

The durability project - application and first measurements in Denmark

Kai Sørensen, DELTA, 14 September 2004

Foreword

A four lane road was not available for the purpose, partly because these are fairly rare in Denmark (except for motorways) and partly because a four lane road would have to much traffic to allow for a road trial. Accordingly, application was on one of the lanes of a two lane road in rural conditions with a medium traffic density of about 5000 ADT.

The road surface is a common type of asphalt concrete with 12 mm maximum grain size and medium texture. The texture has been measured with a laser, and the sand patch method will be applied later.

Some of the materials arrived fairly late in June, and there was an attempt to complete the application before the summer vacation period sets in from early July.

This was managed for the three thermoplastic materials, but not for the paint and the tape (cold plastic is not used very much in Denmark, and was not applied). These materials were applied mid August after the end of the vacation period.

The problem with the paint was the instruction to use an airless machine. Only one such machine was located in the whole of the country, but a test showed that this machine could not be used for this particular paint. Eventually, the paint was applied by air driven hand guns through masters.

The tape was mixed up with a commercial shipment and passed on, but was recovered.

The application is fairly complete with seven broad lines of longitudinal markings and three narrow lines of transverse lines for each material, and with a repetition of both longitudinal and transverse lines for the Nordic thermoplastic material.

The application was done by experienced crews from the LKF company. However, the only markings applied by machine are the longitudinal thermoplastic markings.

The application thickness was not studied during application, but application was continued onto aluminum plates and the thicknesses will be measured on those.

The initial measurements were carried out mid August in connection with the completion of the application. Because the distribution of wheel passages has not yet been determined, the measurements were done in all seven lines of longitudinal markings, and at the corresponding 7 locations on the transverse markings.

The distribution of wheel passages will be determined before the final measurements next year, so that it can be decided which of the above-mentioned seven locations are relevant. The final measurements have to be done in July 2005 for the thermoplastic materials, and in August 2005 for the other materials.

1. The road

The application has been made on road No. 530 'Mørdrup-Ålsgårde' at kilometer station 4,3. This is the road, where the current Danish road trials section is located a couple of kilometers to the South.

The road is a two lane road with an ADT of about 5000 vehicles per day. The materials have been applied in the Eastern driving lane (right hand lane when driving North).

The road has a common type of asphalt concrete surface with 12 mm maximum grain size.

2. The materials and patterns of application

The materials applied are:

1. thermoplastic from Cleanosol
2. thermoplastic from Prismo
3. thermoplastic from Aetec
4. thin application of paint from SAR
5. thick application of paint from SAR
6. tape from 3M

The materials have been applied in both the longitudinal and the transverse pattern, refer to figures 1, 2 and 3.

The longitudinal pattern has 7 markings spaced across the driving lane for a number of positions along the road marked L1 to L7 at the edge line.

The transverse pattern has 3 markings spaced along the driving lane for a number of positions along the road marked T1 to T7 at the edge line.

The above-mentioned 6 materials have been applied at positions L1 to L6, and at positions T1 to T6, with a repetition of material No. 1 at positions L7 and T7.

3. The application

The thermoplastic materials were applied on 5 July. The application was by machine for the longitudinal pattern, but by hand for the transverse pattern.

The paint and the tape was applied on 17 August. The paint was applied by means of air driven hand guns through masters. The thin application was made in one layer, and the thick application in two layers.

The weather on both days was fairly warm with some wind.

