FENet

NEWSLETTER

Issue 1, February 2002

FENET HISTORY

1st NSC Meeting

The FENET project started August 2001. Tom Kenny and Nigel Knowles hosted the 1st NSC Meeting which was held at the Institution of Civil Engineers, London 27 - 28 September 2001. NSC means Network Steering Committee. This board consists of 8 RTD co-ordinators (two for each RTD area), 16 Industry Co-ordinators (two for each industry area) and the organizers (Tom Kenny, Nigel Knowles, Werbos, Intensity by Design).

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www.FE-NET.org

1st Annual FENET Workshop

In a relatively short timescale for extensive preparation a large event was organized from 13th to 15th November 2001 in Wiesbaden, Germany:

- Industry Analysis Requirements Workshop, 13th - 14th Nov. 2001 at the Hotel Dorint, Wiesbaden, Germany
- FENET / NAFEMS Seminar: „FEM in Structural Dynamics“, 14th - 15th November 2001, Hotel Oranien, Wiesbaden, Germany

It was very successful.
Some facts:
Industry Analysis Requirements Workshop
Attendees: 95
Presentations:

- 8 on analysis issues and business drivers in industry areas
- 4 on background issues & requirements based on presentations arising out of the NSC meeting in RTD areas
- over 60 industry presentations
- 12 presentations on summary of issues (8 on industry sectors, 4 on RTD thematic areas)

NSC meeting:
Summarizing input and defining workshop topics
FENET / NAFEMS Seminar: „FEM in Structural Dynamics“
Attendees: 111
Presentations:

- 17 presentations incl. keynotes

All in all there were 148 attendees at the event.

Workshop Planning Meeting

The next meeting of RTD Co-ordinators and organizers was on 18th December 2001 at Greenwich University, UK. This was a FENET workshop planning for Copenhagen with three primary objectives:

- Making sure that sufficient focus was given to the generation of deliverables
- Agreeing workshop content & format
- Agreeing the actions and timescales towards successful workshops

A number of issues arose, firstly the proposal document committed to a deliverable being produced out of each pair of workshops. That is to say for each RTD area , for any given workshop topic it was envisaged that there would be:-

a) Preparatory Workshop
b) (Follow up actions and documentation)
c) Final Workshop - out of the final workshop would come a useful deliverable.

Deliverables could take a variety of forms including:

- State of the Art Reviews (distinguishing between state of practice (what is routinely used) and state of art (what is possible and emerging)
- Best Practice Guides
- Technical Benchmarks
- How to Guides
- Case Studies

A general discussion was held about the need for a format that would encourage interaction and solicit presentations.
Suggestions put forward included:

- Chairperson driving prepared topics forward one at a time
- Use of break out into smaller groups
- Avoiding Static Presentations
- Encouraging vendors to make presentations which realistically presented capability

A long discussion followed about alternative duration, degree of parallelisation etc. It was agreed that the workshops:-

- Needed to be longer than 1 day to be effective
- That the overall duration should not be extended beyond 2 days
- Some staggering and unscheduled free time was highly desirable

