PHOENICS News

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Editorial

PHOENICS 2008 has been developed and tested in house with beta-site testing now underway. This version of the code will soon be on general release and will contain new and improved features including:

1) Improvements to In-form

Many customers have found the PHOENICS In-Form (input-of-data-via-formulae) feature of immense value for introducing features into their models without user-programming.

However, there were a (very) few functions of In-Form, specifically those which made simultaneous use of information generated by different processors, which could not be used. These difficulties are being removed.

2) Surface-to-Surface Radiation Model in Parallel PHOENICS:

Japanese, and other Far Eastern customers, have used PHOENICS CVD successfully for many years. Because some of the models constructed by customers are very large, requiring up to 20 million computational cells, companies have been using Parallel PHOENICS.

There was a difficulty in that the surface-to-surface radiation model built into PHOENICS did not work in parallel. This obstacle has been removed: PHOENICS-CVD now works satisfactorily on parallel computers when surface-to-surface radiation is activated.

3) a rotating geometry object and

4) thin inclined plates

These latter two features will be described in the Spring Issue of the Newsletter.

Australian Training Workshops

ACADS-BSG
Building Services Software

By Murray Mason, ACADS-BSG

In February 2008, at the invitation of ACADS-BSG, CHAM's agent in Australia and New Zealand, John Ludwig made the trip to Australia to run a four day advanced user training course in Sydney for PHOENICS users, followed by a two day in-house training course for Connell Wagner.

John Ludwig lecturing at the four day advanced user training course in Sydney

John gave detailed lectures and ran tutorials on the various aspects of modelling, achieving convergence and interpreting and presenting the results of simulations as well as providing a preview of the soon-to-be-released PHOENICS version 2008.

AIRAH NSW Monthly Meeting

On the evening of the first training course, John and three other experienced Sydney-based users of PHOENICS gave presentations at the AIRAH NSW monthly meeting on "The Use and Application of CFD in the Air Conditioning and Fire Protection Industries".

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This meeting was attended by 80 AIRAH members and guests, and promoted some lively discussion. As first speaker, John provided an overview of CFD and PHOENICS. He then presented three case studies:

- Spread of smoke through a complex car park as a result of a car fire on one of the lower floors.
- The application of PHOENICS to Steady-state Simulations of the Internal Flow within a Multi-storey Building and
- The application of PHOENICS to Large-scale Environmental Flows

Jamie Vistnes, Senior Fire Safety Engineer with Stephen Grubits & Assoc then gave a presentation on "The Use of CFD for Alternative Solutions for the Building Code of Australia and AS1668". Jamie also presented three case studies:

- Fire and smoke modelling in a large multi-story shopping centre
- Fire and smoke modelling in an underground railway station and
- Alternative solutions for a car park ventilation system

Next, Adam Kyle made a presentation prepared by Richard Palmer, an Environmental Design consultant with Advanced Environmental, on "Case Studies on Displacement Ventilation." These case studies were on the use of PHOENICS to model:

- Exhausting perimeter loads in a retrofitted displacement ventilation system in an office utilising a light shelf that channels hot air into a perimeter bulkhead.
- The evaluation of alternative supply air options to achieve Temperature limits over a painting zone in an art gallery requiring AAA conditions

The fourth speaker was Qian Wang, a CFD specialist from the Arup STG group in Sydney who is also a specialised ESD designer, a Green Star accredited professional and NABERS/ABGR Accredited Assessor. Qian presented 3 case studies:

- Using PHOENICS to determine the Green Star Air Change Effectiveness for an Office floor with a VAV system with high induction swirl diffusers.
- Using PHOENICS to determine the Green Star Air Change Effectiveness for an Office floor with Chilled Beams and high induction swirl diffusers.
- A CFD study undertaken using PHOENICS to determine hot spots in a cooling system using CRAC (Computer Room Air Conditioning) Units for an IT Rack Installation

The AIRAH NSW meeting on "The Use and Application of CFD in the Air Conditioning and Fire Protection Industries".

