



Editor's Corner

This is probably my last editorial as FERG convener. It has been a mixed year. After Kostas left for his sabbatical in sunny Monterrey and the school merger, many folk had clashing commitments. We had a few meetings where only a few stalwarts managed to make it alone. We tried changing the time from the Friday to the Wednesday, in the hope that more people would be available. This has worked to some extent and attendance has improved. However, with current demands for meetings to be held on Wednesday when staff are allegedly free, I do not see many of the teaching staff being available to attend. This is a pity, because many are keen to take part in the activities of FERG.

In order to straighten the group, we tried a brief attempt at a merger with the Material's research group. Some executive discussions were made, but the proletariat of MRG did not follow. Though, usefully, we picked up Guillaume along the way.

Other additions to the e-mail list came from a university wide e-mail that I put out. This caught the interest of a few folk around the new faculty of Design and Technology. I hope some of them will do a talk on their research, proposals or ideas in the near future. Such things lead to multi-disciplinary research and idea cross-over and will strengthen the research culture within the university. As an example, a couple of weeks ago, we had the first meeting of staff of the Centre for Environmental Engineering and Sustainable Technology. Within a few researchers saying what they worded on, a new proposal was conceived.

We ended the year with a second wind. We had a couple of well attended talks. One from Terry Rhodes from Shell Consultancy Services discussing Shell's outlook on offshore wind energy; and David McGrath (ReGenTech) came to talk about his fuel cells and the collaboration with RGU to develop them. Prior to Christmas we had an interesting series of talks from Babs' research crew as they wend their way towards their respective PhDs. We also welcomed aboard Edward Gabina's researchers, who have been very keen participants.

So what's to come for the new convener? The word from faculty is to improve the research culture of RGU. FERG should benefit from this. It should also play an active part in encouraging ideas and research within and without the group. Many of our current researchers are $\frac{1}{2}$ to $\frac{2}{3}$ through their PhDs, so thoughts should be on sustaining the Group's research programmers. The biggest task for the incumbent, as it has been for me, will be sustaining interest, in an ever increasing tide of demands on the members' time.

Enough of the mad rantings and philophosising. The pace of EU demands has relented somewhat since the project officially ended and we don't get paid for the extra work we have to do on project reporting. The draft final report, submitted before Christmas, came back to us only recently for correction. Fortunately, only quite minor corrections. The report was very well received and Ian and I believe the EU were very pleased with the project as a whole for producing good results, achieving all the objectives and staying reasonably on schedule. A big success for our first EU project as project managers.

The project I did on the hydrodynamic modeling of Yell Sound, as part of the Stingray project, was also well received. The Engineering Business are continuing close ties with RGU for our oceanographic expertise. We are also collaborating on a paper on the Yell work for the MAREC 2002 conference.

I actually managed some extra curricular work towards my PhD as well. One of the major concerns of tidal energy is how much energy can be removed before the tidal currents take an alternative route. An effect known as blockage. I did some literature reviews and found that the only works hat has been done on such effects, at least in computational tidal studies was on mangrove swamps. There is probably some stuff on causeway construction though. I have planned an experimental programme to investigate this effect.

Guy T Melville
Convener

Proofs of Concept & TCS Update

I learned from Helen Mill, the Manager for the Commercialisation of Research, that the School of Engineering has been awarded 4 projects from the Scottish Enterprise Proof of Concept Fund, with a total value of £578,400. Two of these are jointly with Dunstaffnage.

On the TCS front, Graeme Dunbar is currently recruiting for a new project and there are another three in an advanced state of preparation through Allan Adam, Iain Richardson, and Rachael Wakefield.

At the present time there is good reason to be optimistic about the School's research portfolio, but never complacent. Remember that this is the first year of preparation for RAE 2006 [or its equivalent], and we need to aim for the top marks.

Douglas Morrison
Research Co-ordinator

CFD Story

My project continues ebb and flow on, with multiphase runs on the new, all singing, all dancing Fluent version 6 (It's an amalgam of versions 4 and 5 with some enhanced post-processing features, actually!) Its release has been some fortuitous timing for me, as I'm at a stage in my project where some nice pictures and numbers are required from my Fluent simulations for use in validation with selected two-phase mechanistic models as well as an impending RDT form deadline. I'm also going to give Fluent 6's new Eulerian multiphase model (only previously available on Fluent 4), a test drive, in order to compare it's performance to the volume of fluid (VOF) model I am currently using. I must dash, however, as deadlines are looming on the near horizon....

Atholl Campbell

Current Work....

Since December of last year, I spent most of my time working on the DTI contract. It was an interesting project, which involved writing the scope for their

new tidal power research programme. It was a great opportunity and I am happy to be able to say that DTI were very happy with the final product. Phew!! The likelihood that further work will come our way is also promising, which is an exciting thought.

