

COST 526 - 'Automatic Process Optimization in Materials Technology' – (APOMAT)  
**Final Report – 31 July 2005**  
**Summary sheet**

Project Code	CH3
Title	OPTIMIZATION OF THE THERMO-HYDRO-MECHANICAL MODELLING OF GEOMATERIALS
Project Leader	<i>Lyesse LALOUJ</i>
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Main collaborators involved	Dr. Cane Cekerevac

**Funding Situation** (for the whole project)

Amount of money received specifically for COST	kEuros
Other resources partially used for the project	kEuros

**International Collaboration** (mention group and type of work done in collaboration during the whole project)

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**Industry participation** (mention name of companies and work done in collaboration during the whole project)

- Colenco Power Engineering AG (Dr. G. Klubertanz, Mr. S. Girardin) - Switzerland

**Meetings, visits, exchange of scientists, short term scientific missions** (mention main events during the whole project)

Location, date

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## **Main Outcome of the project** (mention only the major points)

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This Project has been finished according to the time schedule. The value of the obtained results is validated by publishing one journal paper and one conference paper. The main results can be summarised as follows.

- The fully coupled three-phase formulation has been developed based on the continuum theory of mixtures. The formulation of the heat balance equation, which takes into account thermal coupling with solid and fluid phases has been implemented into the Finite Element Code – MHERLIN.
- On the optimisation task, an appropriated optimisation strategy has been developed and applied to the numerical modelling of the thermo-hydro-mechanical behaviour of clay barriers. The procedure and developed code have been validated for drained as well as undrained triaxial shear tests for three initial states. Comparison between numerical and experimental results clearly shows capability of the optimisation procedure to derive model parameters correctly.

With respect to the importance of the related topic, work progress and the obtained results we will continue research in this domain. Besides two recent publications on this subject, some of the results obtained in the framework of this project, will be published at the International Conferences.

## **Publications, related to this project**

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Published

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Submitted for publication

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C. Cekerevac, S. Girardin, G. Klubertanz and L. Laloui. 2004. Optimisation routine for the identification of elasto-plastic model parameters. *Computers and Geotechnics*

In preparation

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Will you continue the actual cooperation with your partners after the end of the action?

Yes

No

Would you participate in a possible "spin-off" action continuing the present one?

Yes

No

Will you continue your present work/collaboration with another European action?

Yes

No