

Variable Speed Limit (VSL)



TRAFIKVERKET

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Variable Speed Limit (VSL)

- Variable Speed Limit (VSL) means that maximum speed limit is lowered when impaired or more risky conditions prevail.
- How the speed limit varies is defined in a regulation that is specific for each object.
- Speed message is communicated by variable message signs



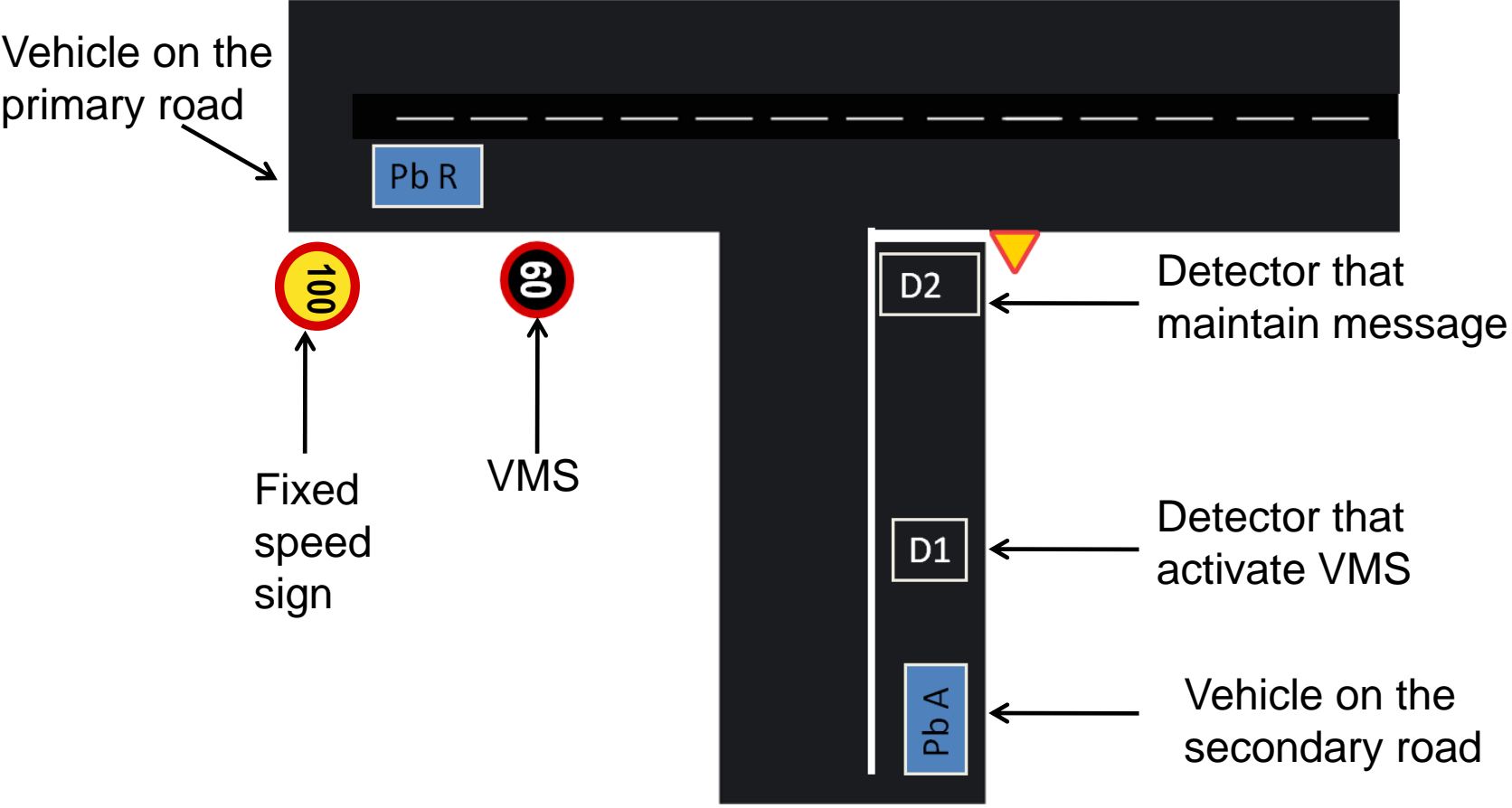
Applications of VSL

- Traffic
 - Intersections
 - Stretch of road
 - Pedestrians and cyclists
- Weather
 - Road surface (snow, ice...)
 - Wind
- Combinations

