

HVSIA meeting

vti

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www.vti.se



Tests carried out since Oct 2003

- » As a part of the Danish project “Mechanistic Design of Semi-Rigid Pavements”
- » Stability test of modified AC-layer
- » Test Structure according to Swedish Specification (reference to coming tests)

Future plans

- Evaluation of different strengthening strategies on existing road in some European countries, (if the European Union accepts the proposal).

Mechanistic Design of Semi-Rigid Pavements - An Incremental Approach



Mechanistic Design of Semi-Rigid Pavements - An Incremental Approach

Danish Road Directorate, DRI Report 138, 2004

www.vejdirektoratet.dk

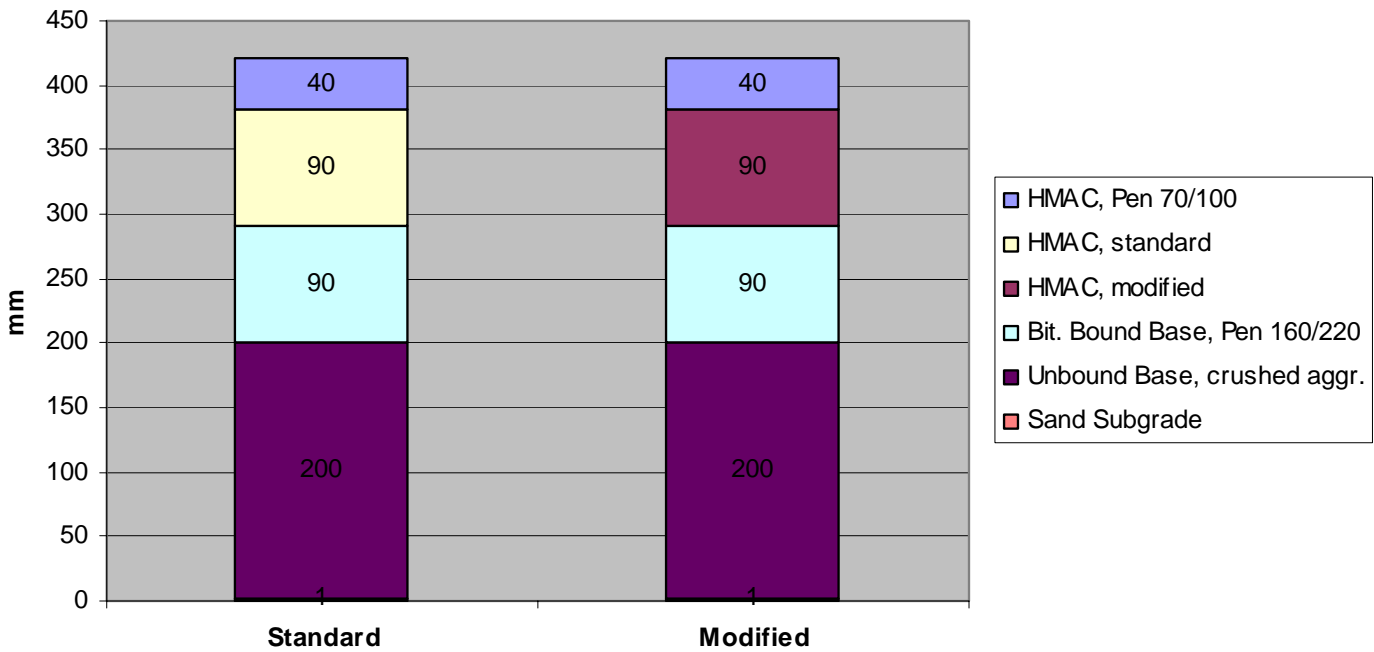
Pavement Designation	A1 & A2	B1 & B2	C1 & C2
Surfacing (30 mm)	30 mm Asphalt Concrete		
Stabilised base course (180 mm)	Gravel 0/16 mm $\sigma_c = 8 \text{ MPa}$	Gravel 0/16 mm $\sigma_c = 4 \text{ MPa}$	Sand 0/8 mm $\sigma_c = 4 \text{ MPa}$
Subbase (200 mm)	Sandy/silty moraine		
Subgrade	Crushed stone embankment > 2 m		