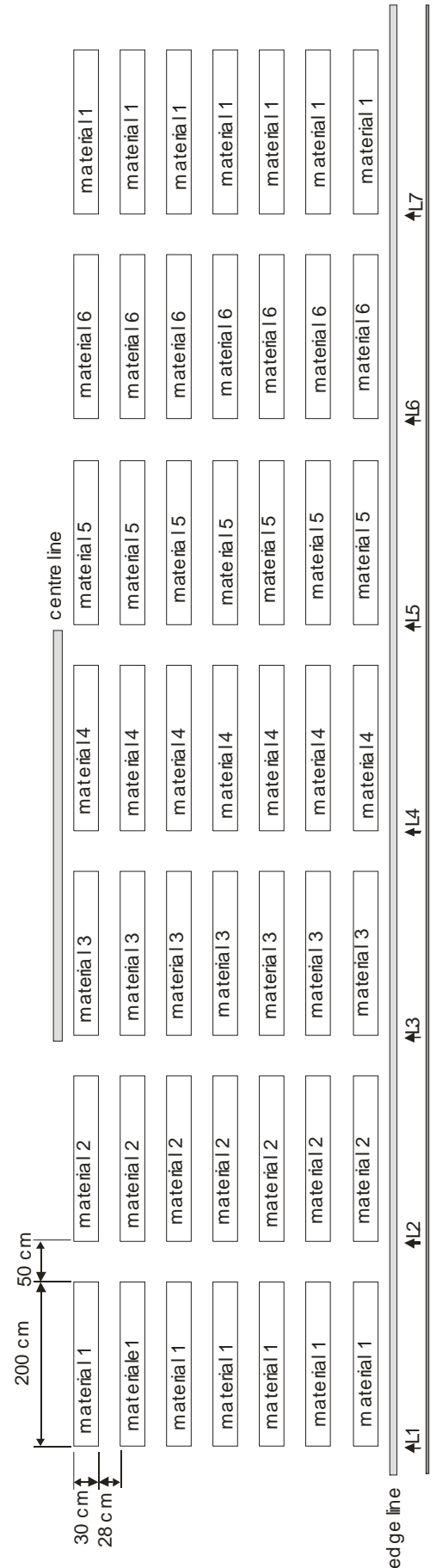


Figure 1: Longitudinal pattern and location of materials.

4. Initial measurement

The measurements of R_L , Qd, Y, x, y and SRT were carried out after the application on 17 August. The weather was fine with an air temperature of 28 C, a temperature of the road surface of 26 C, a relative air humidity of 43%, some clouds (2/8) and some wind.

R_L values were measured with an LTL-X, Qd values with an Qd30, Y, x and y values with a Gardner 45/0 Colorguide and SRT values with a pendulum tester.

Readings of R_L values were taken in 4 positions for each of the longitudinal lines, with a uniform spacing along the lines. Readings were also taken in 7 positions for each of the transverse markings, at the transverse locations indicated by the 7 rows of longitudinal markings.

Readings of Qd values were taken at the same locations as used for the R_L values.

Readings of Y, x and y values were taken in the middle position of each of the longitudinal lines, and in the above-mentioned 7 transverse locations for the middle of the three lines at each position.

Readings of SRT values were taken at the same positions as used for the Y, x and y values.

The results of the measurements are available in an Excel sheet named 'Danish durability measurements August 2004'.

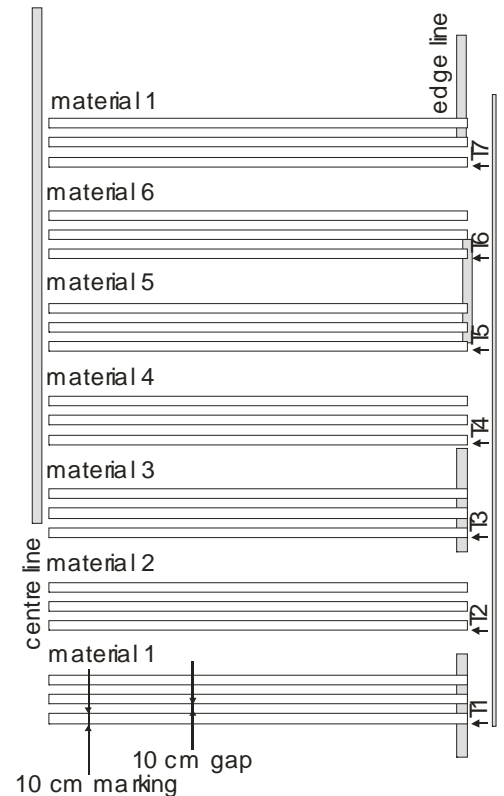


Figure 2: Transverse pattern and location of materials.

Figure 3: The Danish trial site.