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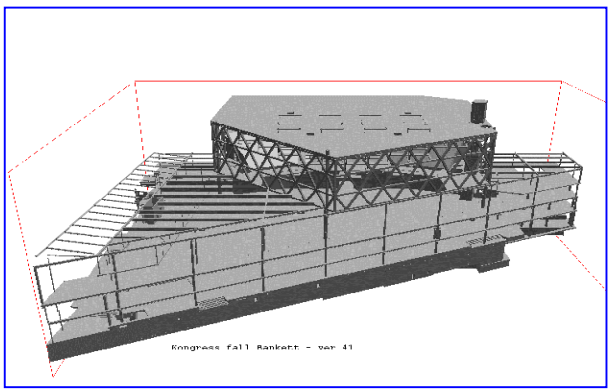
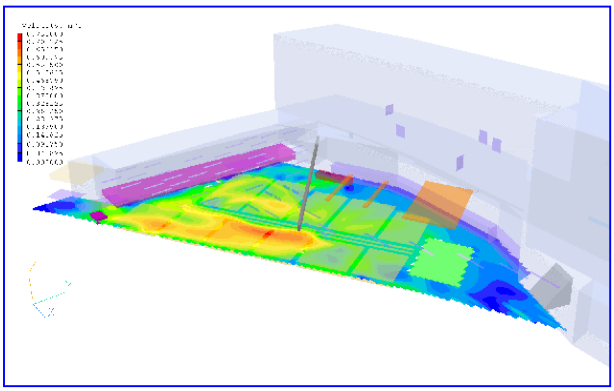
Stockholm Congress Hall Case Study

PHOENICS-using consultants, CFD Service in Sweden, employed PHOENICS/FLAIR for a ventilation performance study of a planned congress hall in Stockholm.

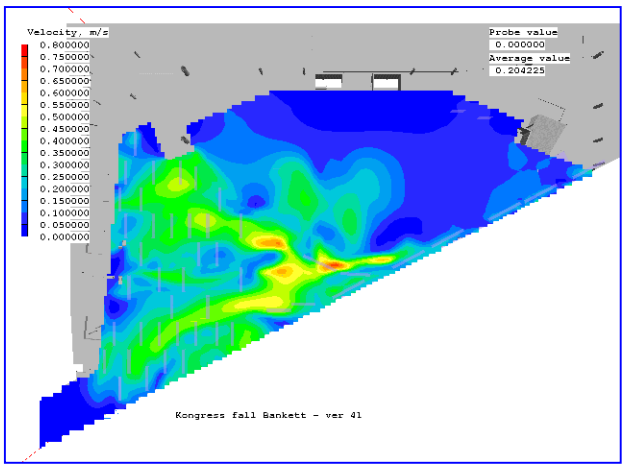


The model envisaged an event, such as a Nobel Prize dinner, with clusters of tables with diners, each with a heat release (@ 80W/p). Additional heat sources from the sun and artificial lighting were included, but the heat from people was the largest element.



The major concern was the relatively large velocities predicted at floor level, the causes of which were not fully understood. A steady-state solution was run for 4000 sweeps. Doubts were raised about the validity of the case set-up when it did not fully converge.

However, in practice, what happened was that the predicted solution gently changed as the iteration progressed. It became clear that the real flow was not steady, and that the inability to reach absolute convergence reflected the unsteadiness in the flow.



New features in FLAIR

As will have become evident from this newsletter, one of the most prevalent uses of PHOENICS relates to HVAC (Heating, Ventilation & Air Conditioning), and related applications such as fire, smoke, and pollution dispersion for both internal and external flow scenarios. The special-purpose product developed for this market is called PHOENICS/FLAIR.

Some of the new features of FLAIR include:

i) Thin inclined plate
ii) Free rotation of all diffuser types
iii) Fire/smoke modelling incorporating further NFPA / CIBSE standards
iv) Surface-to-surface radiation
v) Improved CAD-to-CFD options

To come later this year: improved solar radiation and wind direction features, links to an energy database, many more CAD import options, and better post-processing graphical options.

