

Asphalt Pavement Temperature Prediction

Polytechnic Institute of Bragança, Portugal
University of Minho, Portugal

Manuel J.C. Minhoto (PIB)
Jorge C. Pais (UM)
Paulo A.A. Pereira (UM)

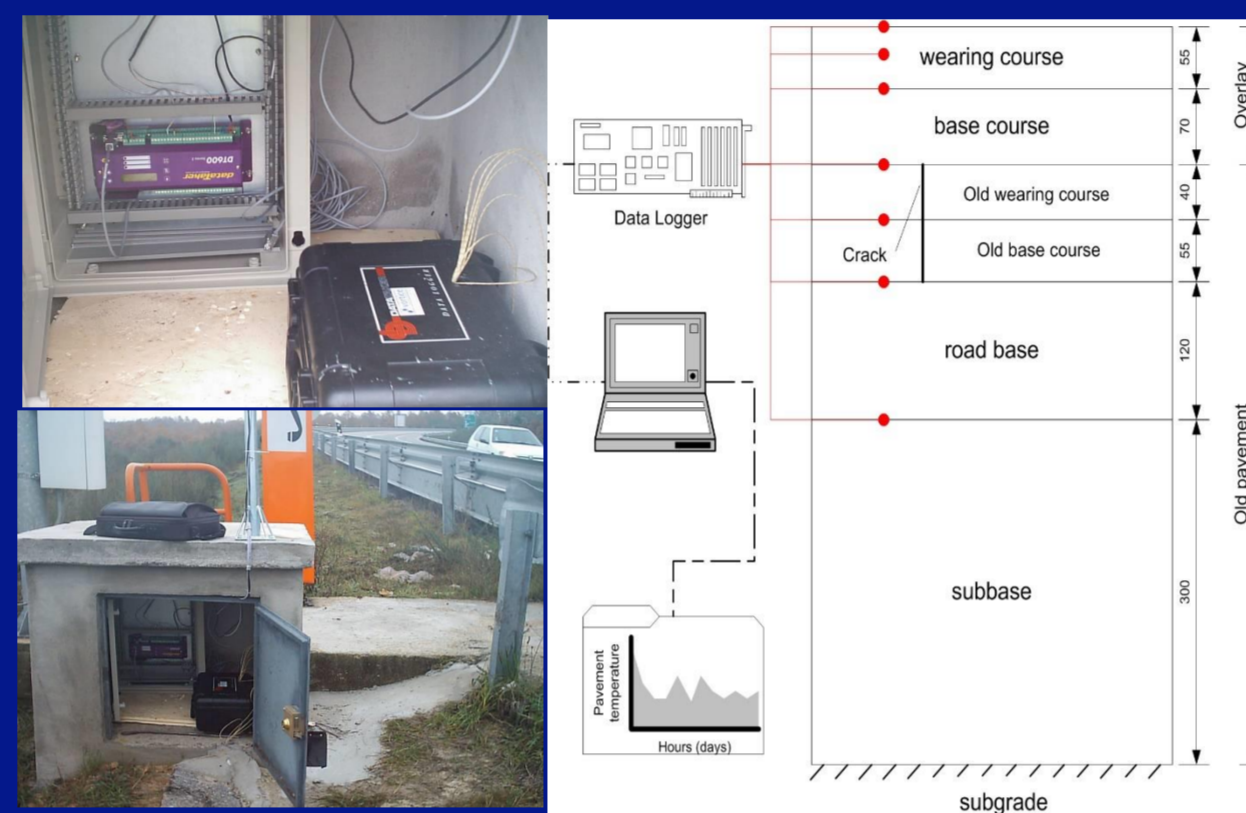
SCOPE OF THE STUDY

Evaluation of the accuracy temperature prediction that can be obtained with a 3-D FEM model when compared to the field pavement thermal condition in several representative days of the year

