

- **Driver behaviour in non signalised intersections**
- Distance markings on motorways – effect evaluation
- Time period needed for lane change manoeuvre on motorways

Video registration of drivers behaviour in 8 non signalised intersections:

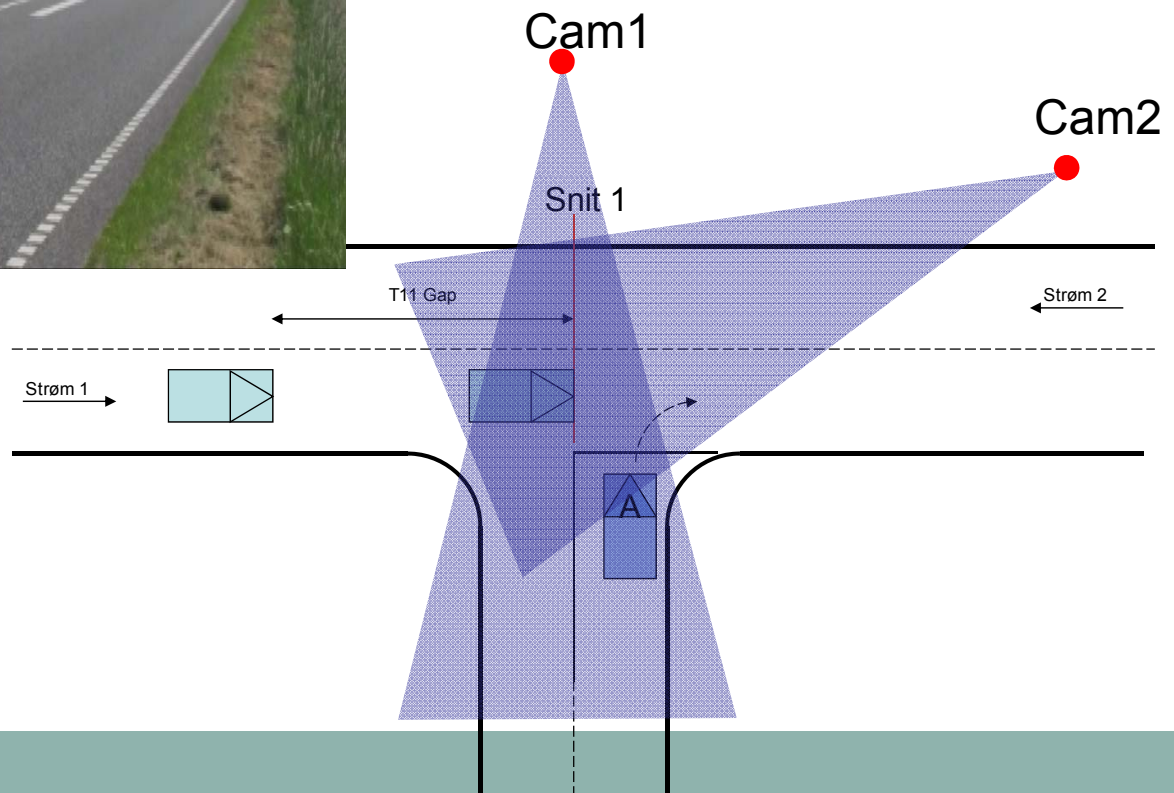
- 2 three - armed in urban area
- 5 three - armed in rural area
- 1 four - armed with mandatory stop in rural area

Estimations from video observations:

- Critical gab
- Follow up time
- Queue discharge



Driver behaviour in non signalised intersections



Turning manoeuvre	3-armed intersections rural – personal cars	
	Critical gab	Follow up time
Right turn from secondary road	7,0 sek.	3,3 sek.
Left turn from secondary road	6,9 sek.	3,7 sek.
Left turn from primary road	5,6 sek.	2,4 sek.