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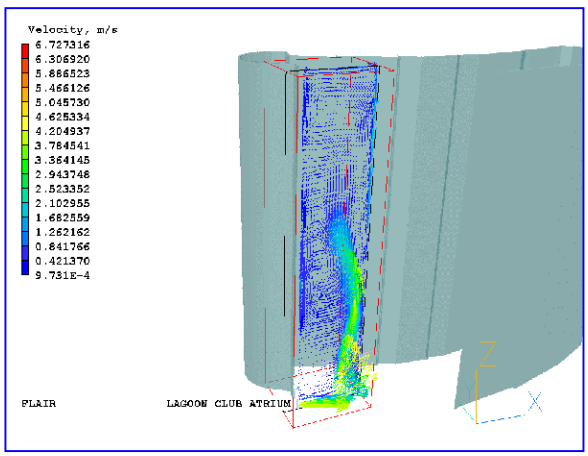
Consultancy update

This year, CHAM's Consultancy Team has been particularly active in the United Arab Emirates, undertaking ventilation and fire studies in tunnels, building atria and underground car parks.

One such project, on behalf of consulting engineers, Pell Frischmann, focussed on the smoke extraction system in the glass-fronted 20-storey atrium of the prestigious "Lagoon Club" hotel complex in Abu Dhabi.

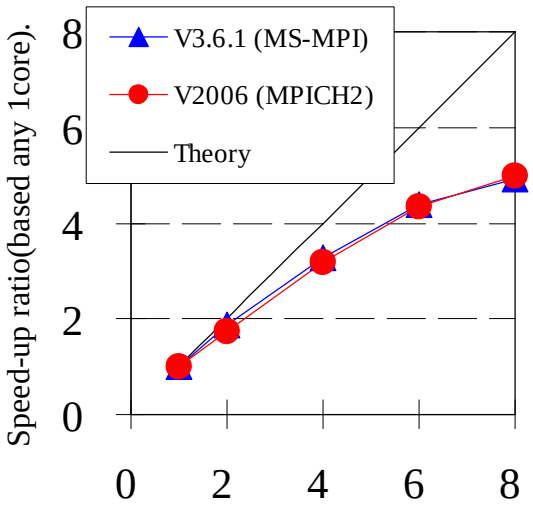


Cases were run for both steady state and transient conditions to simulate the potential thermal and visual conditions resulting from a furniture fire in the hotel lobby area up to the point at which fire-control and smoke-extraction measures were put into operation.

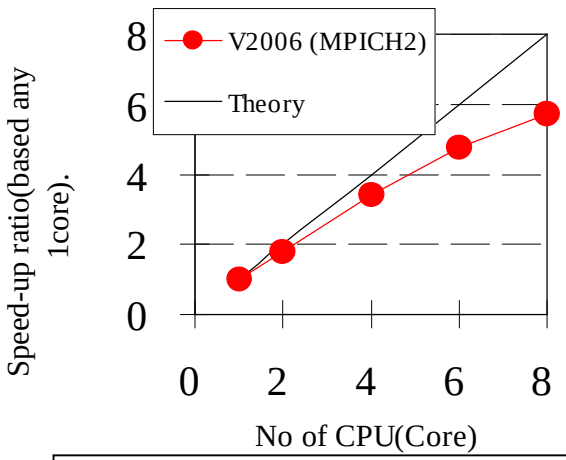
Parallel Performance

CHAM Japan's customer, ASMO, (manufacturer of small motor systems products for automobiles, office automation machines, etc) uses the 64bit parallel Windows version of PHOENICS for flow simulation around parts of a car.

The following graphs show the results for a medium case (12.5 million cells) and a larger case (20 million cells). Interestingly, the speed up ratio for the large case is better than that of the medium case.