Test site at VTI Sweden

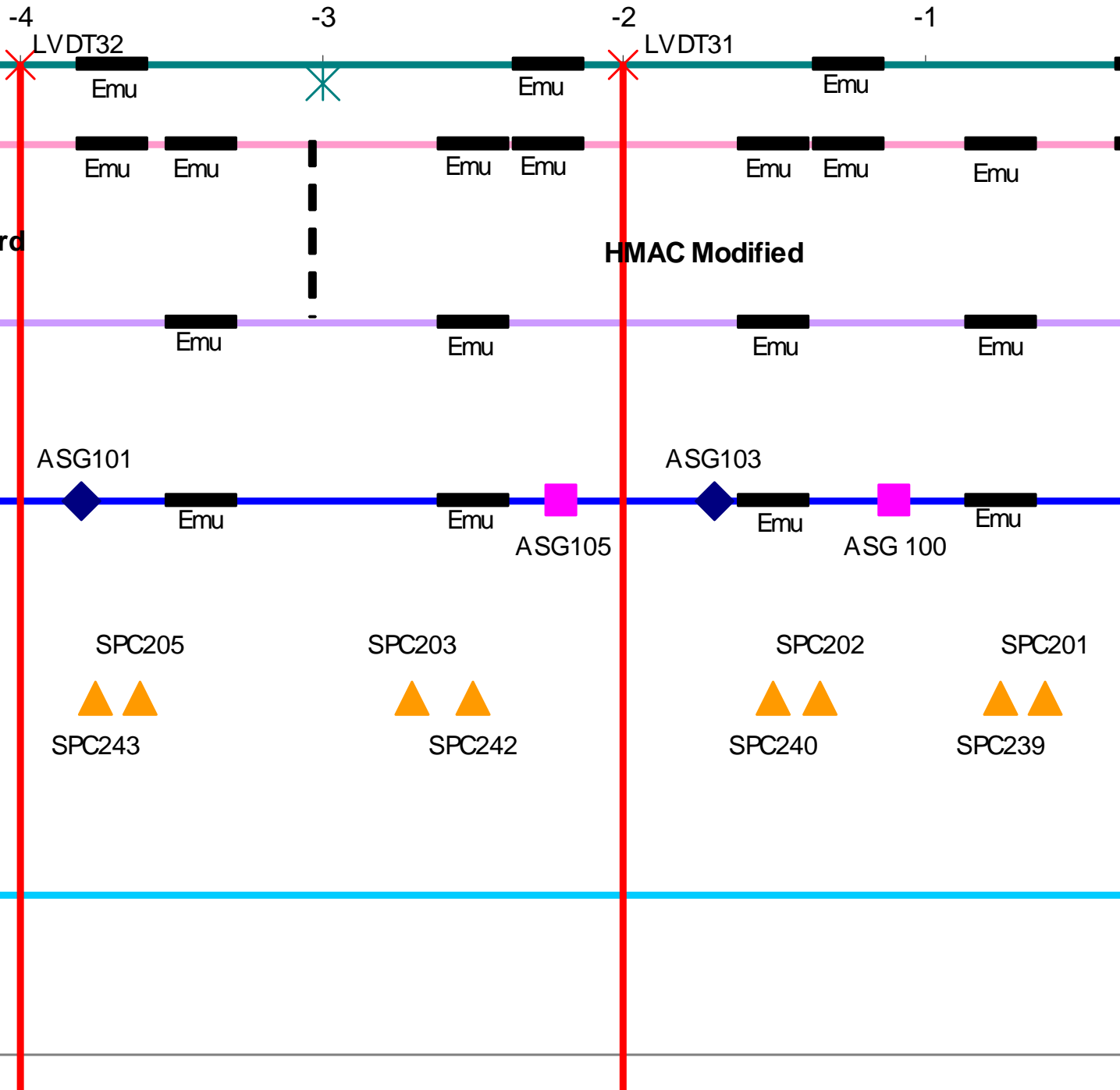
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Test Structures
AC Layer Stability Test, SE09