- The estimated parameters result in a lower capacity for secondary traffic compared to the Danish Road standards.
- For left turn traffic from primary road the capacity is almost unchanged
- No differences between urban and rural and not either between 3-armed and 4-armed intersections

Capacity calculations by use of Time gab model together with the new parameters results in realistic estimations in general

The use of different values adjusted to the local traffic situation as an alternative to have only one standard value should be considered

Passenger car units (pcu)

Truck/bus
(8 – 13 m)



Semitrailer/truck w. trailer
(13 – 22 m)



Turning manoeuvres	PCU (passenger car units)			
	Truck/Lorry/Bus 8-13 m		Semi trailer/ truck w. trailer 13-22 m	
Right turn from secondary road	1,4	(1,3-1,6)	2,2	(2,0-2,6)
Left turn from secondary road	1,7	(1,6-1,9)	3,1	(2,2-4,4)
Left turn from primary road	2,3	(1,8-2,8)	4,1	(2,6-5,8)

The new estimated values are higher compared to the Danish road standards

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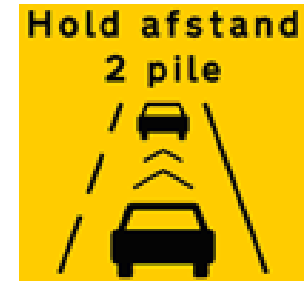
Markings were implemented in 2007

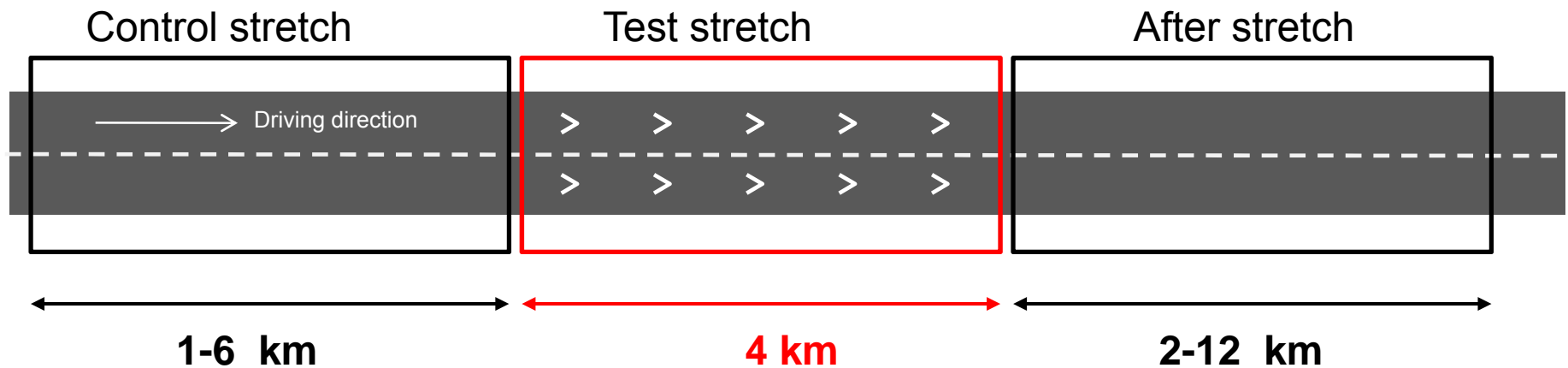
5 motorway stretches – about 4 km long and speed limits 130 km/h

M60 - Østjyske Motorvej at Horsens (south/north)

M30 – Sydmotorvejen at Køge (south/north)

M40 - Fynske Motorvej at Aarup-Ejby (West)



