



COST 526

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

Half-Yearly Report

1. Reporting Period	1.7.2002 – 31.12.2002
Project title	Optimisation of properties and dimensional stability of composites by controlled fibre placement
Project leader	Dr. Per-Ola Hagstrand
Organization	Laboratoire de Technologie des Composites et Polymères (LTC) Ecole Polytechnique Fédérale de Lausanne (EPFL) CH-1015 Lausanne, Switzerland
Main collaborators involved	Dr. Niklas Jansson, Dr. Per-Ola Hagstrand

2. Funding Situation

Amount of money received specifically for COST 62 000 CHF kEuros (received 2002-06-24)
Other resources partially used for the project

3. International Collaboration

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

Participation in the Working Group Meeting in Budapest + project progress report

YES

NO

4. Industry participation

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

The project will to some extent be carried out in collaboration with DaimlerChrysler, Research and Technology, Ulm, Germany.

5. Meetings, visits, exchange of scientists, short-term scientific missions	Location, date
Per-Ola Hagstrand took part in the Swiss APOMAT meeting.	Aarau September 11 th 2002

6. Progress within the reporting period

(Not exceeding 3 pages, including tables and figures)

Dr. Niklas Jansson joined the project on half-time as from November 3rd 2003 and is doing the FE modelling and optimization part. The aim of the project is set to model and optimize the load

introduction into a fibre tow reinforced polymeric structure. As the tow is large to in comparison to the size of the structure, the material response can't be homogenized. Hence, the analysis of the structure involves an orthotropic tow inside an isotropic matrix and must possibly be done in 3D which would make the optimization a really challenging task. Therefore, the initial work in the project focuses on the pure modelling part of the problem, both to asses the capability to predict the stiffness and failure load of this kind of structures and to investigate the possibilities to simplify the modelling approach. The performed work until now has been on the detailed 3D-modelling with comparison to experiments to follow soon.

7. List of publications

a) Published

Below are publications that have been generated within the IPPC project, which as mentioned, is related to the APOMAT project:

MECHANICAL ANALYSIS OF MULTI-MATERIAL COMPOSITES MANUFACTURED BY INTEGRATED PROCESSING

P.-O. Hagstrand, M. D. Wakeman, F. Bonjour, P.-E. Bourban and J.-A. E. Månson

Proceedings of SAMPE 2002

Long Beach, California, USA, May 12-16 2002.

COST MODELLING OF A NOVEL INTEGRATED COMPOSITE MANUFACTURING CELL FOR INTEGRATED COMPOSITE PROCESSING

M.D. Wakeman, F. Bonjour, P.-E. Bourban, P.-O. Hagstrand, J.-A. E. Månson

Proceedings of the 23rd International SAMPE Europe Conference

Paris, France, April 9-11 2002.

ROBOTIC TOW PLACEMENT FOR LOCAL REINFORCEMENT OF GLASS MAT THERMOPLASTICS (GMTs)

M. D. Wakeman, P.-O. Hagstrand, F. Bonjour, P.-E. Bourban and J.-A. E. Månson

Composites Part A. 33 1199-1208 (2002)

b) Submitted for publication

c) In preparation

MECHANICAL ANALYSIS OF THERMOPLASTIC POLYMERS REINFORCED WITH ROBOTICALLY PLACED CONTINUOUS FIBER TOWS

P.-O. Hagstrand, N. Jansson, B. Ecabert, F. Bonjour, M. D. Wakeman and J.-A. E. Månson

For ICCM-14, San Diego 14-18 July, 2003