VSL at intersections

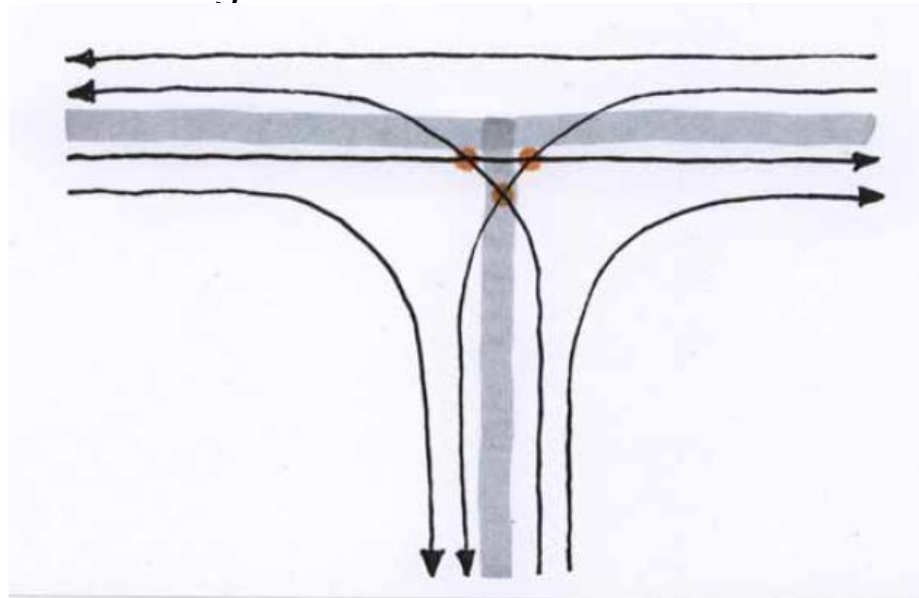
- VSL is used at intersections where there is a high accessibility, a good speed adaptation and high road safety is preferable.
- Fixed speed limit is replaced with VSL, for example,
 - Before: 100 km/h at the stretch of the road and 70 km/h in the intersection
 - After: 100 km/h at the stretch of the road and intersection but when VSL system is active the speed limit is 60 km/h in the intersection
- The VSL system is controlled by vehicles crossing or turning.
- During a big part of the day the speed limit is 100 km/h instead of 70 km/h.
- The lower speed limit, 60 km/h, only occurs when it is relevant.
- 60 instead of 70 km/h because of principle of collision

