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OPTIMUM REINFORCEMENT SCHEME TO PREVENT SLOPE FAILURE IN STATIC CONDITIONS

Purpose(s): Assessment of slope stability considering an optimum reinforcement scheme

Client: INGEMA

Date: 2005

Location: Morocco

Partners: None

Project executive manager: Céline BOURDEAU

Code(s) used: *FLAC*

In the frame of the construction of new railway tracks in Morocco, INGEMA was concerned with **the stability of artificial embankments** located on both sides of the tracks. They asked Itasca Consultants SAS to define, by means of numerical simulations and for a given slope geometry and geology, the **optimum reinforcement scheme** that would result in a static factor of safety of 1.5 and minimize material costs.

The **shear-strength reduction technique** implemented in FLAC was used to obtain the **failure mechanism** of the slope with respect to various reinforcement schemes characterized by the number of cables, their position along the slope, their length, their angle with respect to the horizontal and their horizontal spacing. A beam also was included along the slope to simulate a concrete layer, and the model was subjected to gravity. Figure 1 shows the optimum reinforcement scheme obtained: it is characterized by 4 cables.

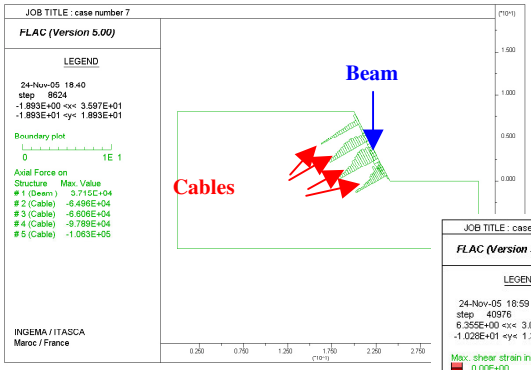

*Figure 1: **Optimum reinforcement scheme** and distribution of axial forces along the reinforcement elements.*

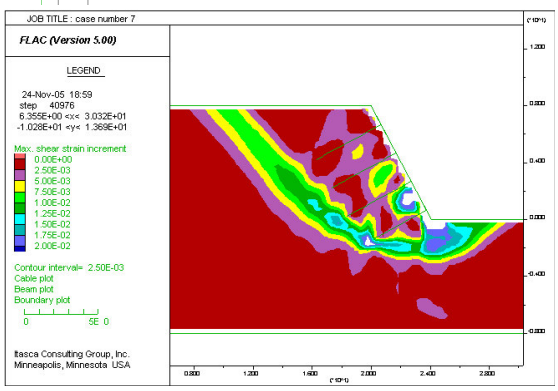

*Figure 2 : **Failure mechanism of the slope** for a static factor of safety equal to 1.5.*

KEYWORDS:
- Reinforcement elements
- Failure mechanism

⇨ ***RESULTS:***

Slope stability is mainly dependent on the characteristics of the lowest cables. Indeed, **the largest axial forces develop along these cables** while almost no axial force is observed along the upper-most cable.

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