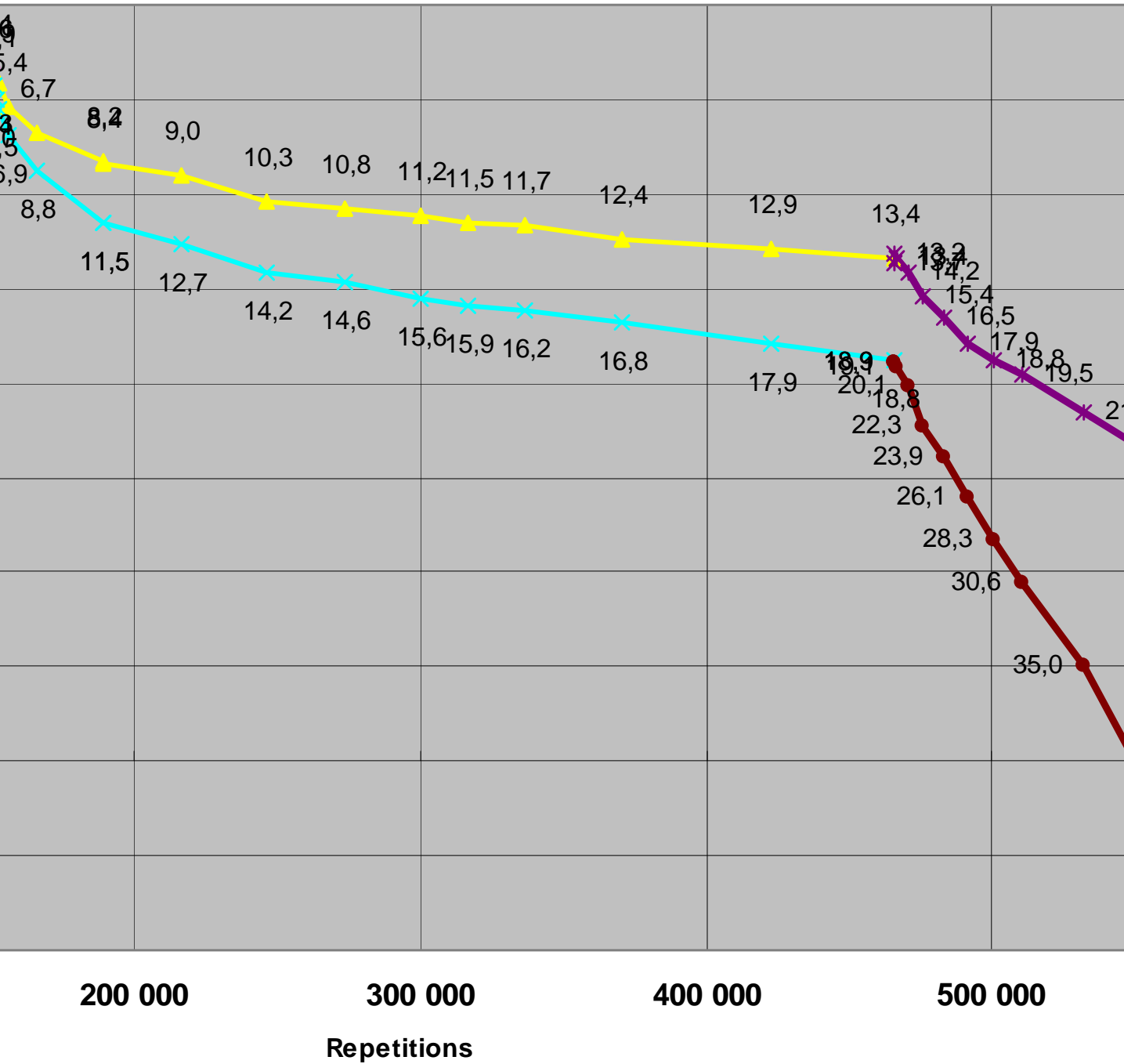


Instrumentation Test Structure SE09

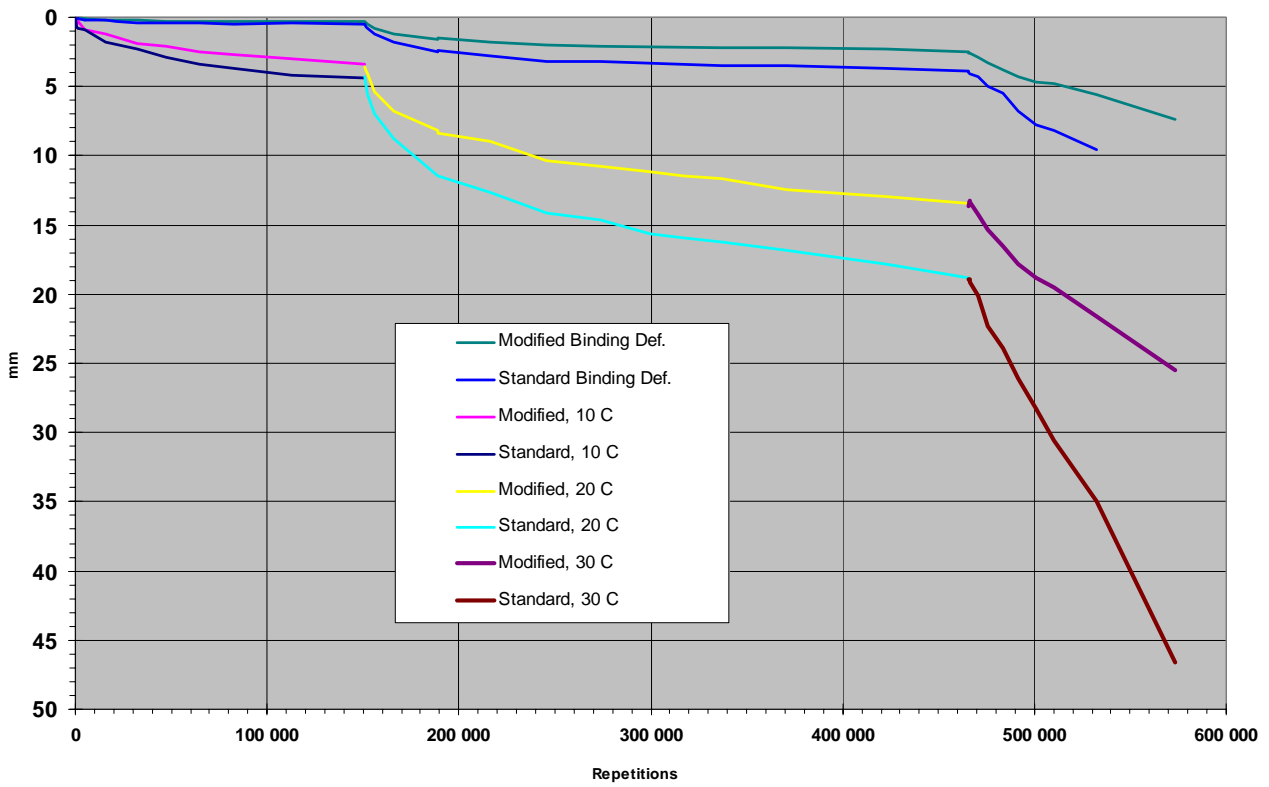


Surface Mean Rut depth, mm

Preliminary results, SE09



Deformation Intermediate AC Layer

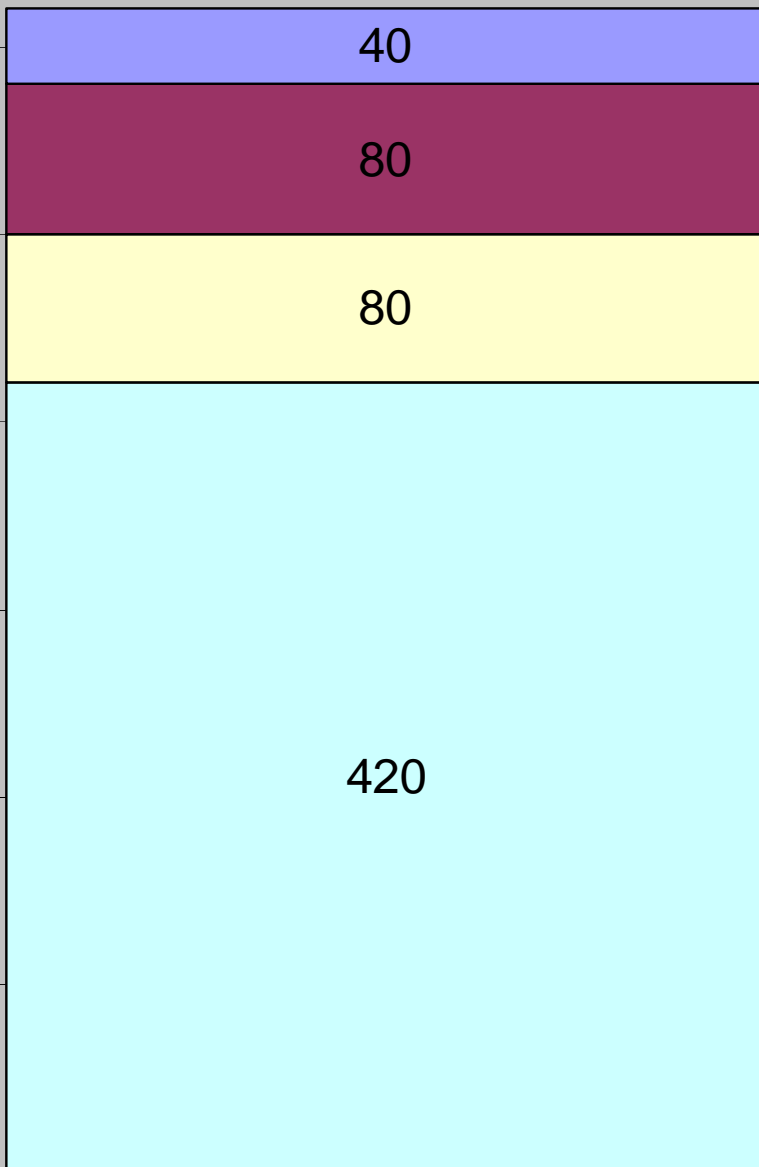


At the end of SE09



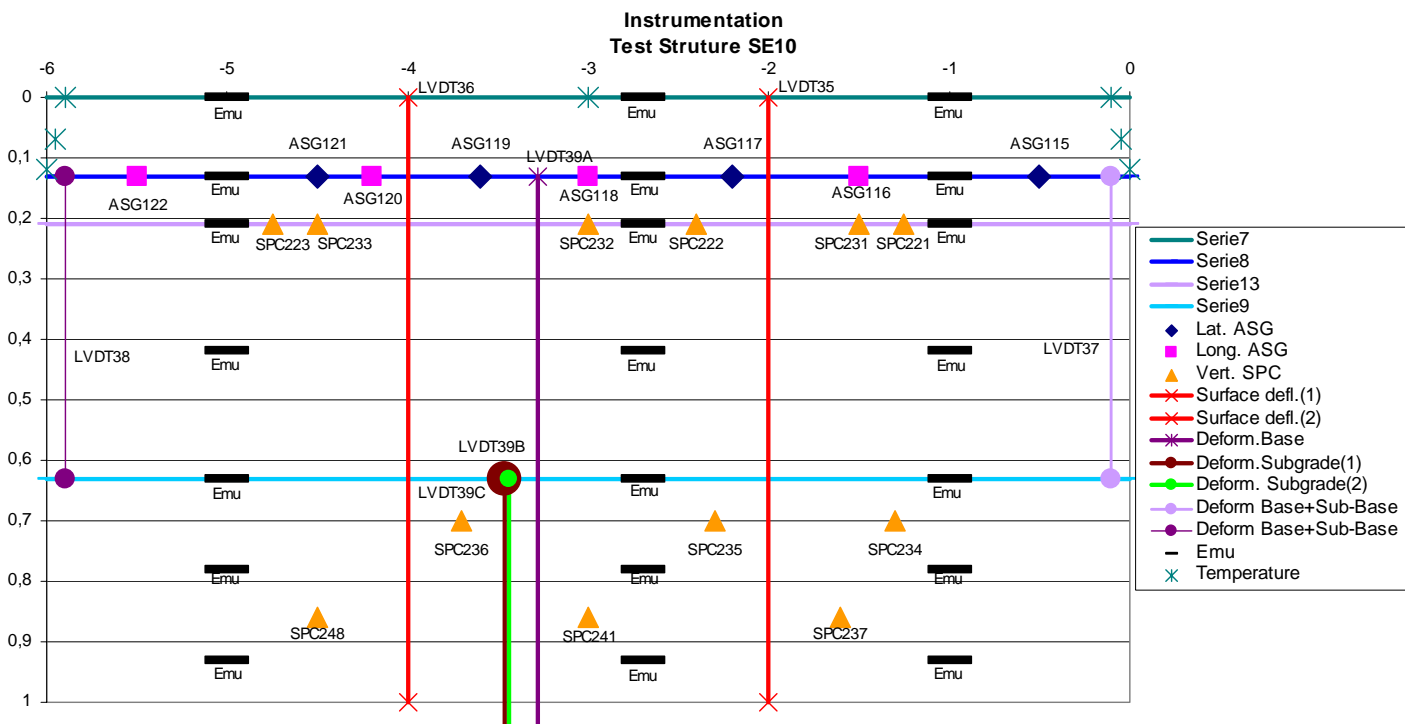
Teststructure, SE10

Swedish reference

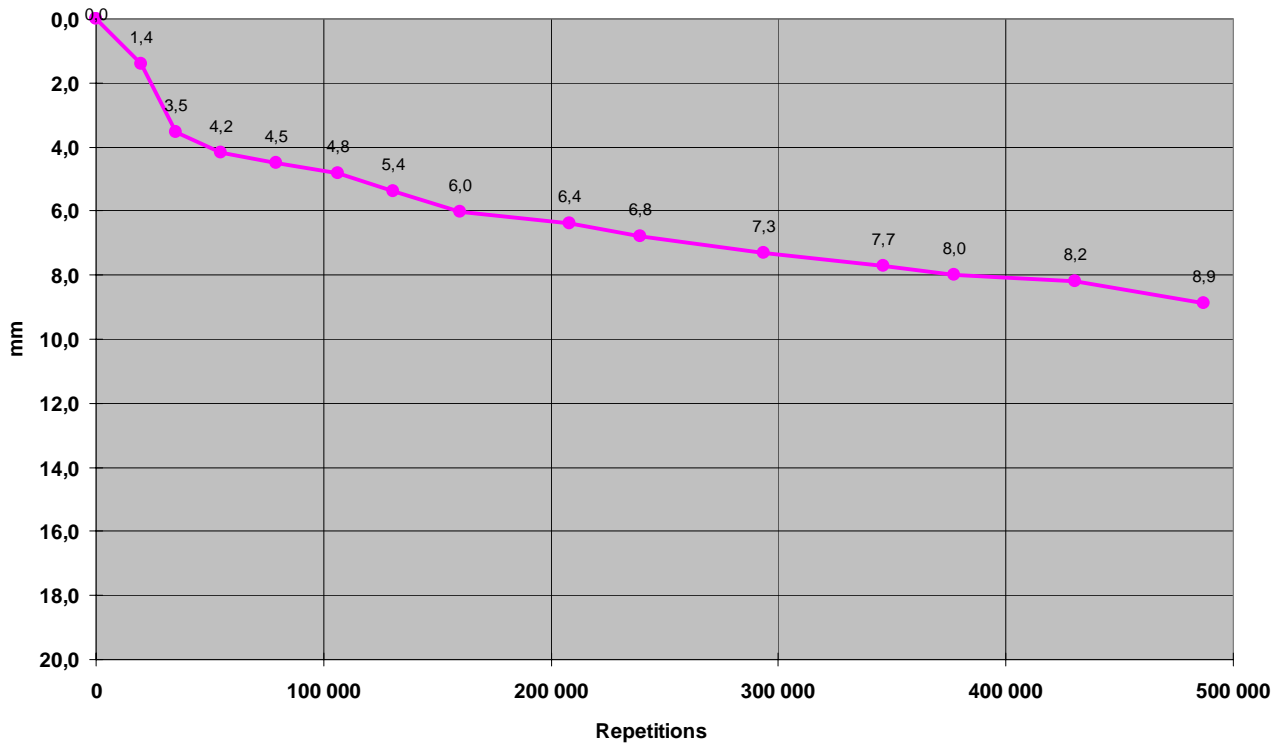


SE10

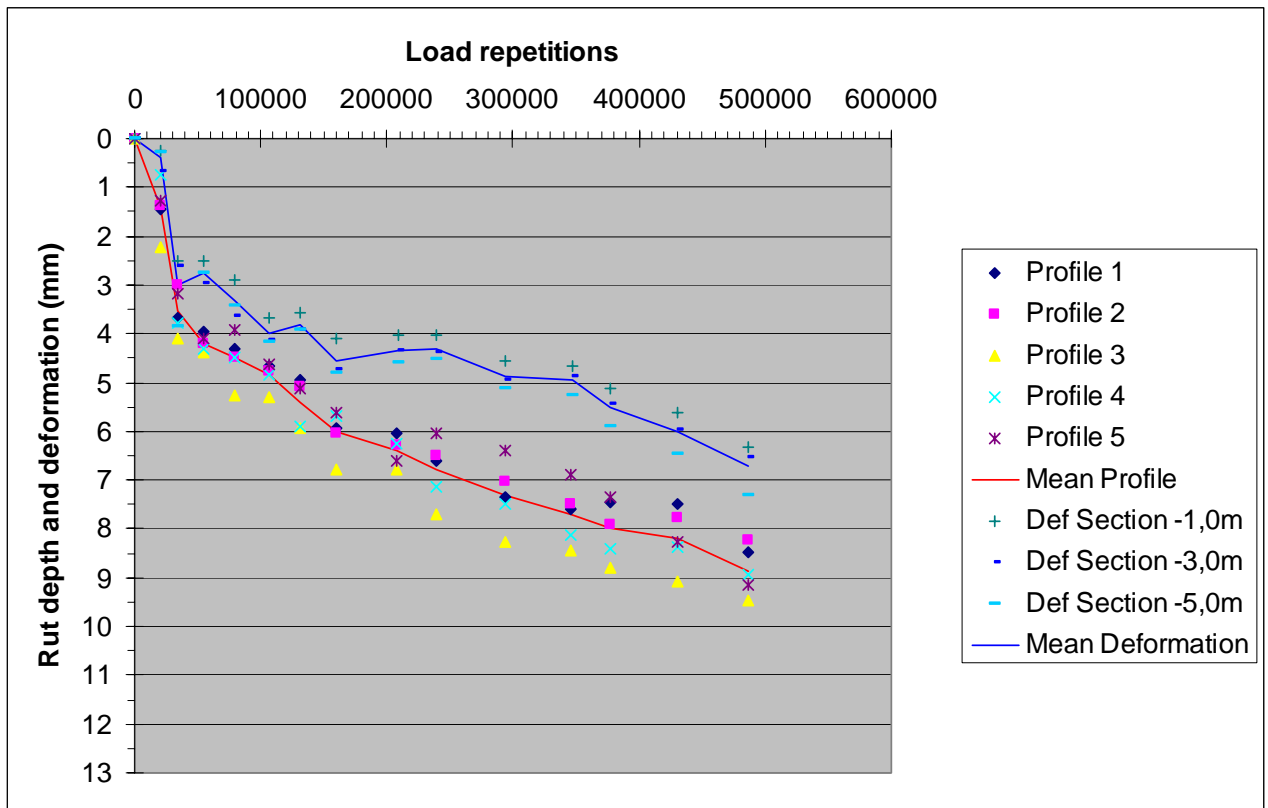
Instrumentation SE10 vti



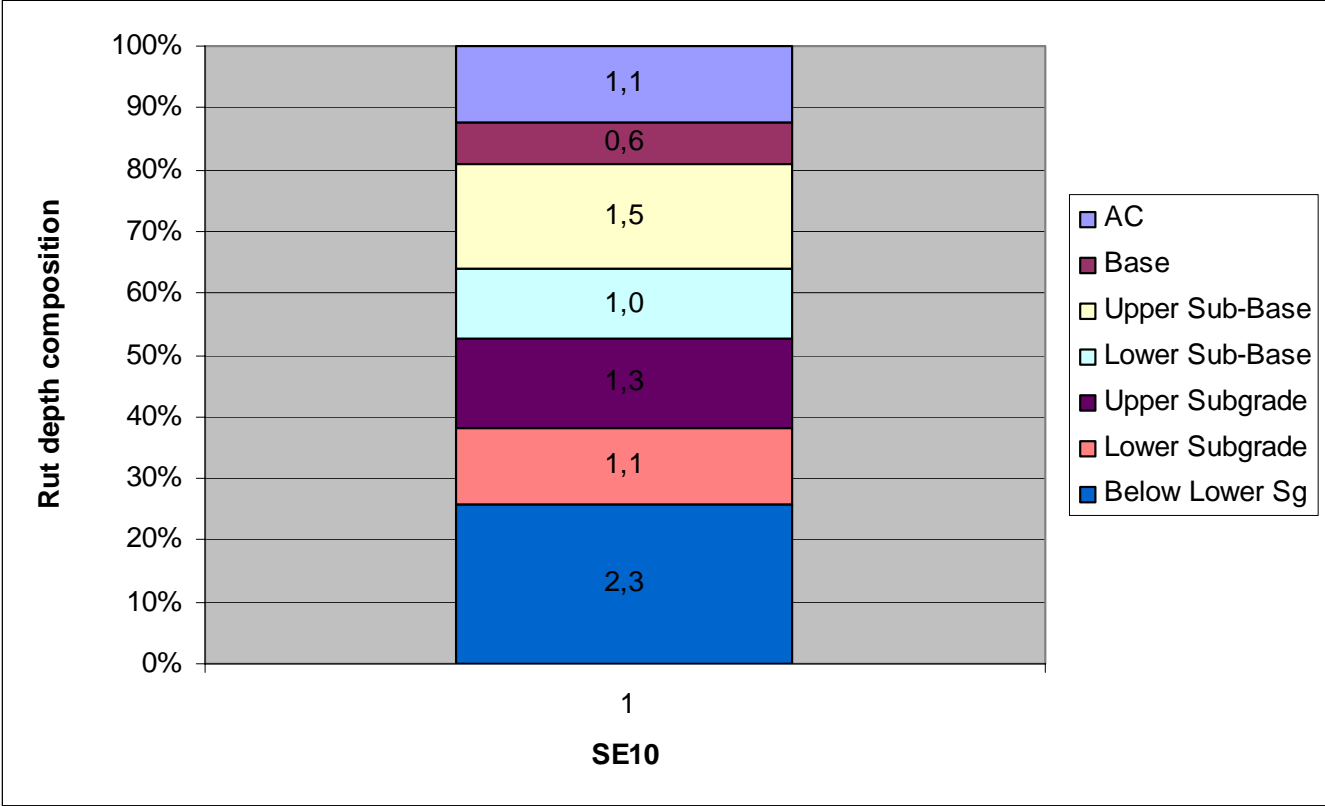
Surface Mean Rut Depth SE10



Deformation, SE10



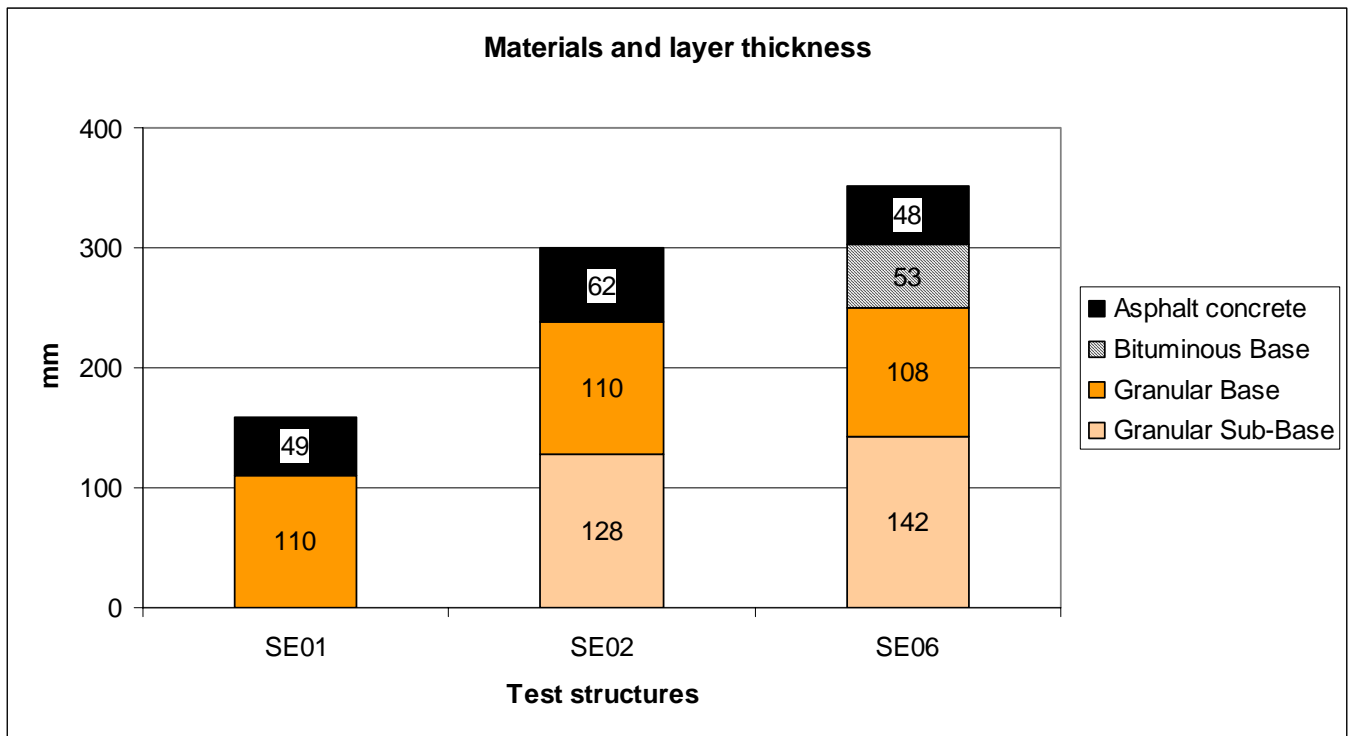
Rut Depth Composition



