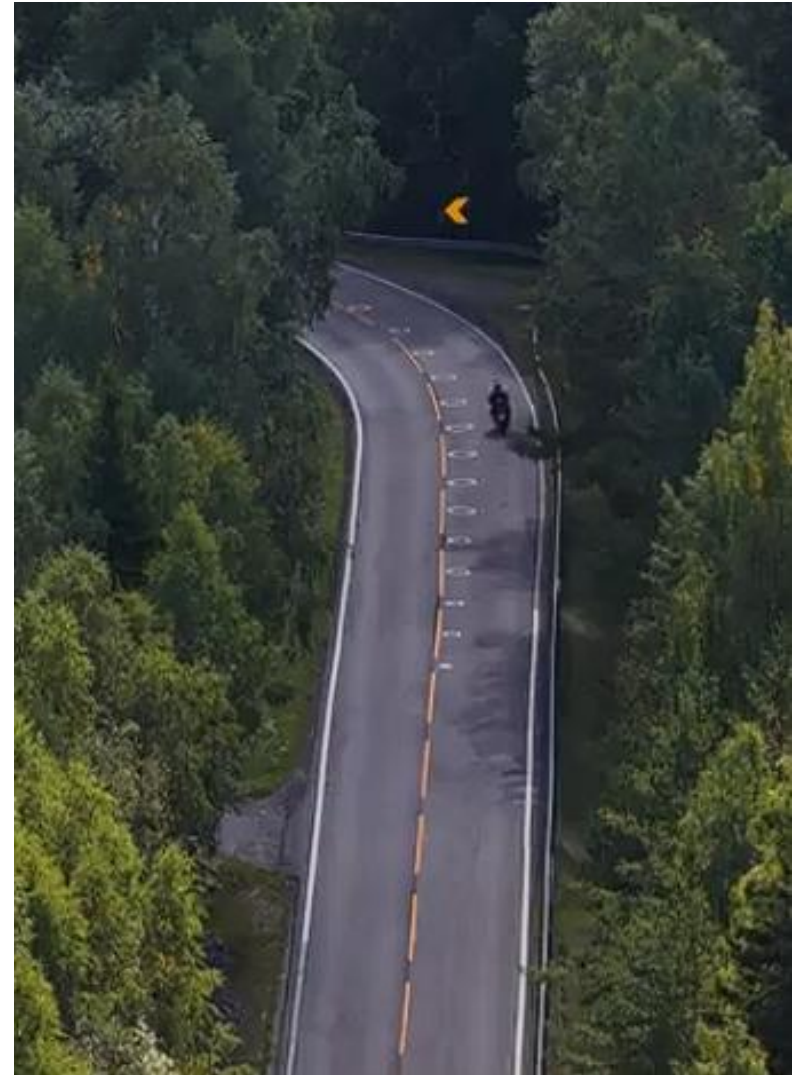
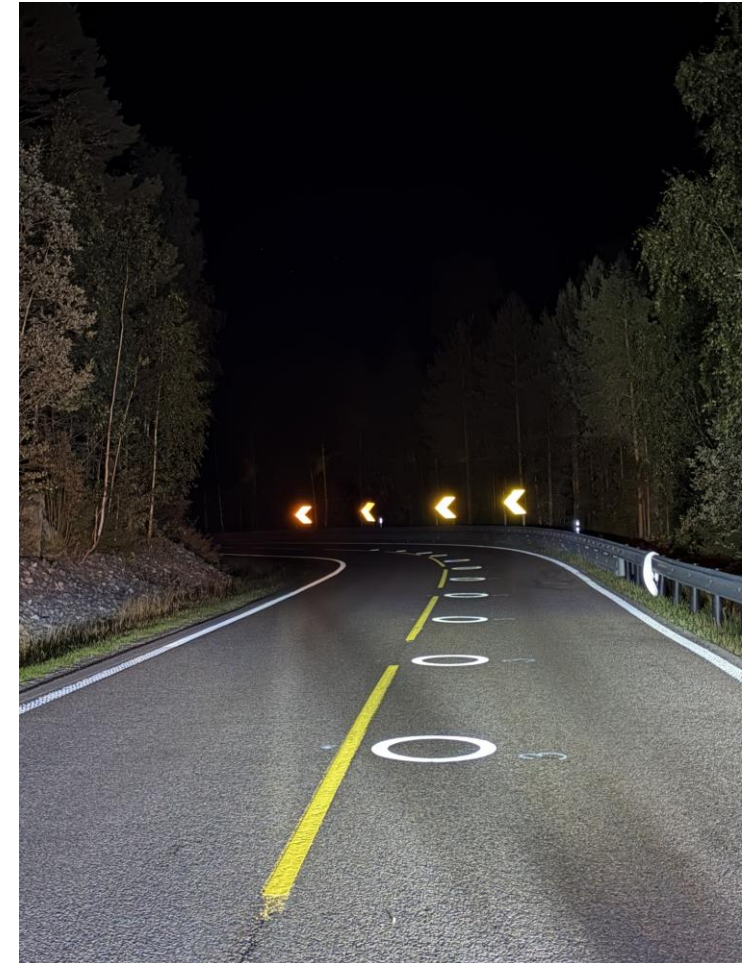
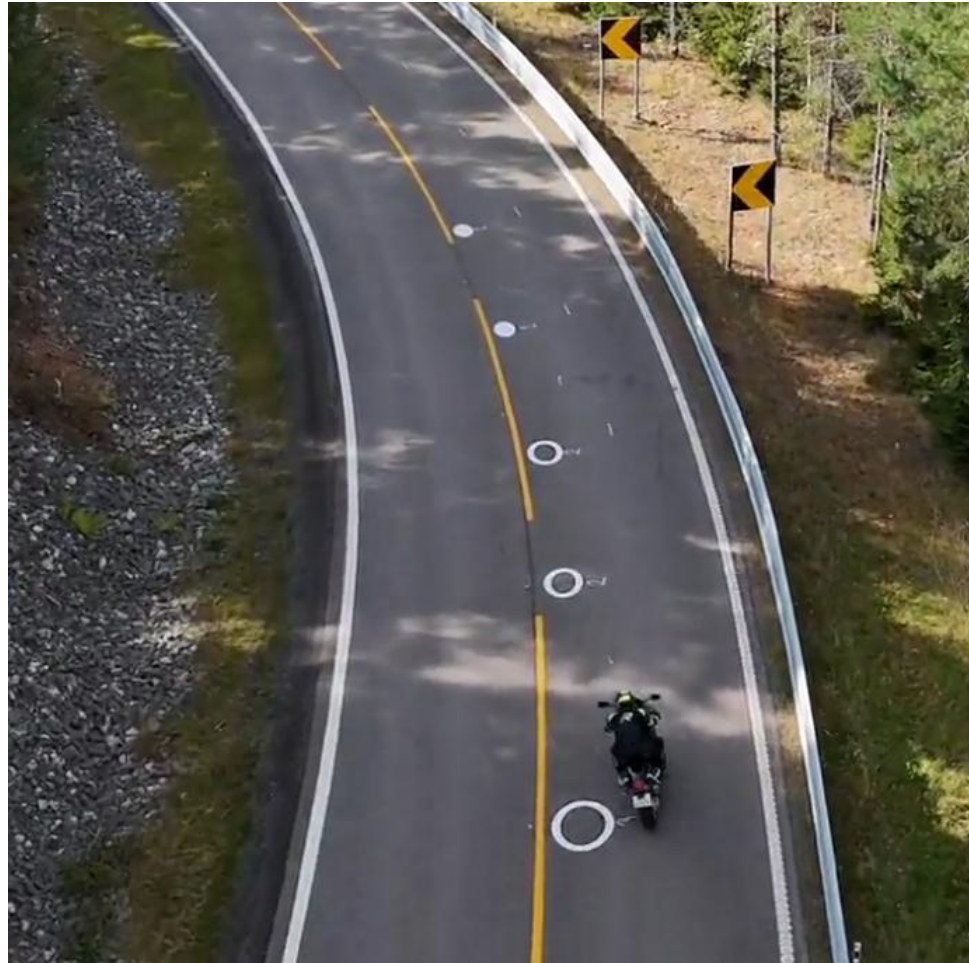