Medium Case with 12.5 million cells



Large Case with 20 millions cells

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F1 in Schools Update
World Championships 2008

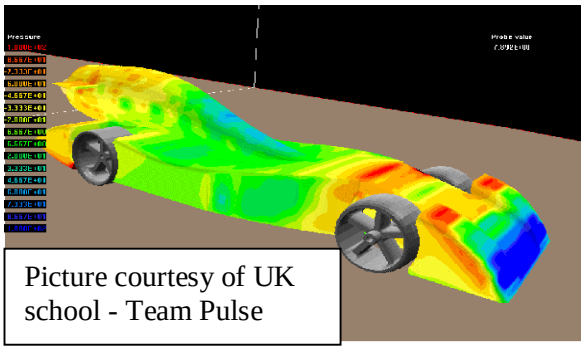
28 teams from 18 countries will compete in this year's world championships to be held in Kuala Lumpur from 18-20 March, during build up to Formula 1 Petronas Malaysian Grand Prix.

F1 VWT Expansion in USA

East Cobb Middle School in Atlanta Georgia is the first appointed Centre of Excellence in the USA, running a site license of the F1 VWT (Virtual Wind Tunnel) PHOENICS subset. Starting only in 2008, the teacher, Fred Stillwell has been running workshops for the F1 in Schools Challenge for students from all over Georgia, during which time they focus upon the F1 VWT. He has an average of 28 students per weekend, with teachers and parents getting involved.

Juli Keplar, Vice-President of US distributors, Denford USA Inc, says "We are really seeing an increase in awareness in that State about the F1 in Schools Challenge, and many schools have committed to putting the [F1 VWT] program into their schools this fall … Fred is showing school administrators how this program can get students excited about coming to class and raising test scores in Science, Math, English and a true interest in students feeling confident enough to pursue engineering courses/careers. The administrators are thrilled with the results from the workshops and want on board!

Fred's students are designing a CHAM racecar for this racing season as a thank you. Fred will be sending pictures when finished."



Picture courtesy of UK school - Team Pulse

To date, nearly 700 copies of the PHOENICS-based F1 VWT software have been sold worldwide. This year sees the release of the Mk V version that will incorporate the changes in design regulations for the R-Type geometry, and make an allowance for the new GT-Sports car grade. In doing so, CHAM will be improving the post-processing graphical options generally, and providing "button-push" macros for default views.

HEVACOMP

for whom CHAM produces the add-on CFD module for its highly successful Thermal Simulation package, has recently been acquired by US software giant, Bentley Systems Inc. Following a recent visit, CHAM's International Sales Manager, Peter Spalding, says:

"We very much look forward to working together with Bentley during 2008 and beyond"

BENTLEY®

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Training dates

Sydney, Australia
4 day training course: 19 - 22 February
Evening meeting at AIRAH: 19 February
Rotterdam, NL: 18 - 20 March
London, England: 26 - 28 March
London, England: 20 - 22 May

See http://www.cham.co.uk/training.php for next PHOENICS training course dates & programme.

Other News & Events

CHAM-Japan exhibited PHOENICS at DMS from 27 to 29 June in Tokyo and from 3 to 5 October in Osaka last year, and held its Japanese PHOENICS user conference on 4 Dec 2007.

Two exhibitions are currently planned for 2008:
Techno-Frontier 2008 - 16 to 18 April
http://www.jma.or.jp/tf/en/reg/guide/index.html
DMS Tokyo 2008 - 25 to 27 June
http://www.dms-tokyo.jp/dms/english/

Contributions

We are always interested in receiving contributions for the Newsletter from Agents, PHOENICS Users and Students. Please email to phoenics@cham.co.uk. Full attributions will be given to all contributions used.

2008 International Conference on Advances in Computational Heat Transfer
R E M I N D E R

An international symposium, organised by the ICHMT, takes place in Marrakech, Morocco on 11 – 16 May 2008.

It is being held "to honour the 85th birthday of Professor Brian Spalding, FRS, and in recognition of his outstanding contributions to computational fluid dynamics and heat transfer."

More information is available on:
http://www.ichmt.org/upcoming-meetings/meetings.html
and then access Computational Heat Transfer CHT-08.

PHOENICS Online

Customers of the fast-growing PHOENICS Online Internet service will soon have the benefit of being the first users of the 2008 release.

PHOENICS Online is used by commercial companies from all over the world, attracted by the immediacy of interactive and unlimited access and technical support services – all included within a single cost-effective monthly payment.

www.in2itive.biz/cham