FENET THEMATIC NETWORK
Contract No G1RT-CT-2001-05034
COMPETITIVE AND SUSTAINABLE GROWTH (GROWTH) PROGRAMME

NAFEMS
The International Association for the Engineering Analysis Community

FENET 2002 Meeting Shedule Summary

27 - 28 February 2002 **Technology Workshops** **Copenhagen, Denmark**	**Workshop topics:** Durability and Life Extension (DLE): **Finite Element Simulation of Contact Problems** Objectives: • To present and review the existing set of contact benchmarks • To obtain feedback from FE users on the contact benchmarks • To identify more challenging contact benchmarks • To identify limitations in the contact capabilities of commercial FE software • To identify future desirable features in Contact simulation using FE • To present cases studies reflecting modern FE contact analysis Multi Physics and Analysis (MP): **Computational Modelling of Multiphysics Processes - 1** The objective of this workshop is to focus upon the status of multi-physics simulation technology and what comprises its challenges. It will cover: • Overview of challenges of multi-physics (Contemporary applications, Levels of coupling, Survey of commercial CAE analysis technologies, Discussion of benchmarks) • Multi-physics case-studies – formulation and routes to solution • Road-map for the future - key problems (Characterization of problems, Physics vs. Levels of coupling, Software capabilities – gaps and limitations) Product and System Optimization (PSO): **Incorporation of Product and System Optimization (PSO) Methods into, Compact, Reliable Design Cycles - 1** Discussion Topics • What are the real barriers to uptake? • What can we conclude from the results of FENET survey on PSO? • What type of documentation for best practices is needed? Technical Presentations Education & Dissemination (E&D): **Barriers to the Effective Use of FEA in Industry - 1** This workshop represents the first step in a comprehensive and wide-ranging pan-European information gathering exercise on a topic that is at the heart of the FENET project. The following three categories of industrial organisation have been identified and all have a valuable input to the workshop. • Those that have invested in FEA technology and are using it as part of their on-going enterprise: - there will always be opportunities to use the technology more effectively. • Those that have invested in the technology, but are no longer using it to any great extent: - having for example let their software maintenance lapse. • Those that have not invested in the technology at all: - typically not associated with NAFEMS or part of any software user group. **Presentation on EC Framework VI** This is an important opportunity to learn about new research programs and funding opportunities by Anne De Baas, EC Project Officer
1 March 2002 **NSC Meeting** **Copenhagen, Denmark**	only for Network Steering Committee member

FENET 2002 Meeting Shedule Summary

13 - 14 June 2002 **Technology Workshops** **Zurich, Switzerland**	**Workshop topics** Durability and Life Extension (DLE): **FE issues related to Structural Integrity (Fracture, Fatigue, Creep, Crack Growth)** Objectives: The main objectives of this workshop are: • To provide an overview of the current state of FE technology in applications related to structural integrity • To provide a discussion forum to identify the need for FE benchmarks in structural integrity • To identify specialist workshop topics in structural integrity Multi Physics and Analysis (MP): **Computational Modelling of Multiphysics Processes - 2** Product and System Optimization (PSO): **Incorporation of Product and System Optimization (PSO) Methods into, Compact, Reliable Design Cycles - 2** Education & Dissemination (E&D): **Methods & Approaches to Reducing Barriers to Effective Use of FEA in Industry** Topics • Review of Recent Software Developments to provide new functionality, improved ease of use, support for casual users and designers • Training Initiatives to improve uptake of Analysis Tools, particularly web based intiatives. • reducing purchase costs by using internet pay as you go access to software • Methods & Initiatives for Cross Sectorial Dissemination
11 - 12 September 2002 **Workshops Trieste, Italy**	**Workshop topics** Durability and Life Extension (DLE): **Finite Element simulation of Fracture and Crack Growth** Objectives The main objectives of this workshop are: • To obtain feedback from FE users on the current state of FE technology in modelling fracture problems • To identify the need for fracture and crack growth FE benchmarks • To identify limitations in the fracture capabilities of commercial FE software • To identify future desirable features in FE simulation of crack propagation • To present cases studies reflecting FE analysis of fracture problems Multi Physics and Analysis (MP): **Loosely Coupled Multi-Physics Systems – 1** Review of Existing methods for coupling Review of Tools to assist with Integration Product and System Optimization (PSO): **The use of Evolutionary Algorithms - 1** Discussion Topics • Training in Optimisation Methods • Model Reduction Problems Technical Presentations • Evolutionary Algorithms for PSO • More Benchmarks for Structural and Design Optimisation • More Case Studies of PSO in Industry **continue next page ->**

FENET 2002 Meeting Shedule Summary

cont´d from previous page -> **11 - 12 September 2002** **Workshops Trieste, Italy**	Education & Dissemination (E&D): **The educational and training requirements for finite element analysts - 1** These two seminars will discuss the educational and training requirements for finite element analysts ranging from designers who use packages as 'black boxes' to advanced analysts. A comprehensive range of analysis types will be covered and include, for example, static, dynamic and non-linear analyses. The objective for the first seminar is to identify, in the ideal situation, the textbooks/booklets/web facilities/training courses etc that should be available and the experience the analysts should have before undertaking a given type of analysis.
13 September 2002 **NSC Meeting** **Trieste, Italy**	only for Network Steering Committee member
11 - 12 December 2002 **Annual Industry Requirements Workshop** **Prague, Czech Republic** **13 December 2002** **AGM & Industry Seminar,** **Prague, Czech Republic**	Once each year FENET organises a meeting to identify the analysis technology issues which are facing the eight industry sectors represented in the project: Civil Construction — Biomechanics Process and Manufacturing — Consumer Goods Land Transport — Aerospace Marine and Offshore — Power and Pressure Systems This is an important opportunity to influence • The topics addressed by the FENET Workshops • Potential Research Projects to address these issues The requirements are categorised using a technology readiness level and assigned an importance factor by industry sector. A full set of proceedings and a summary report is made available to all attendees. The event also includes a variety of presentations from industry highlighting state of the art methods. The event is a key opportunity for networking and technology transfer, and as such is an important aspect of the networks dissemination activities.

