



COST 526

**“Automatic Process Optimization in Materials Technology”
(APOMAT)**

Half-Yearly Report

To be sent to **V.Tesch@access.rwth-aachen.de** until **August 31, 2002**

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|--------------------------------|--|
| 1. Reporting Period | 1.1.2002 – 30.6.2002 |
| Project title | Formulation of Objective Function for estimating Fatigue Damage of Cold Forging Tool Steels at Micro Scale |
| Project leader Organization | Dr. Tomaž Rodič Faculty of Natural Sciences and Technology, University of Ljubljana, Slovenia. |
| Main collaborators involved | C3M |

2. Funding Situation

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

2.9 kEuros
0 kEuros

3. International Collaboration

(mention group and type of work done in collaboration during the reporting period)

Participation in the Working Group Meeting in Saint-Dié des Vosges + project progress report

- YES ➔
 NO

LMT-ENS Cachan (France) – Micromechanical modelling of materials

4. Industry participation

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

Iskra-Avtoelektrika. Investigations of parameters influencing service life of tooling systems

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|--|---|
| 5. Meetings, visits, exchange of scientists, short-term scientific missions | Location, date |
| Working Group Meeting Meetings with Iskra-Avtoelektrika | Saint-Dié des Vosges, 21-22/05/02 Ljubljana, Nova Gorica, 3 meetings |



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6. Progress within the reporting period

(Not exceeding 3 pages, including tables and figures)

The work is being performed in conjunction with Ph.D. research work by Damijan Markovic. The following activities have been undertaken in first six months:

- review of existing micro-macro strategies
- investigations of significant quantities
- analysis the responses obtained micro-macro strategies in terms of elastic energy, work of external forces and total dissipation
- representation of the micro models by using two possibilities: (a) finite element discretization of different phases and (b) by taking into account material heterogeneity within elements
- code implementations
- simple benchmark tests

The intermediate results have been summarized in an internal report and will be presented at the next working group meeting of COST-APOMAT.

7. List of publications

a) Published

T. Rodič, J. Korelc, M. Dutko, A. Pristovšek: Sensitivity analysis of cold forging dies with respect to parameters influencing fatigue damage due to cyclic plasticity, V: M. Pietrzyk, Z. Mitura, J. Kaczmar (editors), “*The 5th International ESAFORM Conference on Material Forming*”, Akademia Góeniczo-Hutnicza Kraków, 2002; ISBN 83-7108-098-0; Krakow, Poljska, 14.-17. april. 2002.

I. Grešovnik, T. Rodic, "Practical considerations regarding optimisation of shape in forming processes", V: M. Pietrzyk, Z. Mitura, J. Kaczmar (editors), “*The 5th International ESAFORM Conference on Material Forming*”, pp.. 27-30, Akademia Góeniczo-Hutnicza Kraków, 2002; ISBN 83-7108-098-0; Krakow, Poljska, 14.-17. april. 2002.

D. Markovič: Testing the new micro-macro strategy. Internal report

b) Submitted for publications

c) In preparation