For the past few weeks or so I have been coming to terms with the novel idea of getting to grips with my PhD again, though, all the work I have been doing will make a chapter or so of my thesis. There has been no time lost, but much that has been gained!! It has been quite motivational evaluating the material I have already got and I have begun the process of the dreaded writing-up stage. I have also been working on a couple of papers encompassing the work achieved so far - mainly involving the Pentland Firth project, but I have ideas for others also. Talking of the Pentland Firth project, I am actually in the process of witting down the hefty final report into a shorter format, in the form of a extended executive summary - which is quite a task in itself!!!!

Sarah Dacre

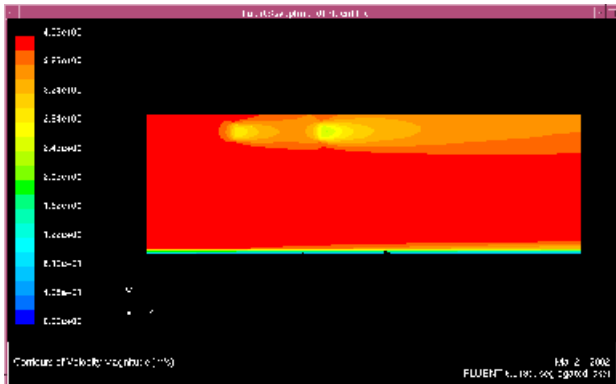
Deadlines on ENDOW

It's been a busy few months here, with several deadlines fast approaching.

The two Honours students who have been working on ENDOW and the Optimising Tidal Turbine Farms project as part of their own Honours Projects have under two weeks to hand in their theses.

It's been quite a rush to get enough results for them to talk about, but I think we're just about there now. We still have to produce some nice graphs and pictures comparing the results from Fluent and 3D-NS though, and see how the two currently match up (or, more likely, differ!) Included is one from Fluent, two turbines at eight diameters apart.

It was good to see Kostas over here again, although it was a very brief visit. The two honours students met their primary project supervisor in person for the first time, although they've coped pretty well communicating with him solely by email.



We still haven't had the opportunity to compare results from both codes with experimental data, though - our partners at Strathclyde University have now decided that the Denny water tank in Glasgow will be the location for these experiments, and not Malaysia as previously considered. Much as I dislike Glasgowshire, this is good news for me, being a person who cannot see the attraction of foreign travel...

AJ MacLeod

RGU Granted Proof of Concept Funding for New Tidal Current Power Concept

Our application for a project to develop a radically different concept of tidal current device has been successful. As everybody in FERG should now be aware, tidal currents offer a substantial predictable source of renewable energy. The total Scottish resource could, if effectively developed, produce in excess of 15TWhrs per annum. That is enough electrical energy to support a population of 3 million! The total for the UK could double this and the European resource could exceed 100TWhrs per annum. Many believe that even these figures are hopelessly conservative.

Most serious attention till now has concentrated upon turbines attached to the seabed using fixed pillars drilled or piled into the seabed. These offer stable platforms but they are expensive to build and install. This means that many potential sites must be dismissed, especially in shallow water where small devices must be used. In addition, available technology is unusable in water depth exceeding 50m. Many sites currently identifiable as offering high energy densities cannot, therefore, be exploited using existing technology concepts.

In this project, we will be developing a new support mechanism, which does not have the disadvantages of

earlier systems. Due to their known limitations, these have a likely upper exploitation limit of 500GWhrs per annum in Scottish waters. In principle, the new concept would allow the technical exploitation of some seven times this figure. More importantly, the cost of exploitation would be some 50% less and small scale sites, appropriate for peripheral communities, would become economically attractive.

The device will be designed at the Robert Gordon University and a half-scale model constructed for testing under realistic field conditions. It will be installed in an energetic tidal channel and its performance monitored over a full lunar cycle. This will allow an assessment of its likely performance under operational conditions. The device will be continually observed for performance against its required behaviour. At the conclusion of this exercise it will be retrieved and, if believed to be necessary following the initial test, modifications will be made for a second trial in the same location.

The proposed device concept could be used to exploit the massive potential of the Pentland Firth, as well as the smaller sources in the sea lochs of the west of Scotland and the inter island channels of Orkney and Shetland. Outside of Scotland, many nations in the developed and developing world possess suitable tidal conditions and the export market for prefabricated tidal current devices, which can be installed without specialist hardware, could be considerable.

Ian Bryden

MSc Interests

I thought that FERG members would be interested to see the range of MSc projects that we will be working on this semester.

Few of the drilling contractors were contacted directly, this time. However, it is interesting to note the drilling projects from SMEs; particularly in CTD, TTRD, UBD and sand control.