IN FIELD TERMO-COUPLES



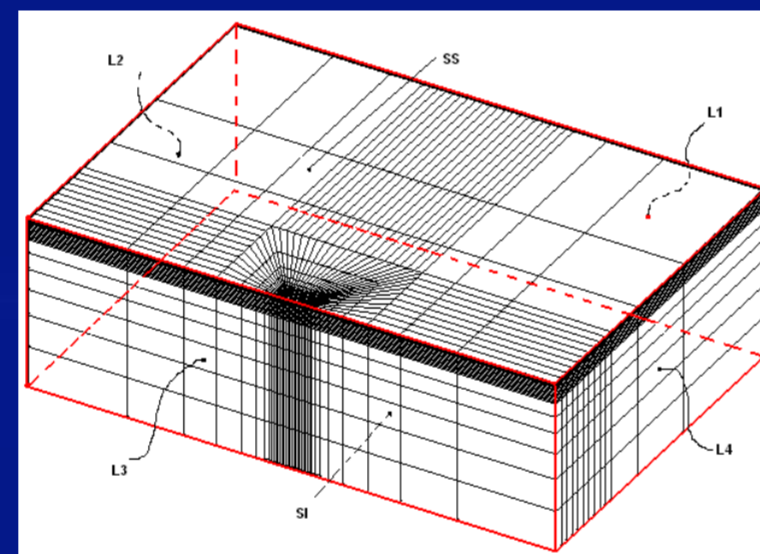
IN FIELD DATA-LOGGER



Weather field data collection



FINITE ELEMENT MODELING



	Thickness (m)	conductivity	Specific heat	density (kg/m ³)
Overlay –asphalt rubber mix	0.055	1.5	850	2550
Overlay – conventional mix	0.070	1.5	860	2350
Cracked layer	0.215	1.5	850	2550
Sub-base	0.300	1.5	805	2370
subgrade	-	1.79	1100	2200

CONCLUSIONS

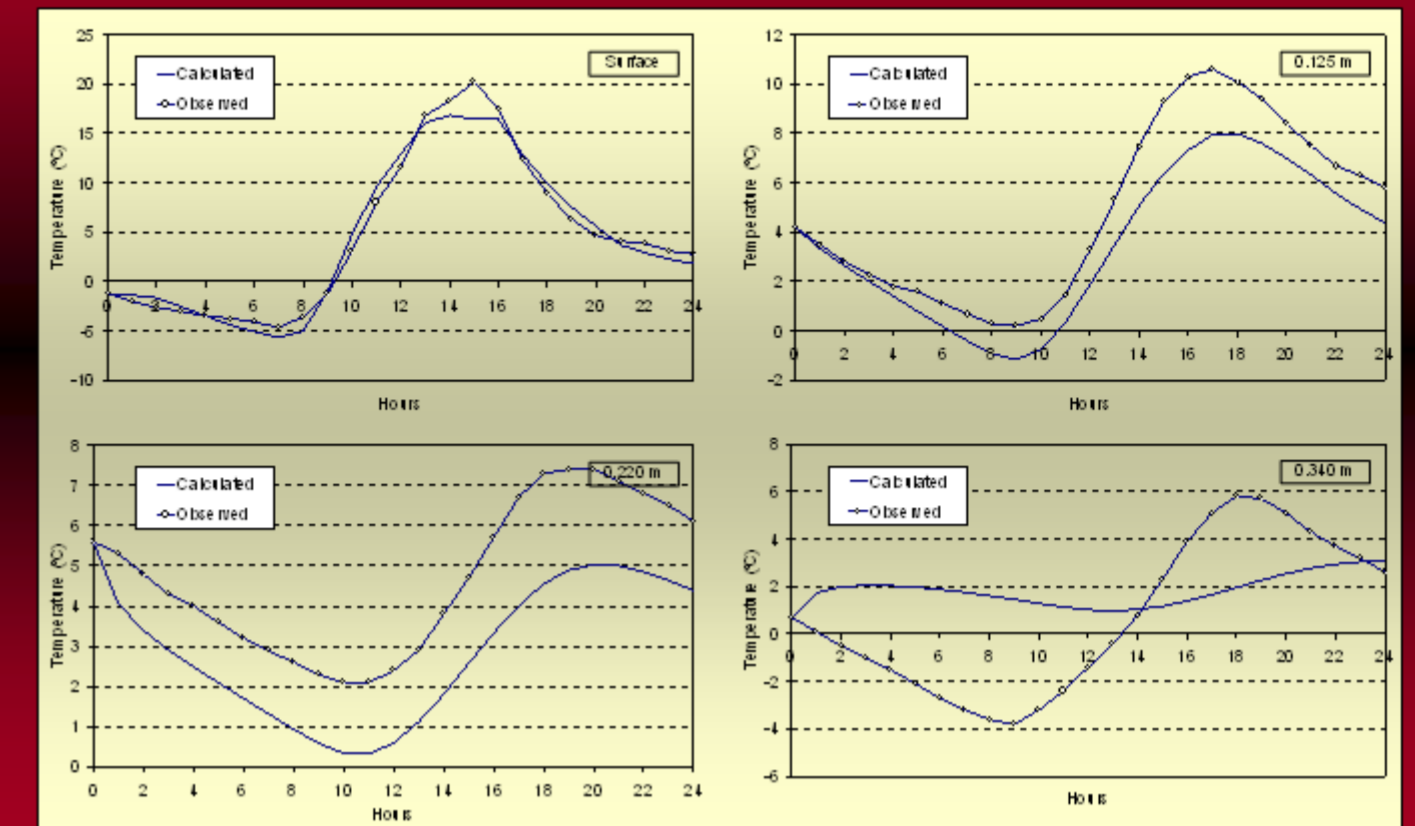
The 3-D finite-element analysis has proved to be an interesting tool to simulate the thermal transient behaviour of asphalt concrete pavement