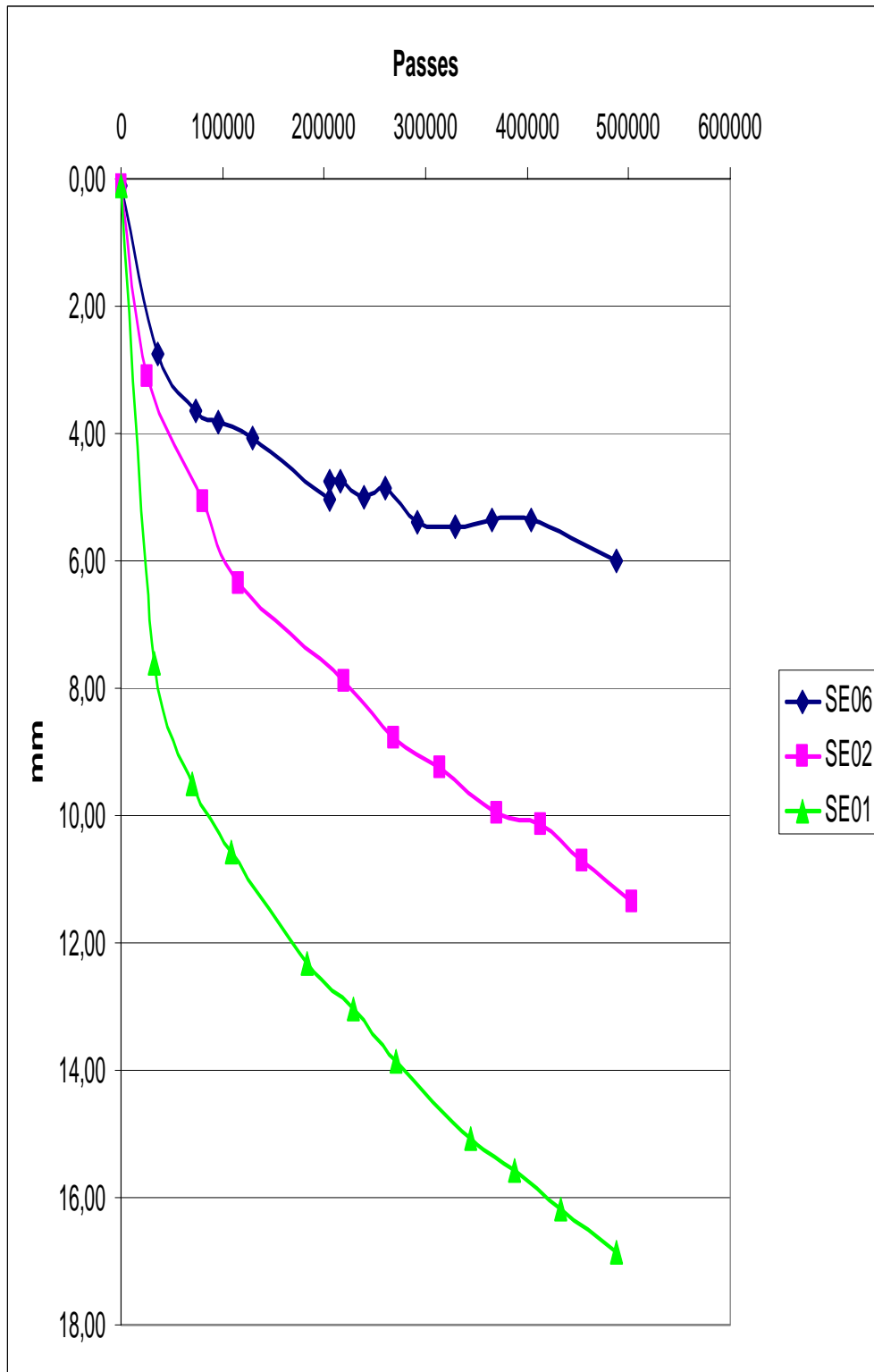
Some result from previous tests

SE01+SE02+SE06

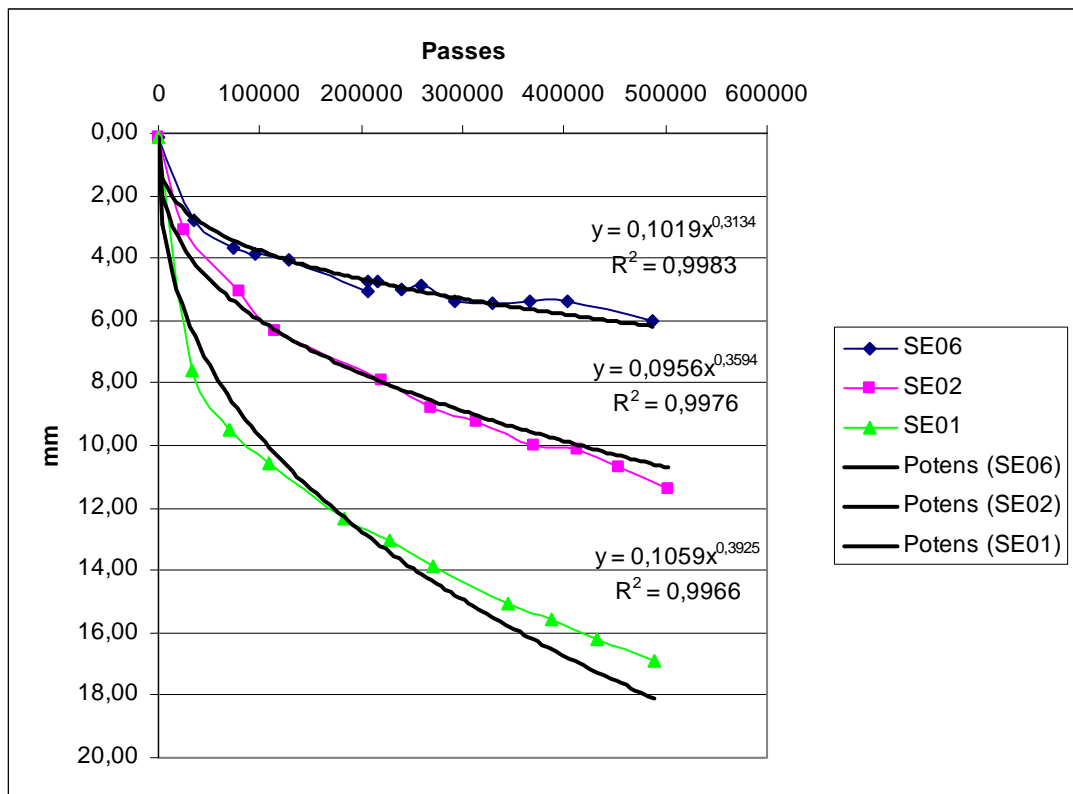
Test Structures



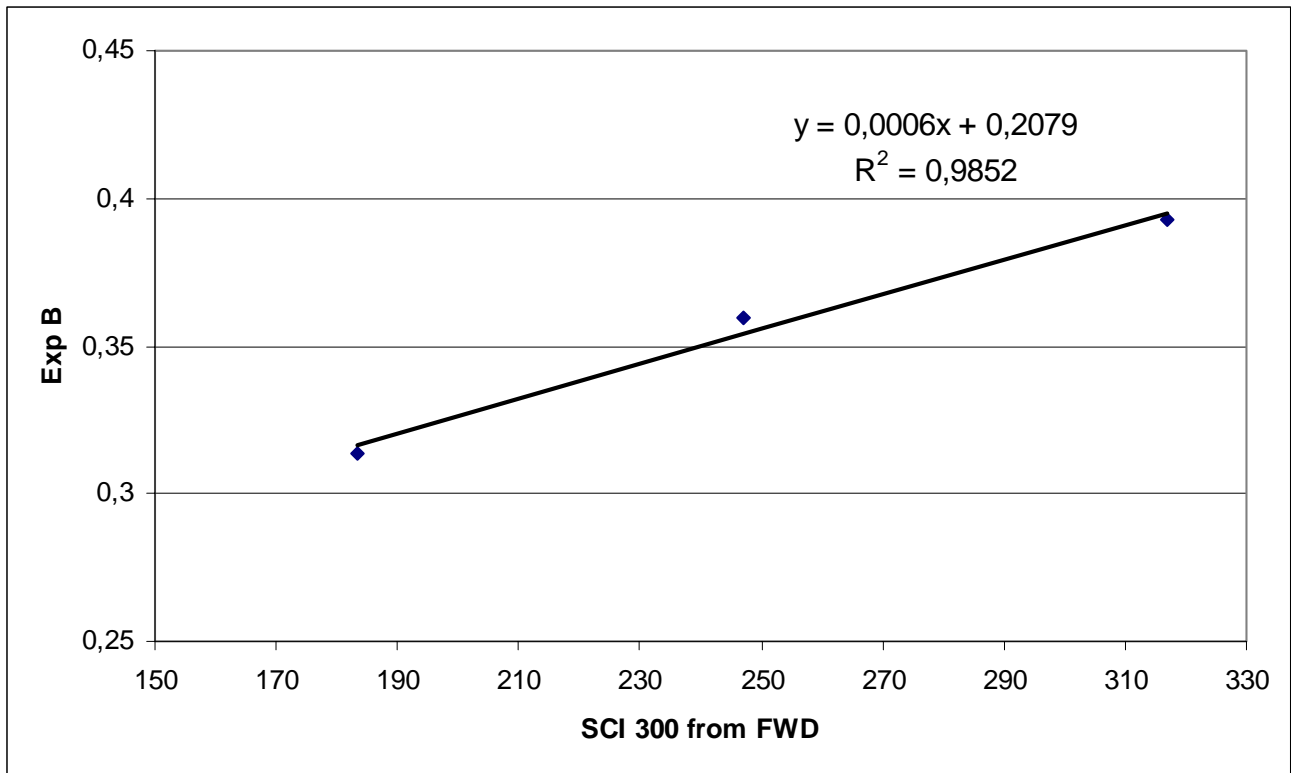
Rut depth propagation vti



Regression Lines



Response vs Performance



Then?

» HVS Rutting = 0,10 x
 $N(0,0006 \cdot \text{SCI } 300 + 0,2079)$

Overview of HVS tests in Sweden since 1998

Test	Start, yy/mm, duration	Total number of loadings (10 ³)	Description	Reference
SE01	98/12 6 month	2296	The first test in a series of three with gradually increasing bearing capacity. SE01, SE02, SE06	VTI Rapport 477A Leif G Wiman, 2001