FENET 2003 Meeting Preview

February 2003 **Technology Workshops** **Location to be defined**	Workshop topics: Durability and Life Extension (DLE): **Finite Element analysis of High Temperature Applications** Objectives • To obtain feedback from FE users on the current state of FE technology in high temperature applications and life assessment • To identify the need for creep and damage FE benchmarks • To identify future desirable features in FE simulation of creep • To present cases studies reflecting FE analysis of creep and life assessment problems Multi Physics and Analysis (MP): **Loosely Coupled Multi-Physics Systems – 2** Product and System Optimization (PSO): **The use of Evolutionary Algorithms - 2** Education & Dissemination (E&D): **The educational and training requirements for finite element analysts - 2**

As more information becomes available on each work shop objectives and outline programmes etc. can be found on the project web site at www.fe-net.org. Please register you participation directly with Roger Oswald nafems@werbos.de

Related Events 2002 - Software Vendors and others

Date	Event title	Location	Organi-sation	Contact person	Event type	Contact phone
2002						
9-11 April 02	NASA-ESA Workshop on Aerospace Product Data Exchange	Noordwijk, NL	ESA/ESTEC	Hans Peter de Koning	Conference	Hans-Peter. de.Koning@esa.int
22-24 April 02	ANSYS User's Conference 2002	Pittsburgh, USA	ANSYS	Bill Bryan	Conference	+1 412 873 3938
7-12 June 02	Fifth World Congress on Computational Mechanics	Vienna, Austria	IACM	Herbert Mang	Conference	+43 1 58801 20201
5-11 September 02	Challenges of Concrete	Dundee, UK	ISE	R Dhir	Conference	+44(0) 1382 344 347
9-11 October 02	3rd DIANA World Conference: Finite Elements in Civil Engineering Applications	Tokyo, Japan	TNO	Jantine van Steenbergen	Conference	+31 15 284 39 75

Related Events 2002/2003 - NAFEMS

Date	Event title	Location	Organisation	Contact
Q1 / 2002				
13-14 March 2002	Fundamentals of FEA for Design Engineers	Coventry, UK	NAFEMS	+44 1355225688
19-21 March 2002	Using FE Based Fatigue Calculation to Improve Product Durability & Advanced Vibration Fatigue	Coventry, UK	NAFEMS	+44 1355225688
Q2 / 2002				
24-25 April 02	Modelling of Assemblies & Joints	Wiesbaden, Germany	NAFEMS Germany	+49 8092 83550
1-2 May 2002	Basics of Stress Analysis	Coventry, UK	NAFEMS	+44 1355225688
20 June 02	How To Model Geotechnics	London, UK	NAFEMS	+44 1355225688
Q3 / 2002				
11-12 September 02	Fundamentals of FEA for Design Engineers	Coventry, UK	NAFEMS	+44 1355225688
3 October 02	State of the Art in CAD FE Integration & NAFEMS AGM	Stratford, UK	NAFEMS	+44 1355225688
16-17 October 02	Using FE Based Fatigue Calculations to Improve Product Durability	Coventry, UK	NAFEMS	+44 1355225688
Q4 / 2002				
13-14 Nov. 02	Basics of Stress Analysis: Essential Techniques & Guidance for Engineers & Designers	Coventry, UK	NAFEMS	+44 1355225688
13-14 Nov. 02	Validation of FE Analysis Models and Results	Wiesbaden, Germany	NEFEMS Germany	+49 8092 83550
2003				
5 February 03	Industrial Simulation & Validation of Turbulent Flows Using CFD	London, UK	NAFEMS	+44 1355225688
5-6 March 03	Fundamentals of FEA for Design Engineers	Coventry, UK	NAFEMS	+44 1355225688
12-13 March 03	Using FE Based Fatigue Calculations to Improve Product Durability	Coventry, UK	NAFEMS	+44 1355225688
29 April 03	Best Practice Analysis Methods: Reducing Product Failure Risks	London, UK	NAFEMS	+44 1355225688
27-30 May 03	**NAFEMS World Congress: Innovative Engineering Simulation Techniques; Best Practice Methods to Virtual Prototyping**	**Orlando, USA**	**NAFEMS**	**+44 1355225688**