Foto: Statens vegvesen

Road Marking



Data Collection and Analysis

Measure no.121: The Norwegian Public Roads Administration will evaluate the use of special road markings to encourage safer road positioning and appropriate speed choice for motorcyclists in curves.

What Will Be Analysed

Lane position through the curve (Norconsult)

Speed changes when approaching and negotiating the curve (Norconsult)

Gaze behaviour and visual attention when approaching and negotiating the curve (Nord Universitet). Interviews in addition.

Design: Before-and-after study

Video observations collected over a 10-day period

50 motorcyclists equipped with eye-tracking glasses

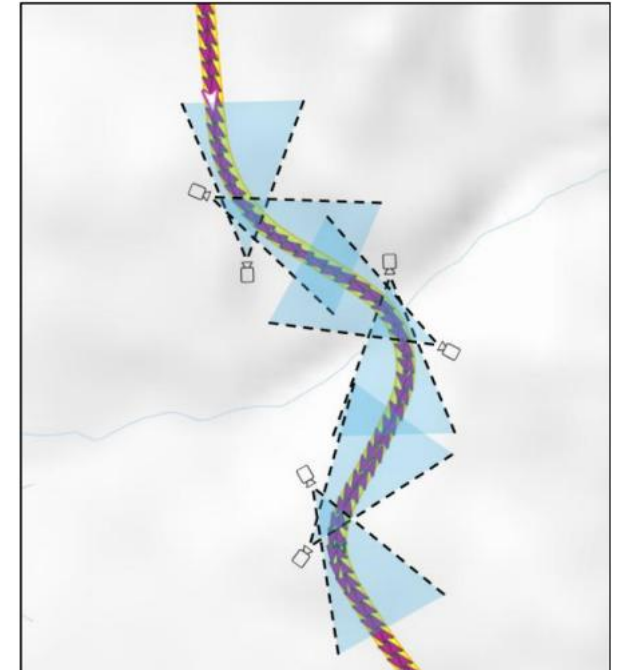


Foto: Norconsult, Tobii eye tracker, Nord Universitet

Next steps

- Results and evaluation from Nord University and Norconsult expected in December 2026.
- Evaluate whether the pilot should be implemented as a permanent measure based on the results.
- Compile lessons learned and evaluate the results, including what worked well and what did not.
- Develop detailed specifications for the road markings, including dimensions and spacing.
- Use the risk curve map to identify and select high-risk curves for motorcyclists.



Thank you!

Hans Olav Hellesøe

Therese Rudlang



Foto: Statens vegvesen



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