SE02	99/06 2 month	1135	The second test in a series of three with gradually increasing bearing capacity. SE01, SE02, SE06	”-”
SE03	99/09 2 month	800	Maintenance treatment on SE01. ”Milling and filling”.	”-”
SE04	99/12 1 month	165	Maintenance treatment on SE02. ”Milling and filling”.	”-”
IS02	00/03 1 month	480	Surface treatment (double) on unbound base and sub base material from Iceland	HVS-testing of Icelandic low volume road structures Thorir Ingason Leif G. Wiman Hreinn Haraldsson ISAP 2002, Danmark
IS03	00/04 1 month	475	Surface treatment (double) and bituminous base layer on unbound base and sub base material from Iceland.	”-”
RX01	00/06 0,1 month	39	Flow rutting test. Effect of steel mesh on pavement deformation at high AC-layer temperature	REFLEX Final Report T4:02 Full Scale Accelerated Tests Jari Philajamäki, Leif G Wiman, Kent Gustafson EU Brite/Euram III RTD Programme, 2002
RX02	00/08 3 month	852	Bearing capacity test. Effect of steel mesh in bituminous base on bearing capacity at ”normal” temperature (10 C)	”-”
SE05	03/01 2 month	613	Unbound base layer study. Crushed rock material compared to natural gravel	Report in preparation

Test	Start, yy/mm, duration	Total number of loadings (10 ³)	Description	Reference