VSL at intersections



Traffic function VSL Intersections

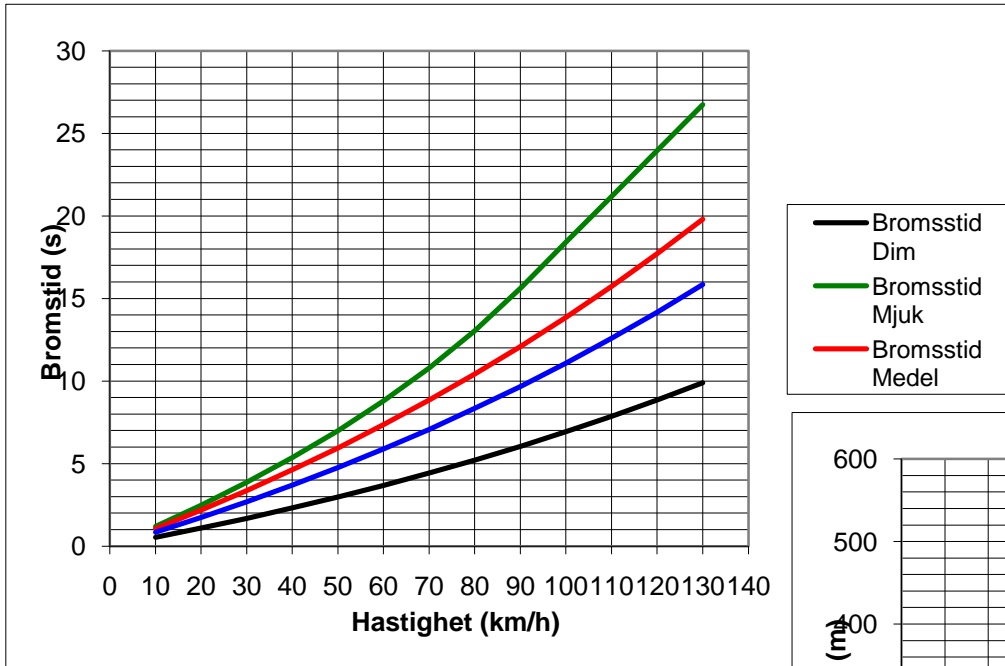
- It have to possible for vehicles passing a active VMS to decelerate down to the point of conflict.
- Vehicles passing a passive VMS and are not decelatering should not be able to encounter a conflicting vehicles.



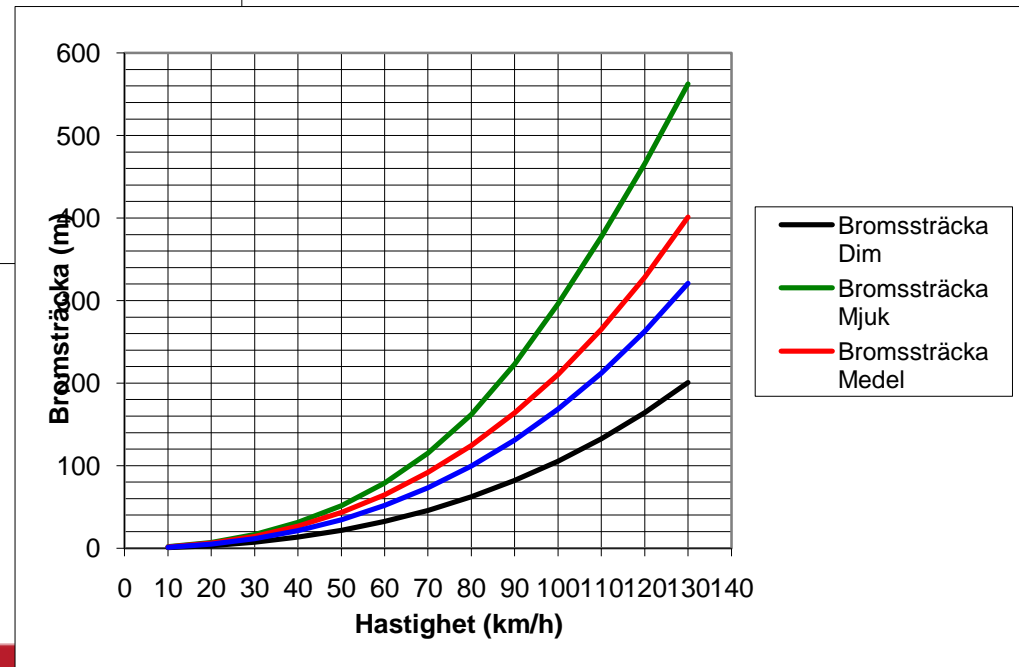
Traffic function VSL Intersections

- Location of VMS
 - The distance of retardation eg between 100-60 km/h
 - Minimal reading distance
 - Time of reaction of the driver
 - Transport Legislation with regard to the number of lanes, etc.
- Location av detectors
 - The time of retardation between 100-60 km/h controls the location of the first detector that activate the VMS. The time between when the conflicting vehicle passes the detector and when it reaches the point of conflict must be at least equal.
 - Road design often restrictions on where to place the detector as left turn lane
- VMS can be moved closer than expected but detector distance must be sufficient