The proposed simulation model predict the pavement temperature at different levels of bituminous layers with good accuracy, mainly in the top layers of the pavement

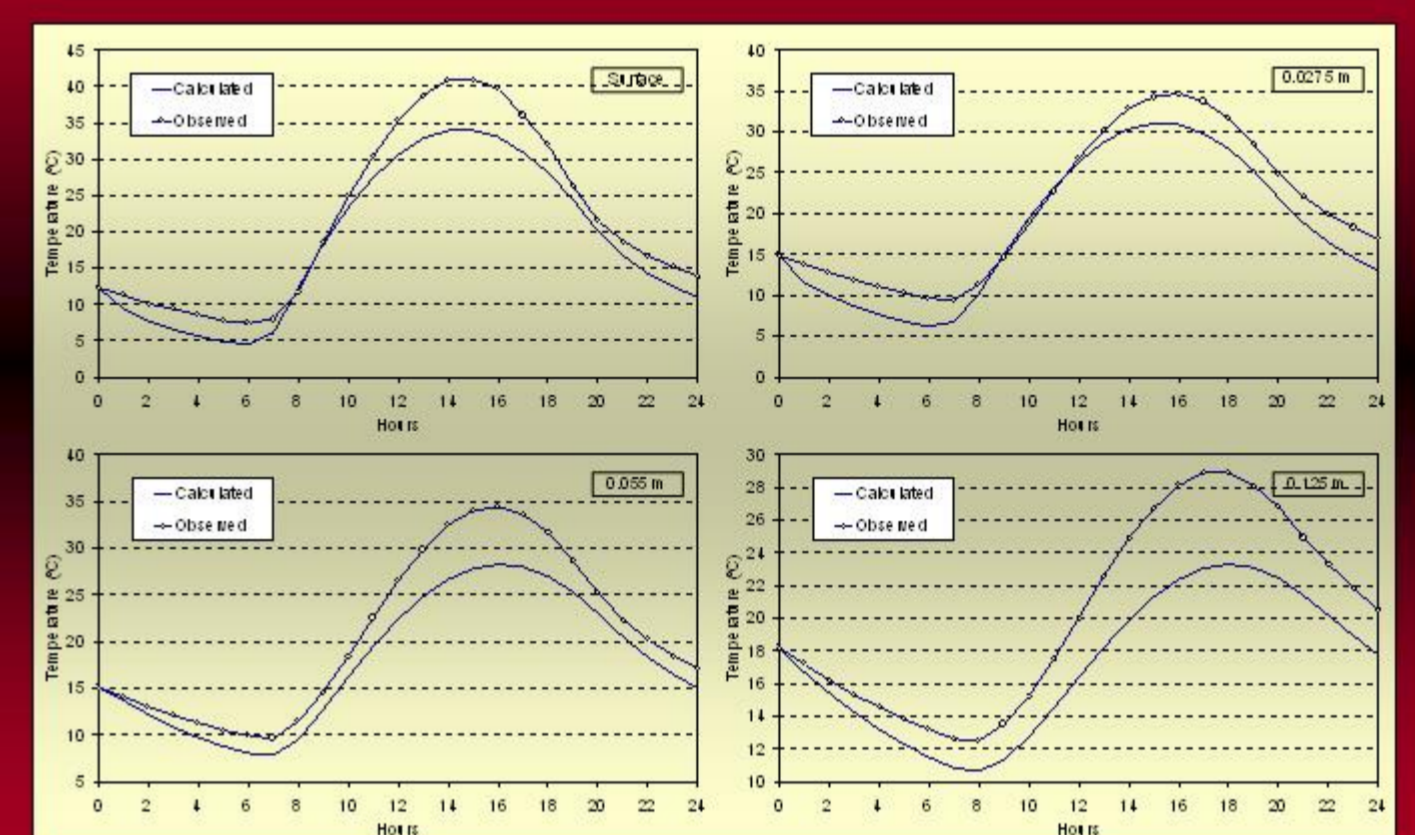
In the cold months, the developed model presents better performance than in hot months

