



FERG NEWSLETTER



Fluids and Environmental Research Group

April 2001

Editor's Corner

There was a pretty timely conference on at the ACC in February - "Creating an All-Energy Future" -. The conference attracted over 40 exhibitors and more than 250 delegates and there was quite a bit of input from FERG members:

Ian was a member of the steering committee which formulated the programme for the conference, and he chaired one of the sessions. He also addressed the main conference on technology requirements for tidal stream power and separately on "The Contribution Universities Can Make..". For a flavour of the excellent feedback the conference received, see Ian's contribution later in this issue.

Guy held a workshop session on "The Use of Parametric Flow Models to Optimise Tidal Farm Developments" work which was also highlighted in the last FERG Bulletin for anyone wanting more information.

Another workshop session was held by Peter on "Photovoltaic Cells as a Renewable, Non-polluting Resource".

In the same theme, we were pleased to announce that Peter Fraenkel, Managing Director of Marine Current Technology Ltd and Technical Director of IT Power Ltd has been appointed as Honorary Professor in the School of Mechanical and Offshore Engineering. Peter is widely regarded as the world's leading expert in the exploitation of energy from tidal currents. He is also directly involved in the exploitation of solar and wind energy.

At our FERG AGM we said au revoir to Kostas who has gone on sabbatical at the Naval Postgraduate School in Monterey, CA. No doubt he is beavering away on his project, but not too busy that he can't keep in touch - check out his article later in the Bulletin.

Well, as to my own efforts over the last few months.....

Environmental Engineering Degree

Three cheers for everyone involved in the recent

validation for said degree. The whole event was extremely successful and so impressed were the panel that we've been given the go-ahead with no conditions attached, just a couple of (very) constructive recommendations. The School was also commended on the strategy of embedding group work within projects and on the close interlinking of research with teaching and learning. Many thanks to everyone involved in making the event such a success and let's look forward to fulfilling the promise of the new course in its inaugural year and on into the future.....

Wood Group News

I've been kept busy as usual through my close involvement with WG environmental activities. Interfacing arrangements between the company and their clients have been of particular importance to much of the work I'm involved in. This has encompassed environmental issues for several projects such as the BP Clair and Magnus EOR projects, NAM compression project, modification works to the (Enterprise Oil) Nelson platform. In addition I've completed an BSEN ISO14001 environmental audit for Northern Integrated Service Ltd. on behalf of Wood Group - experience which I would like to further in order to register with the professional association of environmental auditors (IEMA)

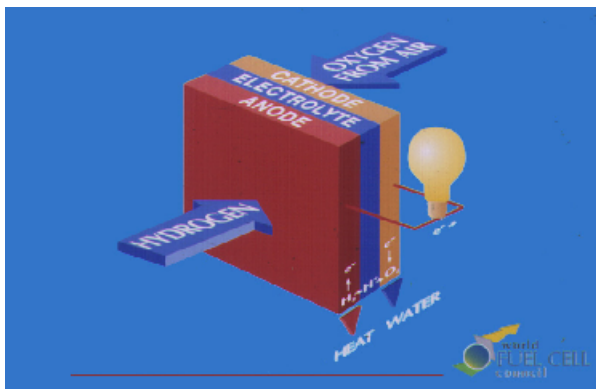
Not all the work has centred around offshore activities, however, as I also liaise with the WG Onshore Companies in Scotland. Again, a wide range of issues are being considered such as site or operational environmental aspects / impacts, EMS implementation, training provision and the FPAL Capabilities Profile Questionnaires.

The concept of sustainability is being embraced by many of the operating companies (as, for example, the rebranding of BP as an "energy" company is testament to) and as part of the shift in culture this entails, consideration of environmental aspects and impacts of business operations is being made at a much earlier (design) stage. Of course, innovative solutions can be an exciting challenge as well as an important competitive plus! It is rewarding to see environmental as well as social and economic issues

being addressed at a more strategic level.

Fuel Cell Research

I am still keen to establish some research and/or development work in the area of fuel cells. Following several meetings, our core team of FC “enthusiasts” has made progress in identifying several possible projects and applications for this technology and we are in consultation with an external company with the aim of establishing a strategic partnership to take this forward within RGU.



Basically, a fuel cell is an electrochemical energy conversion device, two to three times more efficient than the internal combustion engine in converting fuel to power. The cell produces electricity, water and heat using fuel and oxygen (from air). When using hydrogen as the fuel, the only emission is water. They were originally developed for use in space programmes, but there are also many terrestrial applications in transport, stationary power and portable power. Apart from provision of continuous electrical energy supply from fuel at high levels of efficiency and power density, they also offer the advantage of minimal maintenance and significant environmental benefits.

And so on to the Main Event.....

Many thanks to all the contributors for this bulletin, read and enjoy!