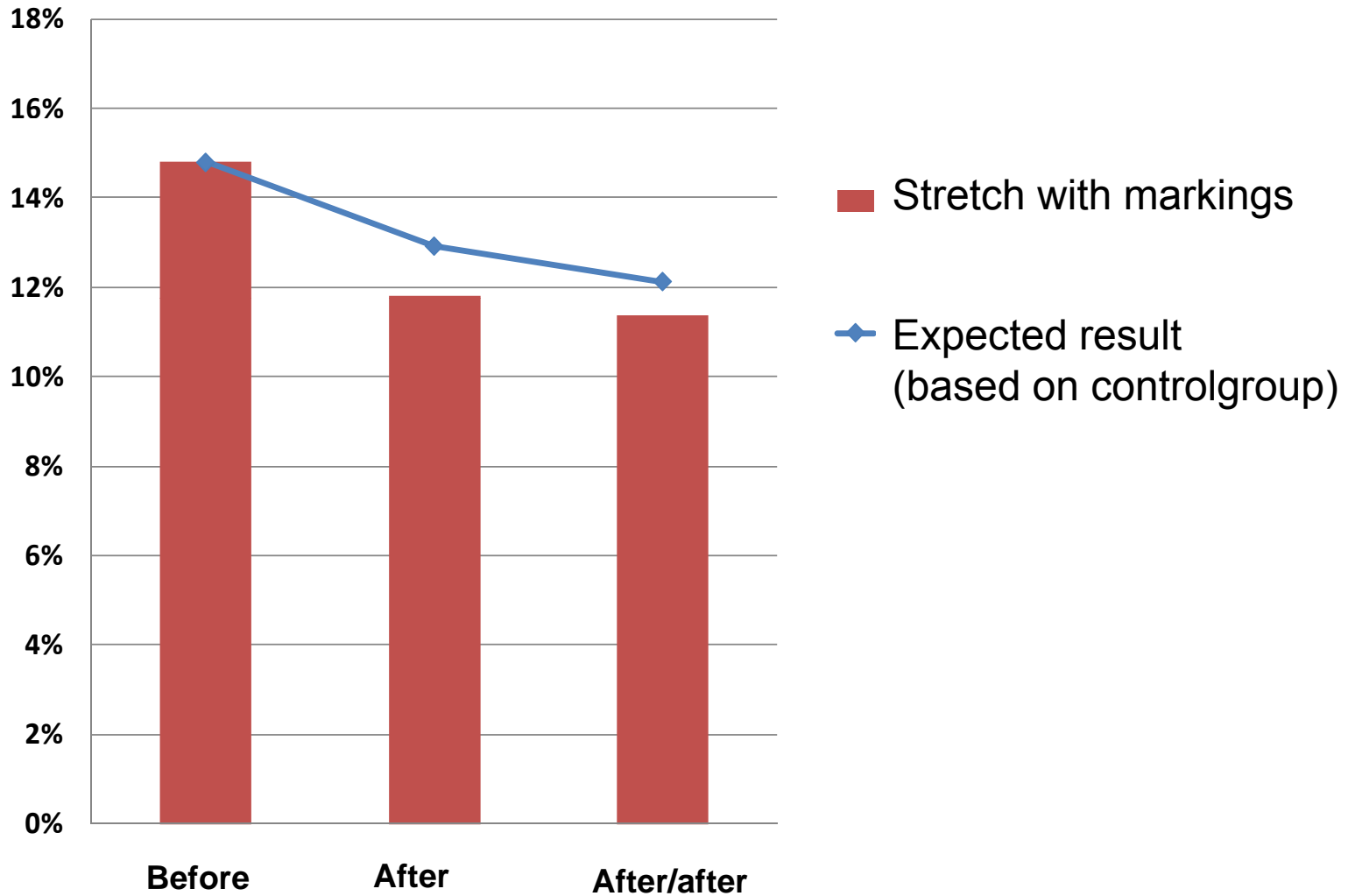


- Single vehicle registrations in all cross sections (right and left lane)
- 4 days (dry weather)

Before: 3-5 weeks before implementation (2007)
After: 6-8 weeks after implementation (2007)
After/after: 3 years after

Vehicles %
(gab < 1 sec)

All stretches (average)

