Variable speed limit field trials
Variable speed limits
In the five years between 2003 and 2007, the Swedish Road Administration (SRA) is conducting field trials on variable speed limits. Twenty test sites have been chosen for this purpose. Variable speed limits mean that the maximum permitted speed is not always the same, but changes depending on the traffic situation. The speed can vary from 30 km/h up to a maximum of 120 km/h, in 10 km/h increments. Variations of this method are being used successfully in several other countries, including Finland and Great Britain.

Essentially, the intention is to increase acceptance of speed limits and rule compliance. This in turn should result in better accessibility and road safety as well as a better environment.

Road safety
Close to 500 people are killed on Swedish roads every year, and tens of thousands are injured. These statistics can never be considered acceptable. This is why we have adopted “Vision Zero” – the new approach laid down by the Swedish Parliament at the end of the 1990’s. “Vision Zero” means non-acceptance of any road fatalities or serious injuries, and that we must strive towards a society where traffic does not claim lives.

Speed limits
“Vision Zero” demands a complete review of all the factors that affect road safety – particularly speed. Many serious accidents can be avoided if drivers were better at adjusting their speed to suit the traffic situation. Most people are aware
Today, speed limits are always the same, regardless of the weather or traffic situation. However, field trials involving variable speed limits could change this traditional system.

One explanation for high speeds on Swedish roads could be that speed limits are fixed. A road where the speed limit is 90 km/h is always a 90 km/h road, regardless of traffic conditions. Many tend to drive at the highest permitted speed, even if rain, rush hour traffic or poor visibility means that the speed should be lower. It is also quite common that drivers exceed speed limits when traffic conditions are more favourable.

Testing variable speed limits is part of the SRA’s ambition to achieve the best possible traffic conditions. It is assumed that more drivers will comply with speed limits if they are variable – if they change when the traffic situation does. The results will be presented after the field trials are over.

Under what conditions will we be testing variable speed limits?
Weather conditions and rush hour traffic are not the only factors to consider. We have chosen several different traffic situations where we believe variable speed limits could change driver attitudes and their behaviour in traffic, and thereby improve road safety and accessibility, for example.

- where there is heavy traffic and queue build-ups
- when a bus is exiting a bus stop
- at slip roads, intersections and left turn situations
- in the case of bad weather and road conditions
- when children are on their way to and from school
Variable Speed Limits in Practice

Information on vehicles and weather conditions
Different types of technical equipment are installed at the test sites depending on the purpose. Sensors in the roadway register when vehicles drive by, including how many. Movement detectors register lighter vehicles, such as bicycles and mopeds. Weather stations monitor temperature, precipitation, and road conditions. At some locations the road is monitored by video cameras.

The information received from this equipment is usually analysed automatically and the speed display setting is changed according to pre-set limit values. The information is also sent to one of the SRA traffic information centres (Figure 2), where, in certain cases, the staff on duty decide which speed limit to display.
Two types of signs
Two types of variable speed limit signs are being used in the field trial. Both are electronically adjustable via remote control. The most common sign being used digitally displays the “statutory maximum speed” and has the same implication as the posted speed limit. However, at one test site a sign is being used to display a “recommended maximum speed”. At this location it is still the normal speed limit signs at the roadside (those in sheet-metal) that legally apply. In this case the variable signs provide a recommendation.

Targets, surveys, evaluation
Variable speed limits may in the long term lead to a greater acceptance and understanding of speed regulations. The field trials will show if this is the case. Moreover, they will provide us with new experience in traffic law and help us develop organisation and technology in the best way possible. Surveys will be conducted before, during and after the installation of variable speed – not only at the test sites, but also on control stretches and on roads in the vicinity of the test sites. The latter is to help us find out whether there has been any change in traffic behaviour that has “spread” beyond the specific test site area.
1. **Highway 582 – Alvik (south-west of Luleå)**
   - Why variable speed limits? Children walk along or cross the road on their way to and from school.
   - Alternative speed display: 30 (recommended speed) and 50 km/h.

2. **Highway 647 – Bodbyn (west of Umeå)**
   - Why variable speed limits? To improve safety for pedestrians/bus passengers using the road.
   - Alternative speed display: 30, 50 and 70 km/h.

3. **E4 Highway – Intersection with a pedestrian crossing south of Sundsvall**
   - Why variable speed limits? Difficult for pedestrians to cross – and for vehicles to enter the highway.
   - Alternative speed display: 40, 50 and 70 km/h.