Steph Rigby
Vice Convenor

The Joy of Fluent Part II

My research over the past few months been primarily

centred on CFD modeling using Fluent and Gambit, with simulations of 3D Newtonian turbulent pipe flow being validated with the analytical approach of comparing a range of frictional pressure drop and turbulent velocity profile equations with the Fluent's results. From these beginnings, I have subsequently moved on to more complex simulations such as flow in an annulus with varying annular clearances (due to factors such as tool joints on drill pipe) and also non-Newtonian flows, using the Power Law rheological model available in Fluent. The next stage will be developing multiphase models such as stratified, slug and annular flows using the Eulerian-Eulerian approach available in Fluent version 4.5. I have also been in contact with Neotechnology Consultants, who have kindly agreed to let me have an academic copy of Wellflo 7, a multiphase flow program which deals with flow regime, liquid holdup and frictional pressure loss prediction methods. This will be used in the future for validation in conjunction with Fluent and the analytical approach.

Atholl Campbell

Ae Fond Kiss and Then we Parted

Officially I take up the post of Head of the School of Graduate Studies on the 1st of May. From this time I will still be available for consultation and will not leave my office for some weeks. Gradually I will have less and less to do with the day to day activities of SMOE. They will be picked up by Professor Norman Deans and advised/assisted by Laurie, Douglas and Ted. It will be my principle duty in these early months to devise a structure for the new school. I anticipate that the SGS will be responsible for all postgraduate courses and funded research within the Faculty. So it looks as if many FERG members will spend at least part of their time within the Graduate School so it's not Adieu!

SMOE Tops for Research Again

Once again, in the 12 months to the end of march 2001 the School of Mechanical and Offshore Engineering was the top earner of research funds in the RGU. This time we earned a staggering £480,000. This was close of 50% of the total research income for the University

When you consider that the research income during the whole of 1995 was £60, the size of our achievement is without precedent in the Scottish

Higher education system.

“All Energy Futures” Conference a Stunning Success

The recent international conference held in Aberdeen has been widely described as a seminal event for shaping Scotland's future.

Speakers from across the world outlined a vision of a post oil future which is already under development. Delegates heard from politicians, bankers and industrialists that the renewable industry will be the largest single employment sector in Western Europe within 15 years.

Sustainability

The prestigious US business journal "Fortune" has, in its March issue, identified sustainability as the single biggest investment opportunity in the developed world and, as such, there will be a convergence between the desires and aspiration of school leavers, commerce and industry. Similarly the "Philips Plot" of predicted world oil production indicates that the peak will occur this decade, followed by a 30-year decline towards a post oil energy era. The DTI "Pilot" report for the Oil and Gas Industry Task Force has identified Offshore Wind and Tidal Current Power as the most promising diversification routes from UK reliance on the Petroleum Industry.

The future is bright, the future is sustainable. -Watch this space!

The Tides

I have produced a detailed document (hopefully by now on the web- and if not, why not?) describing the activities of the tidal power group. If anyone wishes to read this, see me, Guy, Sarah, Angus etc.

House of Commons

The official enquiry into tidal and wave power is now drawing to a close. I cannot obviously reveal details but I think that we should all expect a massive publicity and financial support boost for tidal R&D shortly

Pentland Firth

We are now two months into the first stage of the Pentland Firth Study and Scottish Enterprise appear very happy with the progress. In line with the expected UK wide announcements. I think we may be seeing a major tidal current plant between Caithness and Orkney far sooner than I would have

believed possible-again.

Watch this space.....

Prof. Ian Bryden

Encouraging Results.....

It's been a fairly quiet few months really - Jonathan's thesis has been submitted and so I've lost a very useful assistant - I'm hoping we won't need any more results from Fluent because I think I've forgotten everything I knew about it, which says a lot for how well Jonathan worked away on his own!

There has been one very big change in that Kostas has temporarily (we hope!) relocated to California. Contact is still frequent through e-mail, but unfortunately the time difference very awkwardly means that just as I finish the day at five O'clock, he is starting it at nine in the morning! This has made phone calls rather infrequent.....

Comparisons between our own code, 3D-NS, and Fluent have been fairly encouraging, but as the experimental results have yet to appear we can't say which code is giving more accurate results yet!

Other than that, I'm busy doing runs to check for the effects of varying turbulence, intensity, submergence depth of the turbine and thrust coefficient of the Turbine, with nothing too out of the ordinary to report as of yet - which is the way I like things!

AJ MacLeod

Publication, Publication, Publication

Well here we are at the end of April. OPT-Current now only has 3 months left. This means, of course, that the actual work on the project is beginning to wrap up in readiness for the reporting stage. The optimisation code is singing, dancing and whistling (OK perhaps a few bum notes). The toolbox, which is being worked on in Ireland, is looking good. The Italians got their boats launched in to the Straits of Messina. I'll have to admit though; some of the modeling work is still a bit dodgy.

In fact the project is going so well, we decided to publish. Unfortunately, some dodgy hydrodynamic

modeling data meant I missed the ISOPE deadline. However, I did get something together for the ImarE conference on Marine Renewable Energy (MAREC), which was held in Newcastle in March. A who's who of North Western European renewable energy (with the exception of Ian, and Kostas) were there. Many interesting papers were presented covering tidal stream, offshore wind, wave and solar energy conversion. The proceedings are in the FERG library. A further paper is being prepared for Energy journal, based on the MAREC paper.

