



COST Action E48



COST Action E48 "The Limits of Paper Recycling"

MC and WGs meeting

**Thursday, 30 June 2005
Friday, 1 July 2005
Hotel De Zoete Inval
Haarlemmerstraatweg 183
2065 AE Haarlemmerliede, Netherlands**



Participating organisation

Poland



**Institute of Thermal Machinery
Czestochowa University of Technology
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Organisation's details

Poland



Institute of Thermal Machinery, TU Czestochowa, Poland

Services/Products:

Education and research

Total number of employees:

12

Employees in E48 related areas:

1 + 2PhD students

Number of students:

14 (PhD), 20 (MSc)

Research focus:

- **turbulence modelling (DNS, RANS, LES)**
- **combustion modelling**
- **turbomachinery aerodynamics**
- **environmental aerodynamics**
- **thermal systems**
- **CFD applications (fuel cells, steel casting, microfluidics, **paper recycling**, ...)**

Ownership structure:

state owned



E48 representative's presentation (I)



Dariusz Asendrych

Assistant Professor, PhD, MSc
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Academic background

- MSc - Mechanical engineering (TU Czestochowa, 1987)
- PhD - Jet flames aerodynamics (TU Czestochowa, 1996)
- Assistant Professor (TU Czestochowa, 1996)

Areas of expertise

- numerical flow simulation (CFD)
- metrology of turbulent flows
- data processing

Function in COST E48

- Member of the MC
- Member of WG2



E48 representatives presentation (I)



Dariusz Asendrych

Most relevant publications

- Julien Saint Amand F., Wojciechowski G., Asendrych D., Favre-Marinet M., Rahouadj R., Skali-Lami S.: "Screening: Fundamental Studies on the Extrusion of Stickies through Slots", ATIP Journal, vol. 58, No 1, Feb./March 2004, pp. 2-14
- Julien Saint Amand F., Perrin B., Gooding R., Huovinen A., Asendrych D., Favre-Marinet M.: "Optimisation of Screen Plate Design for the Removal of Stickies in Deinking Pulps", 11th PTS-CTP Deinking Symposium, Leipzig, April 2004
- Niklas M., Asendrych D.: "Numerical Modelling of the Paper Pulp Flow", Proc. XVI National Polish Conference on Fluid Mechanics, Warszawa-Waplewo, 20-23.09.2004
- Julien Saint Amand F., Perrin B., Frach D., Asendrych D., Huovinen A., Gooding R.: "Stickies Screening: Study of Stickies Extrusion through Slots and Optimisation of Screen Plate Design", 7th CTP Recycled Fibres Forum, Grenoble, Feb. 2005
- Asendrych D., Favre-Marinet M., Julien Saint Amand F.: "Decoupled Approach to the Modelling of Contaminants Removal from Recycled Paper", Workshop on Multiphase Flows - Simulation, Experiment & Application, Dresden, May 31/June 3, 2005



Own expectations in E48



- ❑ **establishment of a European research network in paper recycling**
- ❑ **generation of European projects**
- ❑ **promotion of CFD - professional tool for simulation of flow, heat and mass transfer**
- ❑ **identification of the areas of paper recycling with possible CFD application**



Own contributions to E48 (I)



Finished or current projects in the area of E48

- ❑ **ScreenClean (5th FP) - "Optimisation of Screening and Cleaning Technology to Control Deinking Pulp Cleanliness" - finished**
- ❑ **"Numerical modelling of a turbulent flow of a multiphase non-Newtonian medium", grant of Polish State Committee for Scientific Research, 2004-2007**
- ❑ **"Optimisation of deinking technologies in the paper recycling process", POLONIUM, CTP-ITM bilateral project, 2005/2006**
- ❑ **"Modelling of the paper pulp flow", university grant, CzUT, 2003-2006**



Own contributions to E48 (II)



Projects submitted or planned during the duration of E48

- ❑ "Numerical modelling of the paper pulp flow in hydropulper" - grant supporting PhD thesis, Polish State Committee for Scientific Research - to be submitted
- ❑

Specific tools (equipment/software) relevant for E48 objectives

- ❑ own PC clusters / access to external powerful computing resources (Gdansk)
- ❑ CFD software: Gambit / Fluent



Brief description of own finished or ongoing research projects in the area (I)



Project 1: ScreenClean - "Optimisation of Screening and Cleaning Technology to Control Deinking Pulp Cleanliness"

- ***background: 5th FP, headed by CTP, participation in WP devoted to pressure screening***
- ***objective: to improve stickies removal efficiency by pressure screening optimisation***
- ***means: simulation of sticky particles behaviour at the screen surface (flow simulation / analysis of particle deformation); simplified approach - steady flow conditions***
- ***results: identified and quantified parameters promoting / opposing stickies rejection; improved knowledge about the screening physics***



Brief description of own finished or ongoing research projects in the area (II)



Project 2: "Numerical modelling of a turbulent flow of a multiphase non-Newtonian medium"

- ❑ ***background: extension of ScreenClean project - pressure screening***
- ❑ ***objective: to build an adequate model of stickies behaviour in the screen - to optimise screening efficiency***
- ❑ ***means: CFD / structural mechanics simulation of sticky particles motion and deformation at the screen surface, unsteady flow conditions, volume of fluid method (VOF)***
- ❑ ***results: preliminary simulations of unsteady flow inside a pressure screen (pressure variation)***



Brief description of own finished or ongoing research projects in the area (III)



Project 3: "Optimisation of deinking technologies in the paper recycling process"

- ❑ **background: French-Polish bilateral programme *POLONIUM***
- ❑ **objective: to exchange knowledge and experience and define possible collaboration areas in the field of deinking**
- ❑ **means: staff and student exchange**
- ❑ **results: student training**



Brief description of own finished or ongoing research projects in the area (IV)



Project 4: "Modelling of the paper pulp flow"

- ❑ ***background: PhD project, CzUT grant***
- ❑ ***objective: to build the relevant model of paper pulp flow in the pulper and to analyse the behaviour of pulp contaminants in terms of their agglomeration / defragmentation***
- ❑ ***means: numerical simulation / experiment - paper pulp material properties***
- ❑ ***results: numerical model built; running experimental trials***



Organisation of E48 events



My organisation has the personal and logistic facilities to organise major E48 events and would particularly be prepared to host (please tick box)



specific (separate) MC or WG meetings



parallel or consecutive meetings of both MC and WGs



a workshop (up to 50 participants)



an international conference (more than 50 participants)



External contributions to E48



I believe that the following external organisations or experts could make valuable contributions to E48 events:

Name	Organisation	Expertise
Prof. S. Skali-Lami	LEMTA, INPL, Nancy	rheology, pulp flow
Prof. R. Rahouadj	LEMTA, INPL, Nancy	rheology
Dr. H. Dabrowski	ICP, Lodz	deinking



Expectations and offers concerning STSMs



My organisation is prepared to host young academics from foreign organisations in the frame of STSMs. We could offer collaboration in

- **CFD training**
 - **CFD simulations (single-, multi-phase flows)**
 - **.....**
-

My organisation is interested in sending young academics to foreign research organisations in the frame of STSMs.

We would particularly be interested in learning more about

- **deinking practical aspects**
- **.....**
- **.....**