Contact Informations

Co-ordinators

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RTD Thematic Area Co-ordinators

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Industry Co-ordinators

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Power and Pressure Systems

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DTLR	Iain Davidson	iain_davidson@dtlr.gsi.gov.uk

Tips & Workarounds

Simple Aid

Jot: load_par.awk*

File Edit View Select Options Help

```
#! /bin/sh

# Filename: load_par.awk
#
# Generates ansys indata parameters for forced response analysis of blisk.
# by
# Usage: nawk load_par.awk < forces.inp > executable.dat
begin {}
{
if ($1+0 == $1) {
printf ("*set,xcoor,%7.6f $*set,ycoor,%7.6f $*set,zcoor,%7.6f  $*set,s2ftr,%7.6f $/inp\n",
$2, $3, $1, $4); }
}
end{}
```

A very simple aid in generation of input files for execution of Ansys (should work with other programs as well) by use of unix-feature „awk“.
For more information please contact:
Per Ekedahl, Volvo Aero Corp., Space propulsion division, Sweden,
phone ++46-520-94384, Per.Ekedahl@volvo.com

Pitfalls to Avoid in Contact Analysis'
Benchmark Tests for Finite Element Modelling of Contact, Gapping and Sliding: NAFEMS Report R0081

Contact, gapping and sliding are apparent in most of today's industry sectors. For example many manufacturing processes including material forming, shrink fitting and casting - involve these phenomena. Similarly, there are everyday occurrences in the interaction of structural and mechanical components, e.g. in roller bearings, gear movements and bolted connections. This report presents details of ten benchmark problems involving contact, gapping and sliding. The benchmarks have been selected to illustrate the principal issues associated with the numerical solution of these phenomena and to introduce the current methodology and terminology relating to such problems.

The report presents a classification of contact, gapping and sliding problems and associated technical challenges, and the identification of
physical attributes to be addressed in potential benchmarks. A background summary of various numerical approaches and geometric representations currently used for the solution to such problems is also presented.

For more information please contact:
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Nawal.Prinja@nnc.co.uk

Fax Reply Form

please send per Fax: +49 - (0) 80 92 - 8 35 51
or e-mail: nafems@werbos.de

I am interested in attending following FENET events:

❑ **FENET Workshops on Thursday, 13th June and Friday, 14th June 2002 in Geroldswil/Zurich, Switzerland.**
- ❑ I would like attend the following workshop
- ❑ I would like to contribute with a presentation to following workshop
  - ❑ Durability & Life Extension
  - ❑ Product & System Optimisation
  - ❑ Multi Physics & Analysis
  - ❑ Education & Dissemination

❑ **FENET Workshops on Wednesday, 11th September and Thursday, 12th September 2002 in Trieste / Italy**
- ❑ I would like attend the following workshop
- ❑ I would like to contribute with a presentation to following workshop
  - ❑ Durability & Life Extension
  - ❑ Product & System Optimisation
  - ❑ Multi Physics & Analysis
  - ❑ Education & Dissemination

❑ **FENET Annual Industry Requirements Workshop on Wednesday 11th December and Thursday, 12th December 2002**
AGM & Industry Seminar on Friday, 13th December 2002 in Prague, Czech Republic
- ❑ I would like attend the following workshop
- ❑ I would like to contribute with a presentation (Industry Sector or RTD Area)

❑ **I am not a FENET member. I am interested in the FENET project.**
(please specify your RTD Area and the Industry Sector in which you work)
RTD Area
❑ Durability & Life Extension ❑ Product & System Optimisation ❑ Multi Physics & Analysis ❑ Education & Dissemination
Industry Sector
❑ Land Transport ❑ Aerospace ❑ Civil Construction ❑ Marine and Offshore ❑ Consumer Goods ❑ Biomedical
❑ Process and Manufacturing ❑ Power and Pressure Systems

❑ **I would like to contribute to the newsletter** (please specify separately)
❑ Events ❑ Tips & Workarounds ❑ Others

Personal details

company: _____

dept.: _____

name: _____

street: _____

city: _____

postal code: _____

country: _____

phone / fax: _____

e-mail: _____

date / signature: _____