

# Climate and Transportation project in Norway: Pavement performance in a changed climate

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The Climate and Transportation project in the Norwegian Public Roads Administrations (NPRA) has assessed the consequences of a changed climate for pavement performance of the Norwegian road network. This has been done through calculations with ME-PDG. The sources of data includes data on the road network, its materials and layering, climatic data for present (2002-2008) and future situation (2070-2100) and data on traffic volumes. The design process is shown in fig. 1. The future climate is described in the report “Klima i Norge 2100” and is based on the IPCC predictions. Fig. 2 shows the climatic data set used in the calculations.

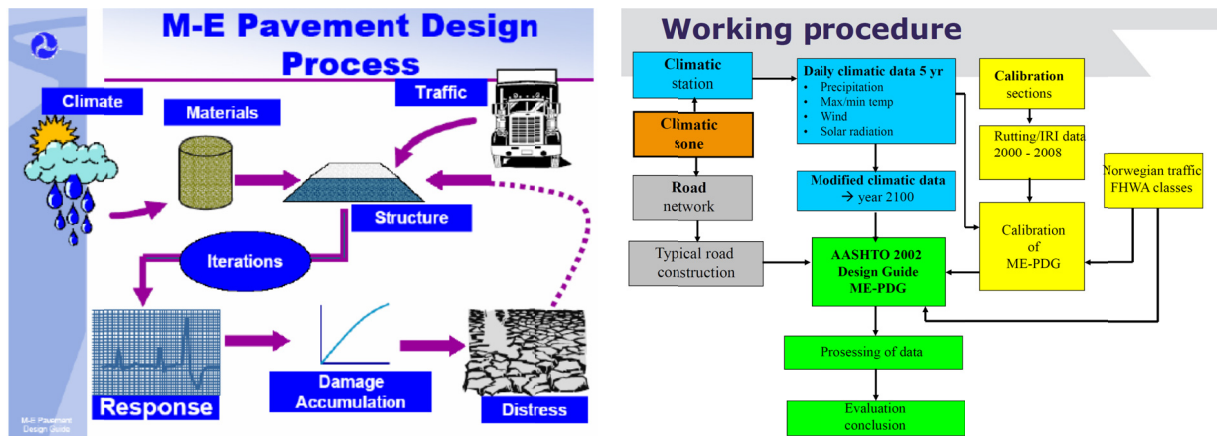


Fig. 1: ME-PDG design process (left) and used working procedure (right)

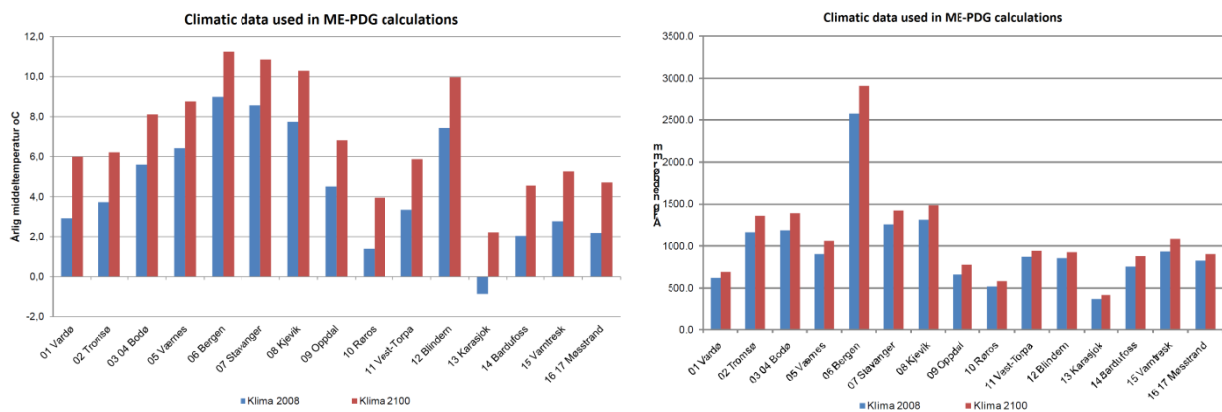


Fig. 2: Present and future yearly temperature (left) and precipitation (right) for the different climatic regions analysed

The results show considerable variations which is a result of the complexity of pavement performance factors in a road structure. The climate it selves in interaction with the road structure has a great impact on the pavement performance, but the anticipated changes in climate is of less importance compared to the other deterioration factors. For the Norwegian road network the anticipated development of ruts will be about 0.2 mm/year less in the future

because of the climatic changes. This is similar to 13-16 % longer pavement life time. The main reason for this is that the positive effect of less frost and frost heave, which will lead to less problems with loss of bearing capacity in the spring-thaw weakening, is bigger than the negative effect of more precipitation which soaks the materials. Fig. 3 shows the results for the main roads in the different analysed climatic regions.

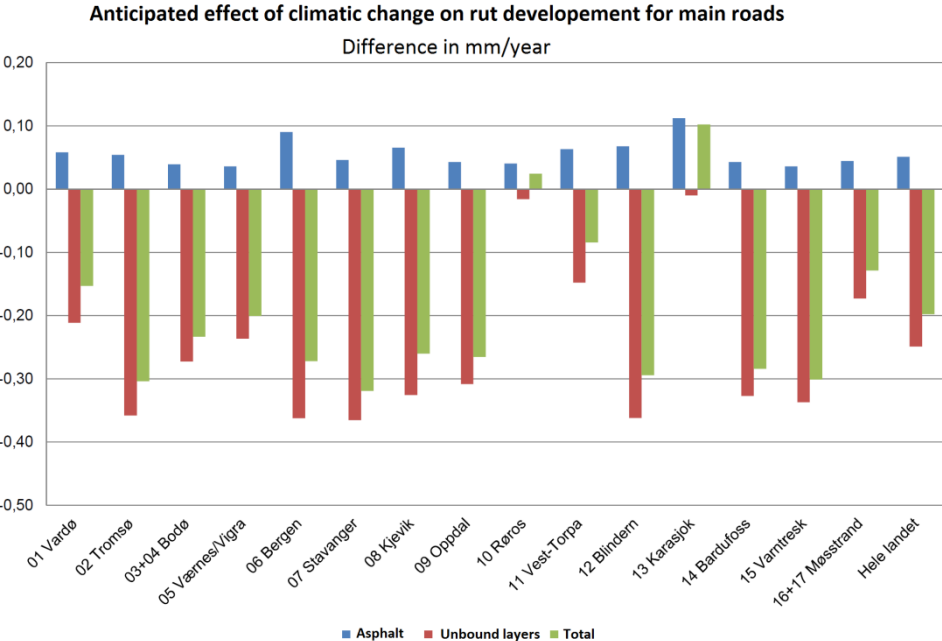


Fig.3: Results from the calculations. The figure does not show the differences between the different regions because other parameters like traffic, road structure materials etc. within the different regions are included in the input data.

There are still some uncertainty linked to the calibration, lack and/or quality of road structure data and the importance of the ground water level. The project has come up with some climate adaptation advices like the use of stiffer binders for future pavement maintenance and increased focus on rehabilitation of the drainage systems.