Traffic function VSL Intersections

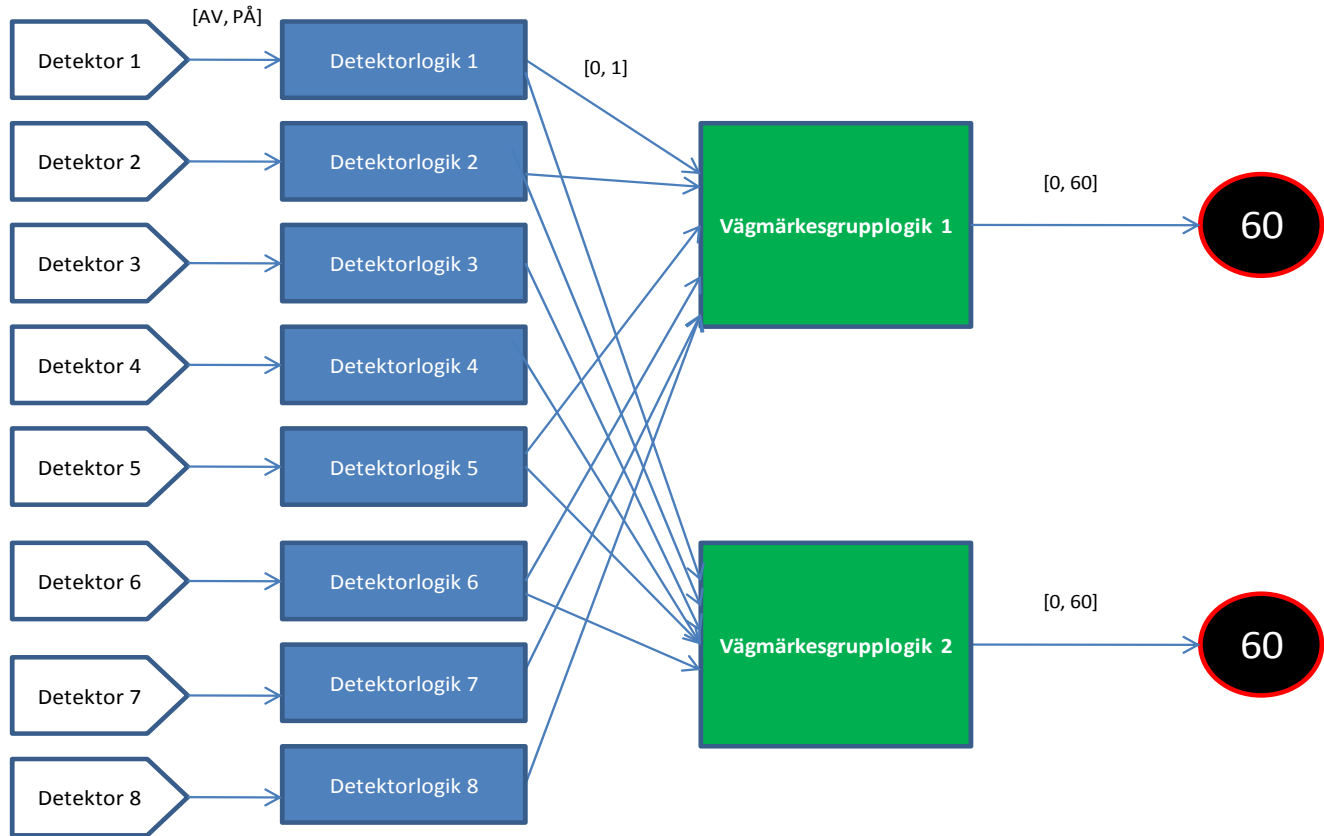


- Brömsstid Dim
- Brömsstid Mjuk
- Brömsstid Medel



- Brömsträcka Dim
- Brömsträcka Mjuk
- Brömsträcka Medel

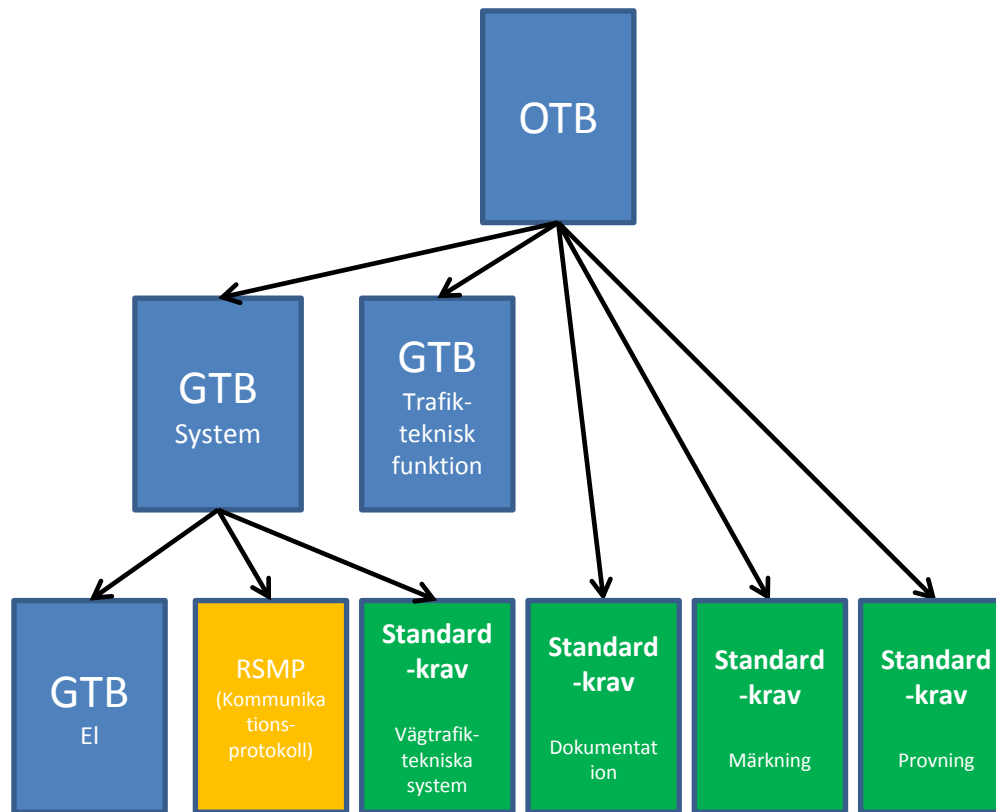
Control logic VSL Intersections



VSL Intersections Standard concept

- Objective: Standardized material to serve as a basis for implementation of all new objects.
- Important that traffic analysis, traffic function, technical solutions, purchasing and construction of system are performed in a similar way.
- The project has not completed but the produced material have been used for the 12 new objects.
- There are three levels of specification documents
 - Standard requirements (identical for all ITS)
 - General technical requirements (identical for all VSL Intersections)
 - Objects technical requirements (specific for each objects)
 - Plan (location of detectors, VMS etc.)
 - List of equipment
 - Setting of logical parameterfunctions
 - Etc.

VSL Intersections Standard concept



VSL Future

- VSL is useful at intersections where high speed occurs and vehicles tend to exceed the speed limit.
- VH Intersections can be useful at 2+1 roads and as an alternative to roundabouts in rural areas.
- Research more about
 - Weather
 - Emissions
 - Vulnerable road users
 - Animal crossing
 - More advanced detection at intersections