

DESIGN OF SEMI-RIGID PAVEMENTS
IN RELATION WITH THE TRANSVERSAL CRACKING
OF THE BITUMINOUS WEARING COURSE

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The construction of semi-rigid pavements of which the underlays are treated with hydraulic binders is widely applied in Europe.

The site investigation concerning the road - networks where this technique was applied, proved that the main problem of the semi rigid pavements is the cracking of the bituminous concrete wearing course due to the thermal shrinkage of the stabilised layers. One of the construction techniques which was developed to fight the reflective cracking is the precracking of the treated with hydraulic binders underlays. With precracking we are creating tranverse cracks the spacing of which is 2 or 3 meters, in such a way that the influence of the variations of the temperature to be neglected.

The CRAFT process is very efficient precracking method which is consisted of:

- the creation of a trough in the treated underlay.
- the interposition of a bituminous compound in order to maintain longitudinal discontruity after the action of the compaction.

The precracking decreases the width of crack opening displacement and also the stresses at the bottom of the bituminous concrete layer derived from the shrinkage of the stabilized layer.

The mechanical behaviour of a precracking pavement can be studied taking into account the principles of the theory of Linear Elastic Fracture Mechanics. In order to optimize the precracking spacing we are using a simulation of the pavement according to the finite elements method.

According to the Minimum Density of Deformation Energy Criterion, the probable direction of the crack propagation is inclined to the vertical direction (it is oriented towards the interface of the wearing course and the base).

The study of the mechanical loading (traffic) concludes that the former could be related with the evolution of a pavement of which the wearing course had been cracked.