Mike Croft

Pg D Projects 2001 - 2002		
1	WS Atkins	Deepwater Pipelines
2	WS Atkins	Deepwater Risers
3	Baker Hughes INTEQ	Analysis of Barite Sag Mechanisms in Drilling Fluids
4	Baker Hughes Oasis	POM - Drilling Performance
5	Cameron	CT Percussion Drilling for Exploration Wells
6	Cameron	Seabed Three Phase Separation & Pumping System
7	Cameron	Deepwater Conductor Separation
8	Cameron	D/H A/L using Gas Pumping & Separation
9	Cameron	Deepwater Fields: Production versus Energy Consumption
10	DTI	A realistic assessment of the impact of Measurement on Production and Reservoir Modelling in typical NS applications
11	DTI	Decommissioning Offshore Installations
12	EGIS	TBA
13	GMIS-Santa Fe	Drilling
14	Halliburton	Sand Cleanout in a Depleted Reservoir
15	Halliburton	Improved CT Fatigue Life & Monitoring
16	Halliburton	Post completion reservoir simulation for sandstone reservoir drilled with OBM
17	Halliburton	CT simulator models
18	Halliburton	Monobore well design utilising expandable tubulars and CTD
19	Halliburton	Improved data acquisition during CT operations
20	HSE	Reliability Implications of API RP53 (BOP Control Systems)
21	HSE	Rig Mechanisation - Equipment Reliability
22	IDM	Investigation into CO2 disposal reuse in the offshore environment as a result of the Kyoto agreement
23	IDM	Investigation into the reliability of fire and gas detection function on offshore installations
24	IDM	Investigate the challenges associated with parent wells & wellhead equipment when using CTD or TTRD for the analysis of existing or new reserves
25	IDM	Behaviour of dropped objects, from offshore installations and / or supply vessels, on subsea facilities.
26	IESL	New granular filtering system, self-cleaning properties evaluation
27	IESL	Development of a computational model to simulate stress-strain behaviour & shape changes of wire mesh
28	LEA	Flare stack calculations
29	LEA	UBD Tripping at balance

30	Lloyds Register	Gas Turbine Vibration Modes
31	Lloyds Register	Flow induced vibrations in process piping
32	MacDonald Energy	Through Tubing Rotary Drilling (TTRD)
33	MacDonald Energy	Underbalanced Drilling (UBD)
34	MacDonald Energy	Risk Model for Well Operations
35	MacDonald Energy	Environmental Impact of Well Operations
36	MacDonald Energy	Overtrawl Protection of Wellheads
37	Midmar Energy	Under Balanced Drilling (UBD)- Comparative assessment using standard drilling rig vs CTD
38	Midmar Energy	Drilling problems associated with well trajectory and bore hole stability in mountainous thrust fault environments
39	RGU	Study of Productivity Improvements Mechanisms in Underbalanced Drilling (UBD)
40	Shell Expro	Life of field, operational cost prediction model
41	Tuscan Energy	TBA
42	Underwater Eng Services	Decommissioning - Underwater cutting techniques
43	Underwater Eng Services	Decommissioning - Clay plug removal from subsea piles
44	Underwater Eng Services	Decommissioning - Active heave compensation
45	Weatherford	Flow Analysis of Drill pipe dart through varying diameters
46	Weatherford	Through Tubing Rotary Drilling (TTRD)
47	Weatherford	Underbalanced Drilling (UBD)
48	EGIS	Flarestack Heat Radiation Modelling

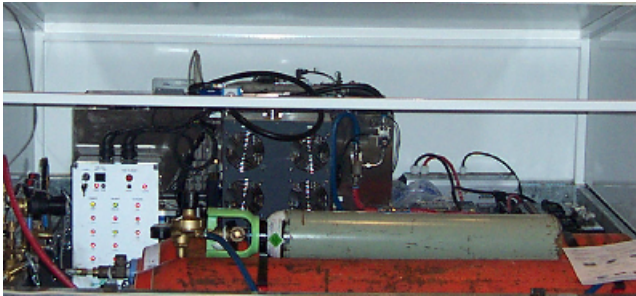
Fuel Cell Research Opportunities

Hi folks. Good news on the fuel cell front. Anyone at the last FERG meeting would have heard mention of the fact that we were about to receive our first fuel cell system. Well, that day has arrived and for anyone who's interested in taking a look, there is now an automated, portable trailer-mounted generating system (for roadside power generation) down in Lab. MA8. Over the next couple of weeks, we will be receiving a manually controlled version of a similar system for use in research and development projects, with power output of the order of 2.5 kW. The system is being provided by ReGenTech - their MD is David McGrath, who spoke at the last FERG meeting. Support for the programme has been secured from Scottish Enterprise, BOC and Wyko Industrial Services and the system is built using FC technology supplied by Alternative Fuel Systems of

Slinford England

The fuel cell produces electrical power by using stored hydrogen and oxygen drawn from the surrounding air. Lots of advantages can be gained by development of systems based on fuel cell technology - they are essentially silent, have few moving parts, do not vibrate and are pollution free, emitting only water vapour.

Recently (Feb 20th) we took the portable system down to the first Scottish Energy and Environment Conference (SEECON) in Glasgow and got an enthusiastic response from delegates throughout the day.



We've also been out and about with the "Making Waves" Roadshow as part of National Science Week (11th -15th March). Our exhibition "Future Energy" went very well - many, many thanks to all those who helped out - with planning the activities, transporting us around and, of course the crew on the stand - I am eternally grateful. We got excellent feedback and I'm hoping to build on what we did for next year's event.

Steph Rigby
Vice Convener

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