The presence of an asphalt rubber mix layer in the top of the pavement seems to have no influence in the pavement temperature prediction

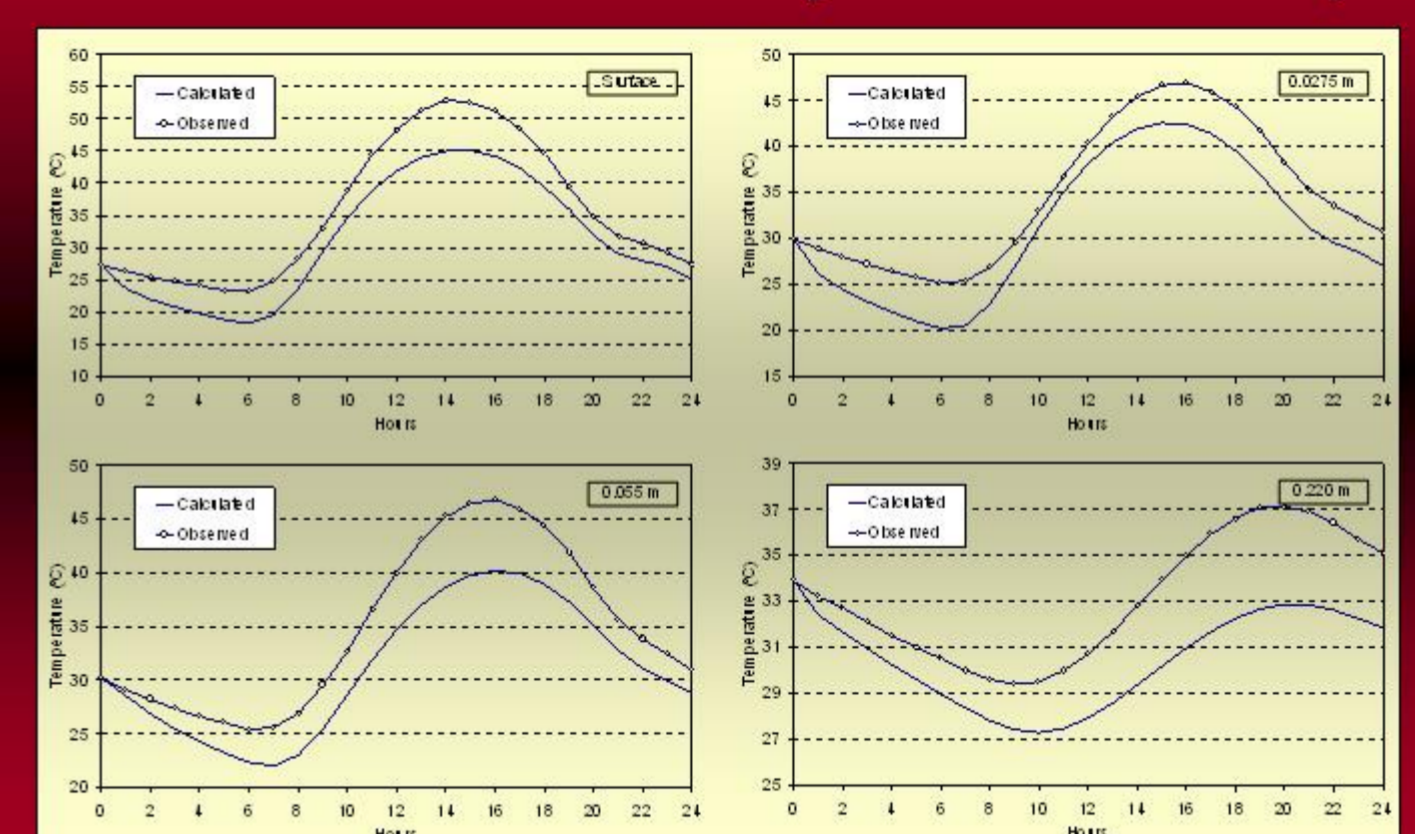
Comparison between calculated and observed temperature for 2th March



Comparison between calculated and observed temperature for 24th April



Comparison between calculated and observed temperature for 24th July



Comparison between calculated and observed temperature for 16th October