4. **E4 Highway – Western approach to Hudiksvall**
   - Why variable speed limits? An intersection where it is difficult for heavy vehicles to enter and exit the highway.
   - Alternative speed display: 70 and 90 km/h (wintertime), 80 and 110 km/h (sumertime).

5. **Highway 55 – Örsundsbro (north-east of Enköping)**
   - Why variable speed limits? Four-leg intersection with heavy traffic load. The speed limit on the primary road is reduced to improve road safety.
   - Alternative speed display: 70 and 90 km/h
   - Field trial period: 2007

6. **E18 Highway – Danderyd Hospital – Viggbyholm southbound (towards Stockholm)**
   - Why variable speed limits? Queue build-ups during peak hour traffic may cause rear-end collisions and impair accessibility.
   - Alternative speed display: 50, 70, 90 and 100 km/h.

7. **E18 Highway – Västmanland (Västjädra–Skälby)**
   - Why variable speed limits? Heavy volume of traffic with risk of queues. Periods of poor visibility and hazardous road conditions. During ongoing motorway construction the barrier between traffic lanes has been removed and accessibility is limited from time to time. In September 2007 trials start with mobile, changeable speed signage.
   - Alternative speed display: 50, 60, 70, 80 and 90 km/h.
8. E6 Highway – Uddevalla bridge
Why variable speed limits? Periods of strong side winds and a risk of falling ice from bridge cables and pylons.
Alternative speed display: 70, 90 and 110 km/h.

9. Highway 45 – Götaleden (Göteborg)
Why variable speed limits? Risk for traffic queues.
Alternative speed display: 30, 50 and 70 km/h.

10. E6 Highway – Tingstad tunnel (Göteborg)
Why variable speed limits? Heavy traffic volume with queues and risk of rear-end accidents as a result.
Alternative speed display: 30, 50 and 70 km/h.

11. E6 Highway – Mölndal
Why variable speed limits? Narrow lanes combined with heavy volumes of traffic during rush hour.
Alternative speed display: 30, 50, 70 and 90 km/h.

12. E6 Highway – Halland (Skottorp–Heberg)
Why variable speed limits? A high standard motorway that permits high speeds – in good weather.
Alternative speed display: 60, 80, 100, 110 and 120 km/h.

13. Highway 137 – Öland bridge
Why variable speed limits? Narrow lanes with varying traffic volumes and periods of bad weather and strong winds.
Alternative speed display: 50, 60, 70, 80 and 90 km/h.

14. E22 Highway – Blekinge (Åryd–Ronneby West)
Why variable speed limits? Numerous collisions with the median barrier. A stretch of road with widely varying weather and slippery surface conditions.
Alternative speed display: 60, 80, 90, 100 and 110 km/h.

15. Highway 21 – Vanneberga (east of Vinslöv)
Why variable speed limits? An intersection where speed limit is reduced for safety and accessibility reasons when vehicles approach from side roads or want to turn left on the main highway.
Alternative speed display: 60 and 90 km/h.

16. E22 Highway – Bäckaskog (east of Kristianstad)
Why variable speed limits? It is expected that it will be easier and safer for pedestrians to cross the E22 if the speed limit is reduced.
Alternative speed display: Maximum: 90 km/h, minimum 60 km/h.
Field trial period: 2007

17. E22/17 Highway – Fogdarp (west of Hörby)
Why variable speed limits? An intersection where speed limit is reduced for safety and accessibility reasons when vehicles approach from side roads or want to turn left on the main highway.
Alternative speed display: 70 and 90 km/h.

18. Highway 11 – Kyrkhuddinge (east of Staffanstorp)
Why variable speed limits? High speeds make it difficult for buses to exit the bus stop, and for approaching traffic to enter the highway from the slip road.
Alternative speed display: 50, 70 and 90 km/h.

19. E65 Highway – Lemmeströ (east of Svedala)
Why variable speed limits? An intersection where speed limit is reduced for safety and accessibility reasons when vehicles approach from side roads or want to turn left on the main highway.
Alternative speed display: 70 and 90 km/h.

20. Highway 111 – Domsten (north of Helsingborg)
Why variable speed limits? The site is a pedestrian overpass across Highway 111 connecting to a bus stop. The speed limit will be lowered to 60 km/h when there are pedestrians on the overpass.
Alternative speed display: 80 and 90 km/h.
Field trial period: The installation is planned to be put into operation in December 2007.

Information about “Trial with variable speed limits” is also available at www.vv.se/variabelhastighet