SE06	03/04 och 04/03 4 month	1000	The third test in a series of three with gradually increasing bearing capacity. SE01, SE02, SE06	-"-
SE07A	03/06 1 month	400	Different content of Mica in unbound base layers. 4 tests at a construction site in the western part of Sweden (E6 Uddevalla).	Provväg E6, glimmerrika bärlager och vägkonstruktioner med lättklinker. Provsträckor och mätresultat. Vägverket Publ. 2004:84
SE07B	03/08 1 month	366	Different base layer thickness on light fill material. 4 tests at a construction site in the western part of Sweden (E6 Uddevalla).	-"-
SE08	03/09 och 03/12 3 month	800	Different particle size distribution in crushed rock material in sub base. Test sections at a construction site in the south of Sweden (E4 Markaryd).	
DK01	03/11 1 month	388	Semi rigid pavement design tests. Different quality of the cement bound base layers. Danish test sections at a construction site in the south of Sweden (E4 Markaryd).	Mechanistic Design of Semi-Rigid Pavements - An Incremental Approach Road Directorate, DRI Report 138, 2004 www.vejdirektoratet.dk
SE09	04/12 3 month	574	Thick (220 mm) AC-layer stability test. With and without modified binder in the intermediate layer (90 mm)	

2005-06-28
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