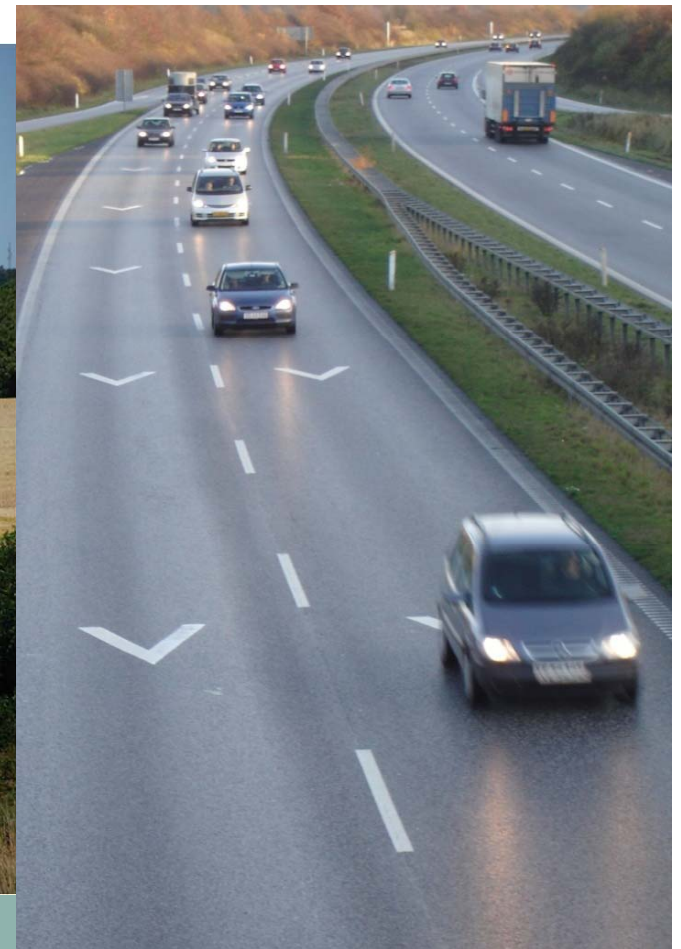


Distance markings on motorways - Results

Primary evaluation after 2 months: The number of small time gaps (< 1 sec) was reduced

Evaluation 3 years after (long terms effect):

- Number of small time gaps (<1 sec) has been reduced by 5 % compared to control stretches
- Long term effect on small time gaps is 2/3 of the short term effect
- The speed level has been reduced by 1-2 km/h



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Time period needed for lane change manoeuvre on motorway

- 50 km test route on 2 lane motorway – speed limit 110 km/h
 - 19 test drivers
 - 11 men and 8 women
 - 8 (33 – 55 years) and 11 (65 – 82)
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- 209 lane change manoeuvres from Left to Right
 - 212 lane change manoeuvres from Right to Left



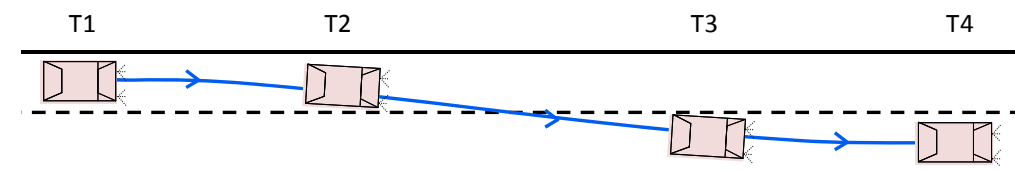
Time period needed for lane change manoeuvre on motorway



Time period T for lane change	Whole manoeuvre	Wheel crossing
T_{verage}	4,8 sec	2,4 sec
$T_{85\%}$	6,0 sec	3,1 sec
$T_{\text{av left>right}}$	4,9 sec	2,5 sec
$T_{\text{av right>left}}$	4,7 sec	2,4 sec

Whole manoeuvre: From the moment when the driver starts to change direction until the moment when the car drives stable with regards to direction and lateral position in the next lane

Wheel crossing: From the moment when the first wheel pair cross the marking line until the second wheel pair have crossed the same marking line.



Thank you for your attention !