Convenor stuff

This will be the last newsletter before our summer recess. We have another two meetings left in May and June where Babs and Atholl will be talking about their drilling fluid research. It is intended that these will be on the last Friday of their respective months.

A big thank you to Chris for his talk on alignment tools. Although interesting, I believe the subject matter was more deserving of the Materials Research Group. Hopefully, with the injection of new staff and the success of FERG, the Materials Research Group will take-off with new vigour.

Thanks also to Peter, who was unfortunately ill for his presentation. But don't worry, we'll fit him in somewhere.

I want to put a diary of presentations together for after the summer. So if anyone wants to present their research or has a conference they want practice for, please contact Steph or me. We have had a lack of external presenters recently, so again if you know someone who would like to talk to us, please get in touch.

From the newsletter - see you after the summer.
From the convenor - see you at the next meeting in May.

Guy T Melville
(Convenor)

Gone with the wind

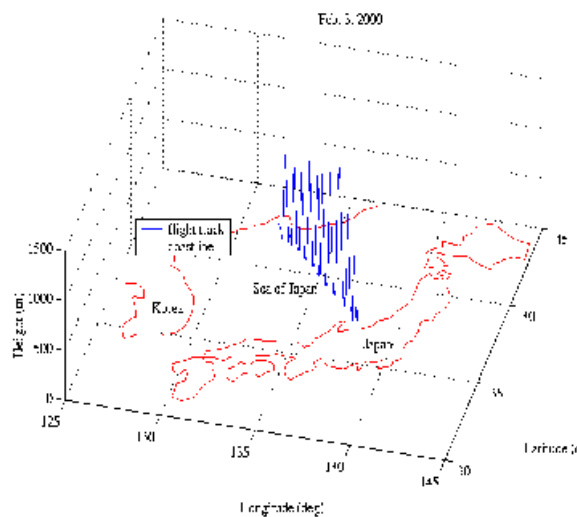
Hello everybody,

Greetings from California to all FERGies!

Since last month, I have joined the faculty and staff

of the Meteorology Department of the Naval Postgraduate School in Monterey and already started to work on a mesoscale atmosphere model called "Coupled Ocean and Atmosphere Prediction System" (COAMPS) developed by the Naval Research Laboratory of the US.

The project aims at the evaluation of surface flux and boundary layer parameterizations used in that model. There is a general lack of systematic evaluation of the surface flux and boundary layer parameterizations in mesoscale models largely due to inadequate observations for appropriate evaluations. During the Japan/East Sea Experiment (JES), intensive aircraft measurements were made using the Twin Otter research aircraft over the Japan/East Sea from late January and through February 2000 and obtained high-rate sampling of temperature, moisture, and the three-dimensional wind and turbulence over a wide range of meteorological conditions. In particular, multiple slant-path soundings were made along a vertical cross-section (see Figure below) that can be used to characterize the vertical and horizontal variations of the marine boundary layer.



The project will utilize the JES aircraft data for mesoscale model evaluation.

Numerical simulations using COAMPS are being made for several selected cases during the JES period. The objective is to understand the model behavior by direct inter-comparisons with observations for several cases and understand the model sensitivity to various parameters in the surface

flux and boundary layer parameterization focusing on the surface sensible and latent heat fluxes. This sensitivity can be traced to modifications of the boundary layer mean properties that are directly used in the surface flux calculations. Results of these tests, including direct comparisons between the measured and simulated boundary layer height, mean vertical structure, and its variation along the flight track under different large-scale and boundary layer conditions will be presented initially in a conference on Mesoscale Processes in Florida next August.

I am missing you all!

Kostas

Tidal Change!

Hi Everyone!

This have all changed since I last wrote.....

I have put my PhD on hold for a while. Six months to be exact! On the 1st of March I officially became a research assistant working on the Pentland Firth Tidal Current Energy Feasibility Study - I am mostly looking into the environmental feasibility and am nearly 2 months into the study. Things seem to be going very well. It was a slow start, but now there is plenty of data and information coming in and lots of people to talk to, things seem to be on the move and progress is being made. I had the privilege of flying up to Orkney (believe me.....I think flying was a privilege!!) and managed to meet with many people. Orkney was ace and I am hoping to be able to get back up there in the near future. Though my Ph.D. has been put on hold (which means I'll be around for at least an extra 6 months.....yea hey!.....lucky you!) I am hoping that this opportunity will enhance my knowledge of my Ph.D. topic and in all essence give me a case study to work on. I am thankful for the opportunity.

Sarah Dacre

Forthcoming Events

There are only another two meetings before we break up for the summer holiday period. The speakers will be as follows

May Babs
June Atholl

Publication Date:

The next bulletin will be due in September. The editor will be decided over the summer.



This document was created with Win2PDF available at <http://www.daneprairie.com>.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.