

ANALYSIS OF GEOGRID EFFICIENCY TO PREVENT THE LOCAL COLLAPSE OF A ROAD

Purpose(s): Analysis of geogrid efficiency to prevent the local collapse of a road

Client: HUESKER

Date: 2005

Location: village of Aumetz (northeastern France)

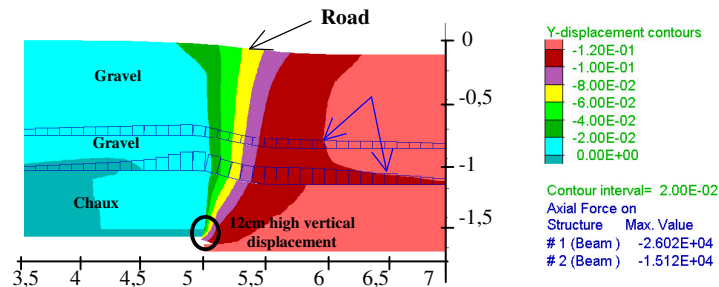
Partners: None

Project executive manager:
Céline BOURDEAU

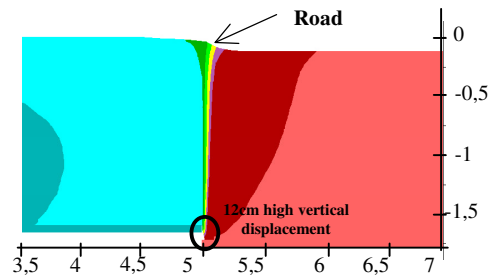
Code(s) used: FLAC

Roads developers have taken advantage of underground mine closures in northeastern France to build new roads on top of ancient mines. This raises the problem of **possible road deformation** due to a **collapse at depth**. To prevent this from occurring, roads developers may incorporate **geogrids** in the layers located beneath the road, but no "state of the art" is available to inform the designer of such reinforcements. Engineers at ITASCA Consultants have used *FLAC* to assess geogrid efficiency.

A collapse at depth was simulated by applying a controlled downward velocity to divide the base of a *FLAC* model, resulting in the development of a vertical, 12-cm high, "step" at the base. Because very large deformations develop at the base of the model, the **"large deformation" mode in *FLAC*** was used. For comparison, numerical simulations also were carried out on a model without geogrids to assess geogrid efficiency on deformations along the surface.



Model including geogrids: distribution of axial forces within the geogrids and vertical displacements showing the spreading of deformations along the surface.



Model without geogrids: distribution of vertical displacements showing the concentration of deformations above the collapse.

KEYWORDS:

- Road collapse
- Geogrids
- Mines

⇒ **RESULTS:**

The results of this study show that geogrids widen the zone along the surface on which deformations develop, thus preventing the formation of a "step" along the surface. The model validates the design proposed by road developers.

REFERENCES:

Bourdeau C. and Billaux D. (2006). Etude de l'efficacité de géogrilles pour prévenir l'effondrement local d'une chaussée. Actes du 6ème colloque francophone: Rencontres géosynthétiques 2006. Montpellier, France, 12-14 juin 2006. p 289-296