



May 2000

### *Surfing the Tidal Wave of Research*

Well here we are at the end of May. Doesn't time fly when you're having fun. So I officially started on OPT-Current at the start of April with a research fellow contract and all that goes with it. Including the commencement of my PhD studies - "Hydrodynamic Design & Operational Modelling of Tidal Energy Conversion Systems". With Ian and Kostas as my supervisors, I'm sure nothing can go wrong, apart from perhaps determining how a free-surface boundary behaves.

On the OPT-Current front (otherwise known as Dimla's project) things are going reasonably well. The hydrodynamic model is running well, even if it doesn't like the boundary conditions I am giving it. The figures from the tide tables are giving 8 m/s (16 knots) currents. Don't go swimming off Arklow Bank! However the program can now produce a list of suitable locations, the turbines that can be used in them and the annual energy production from them. But with 8 m/s currents, the data may be a bit inaccurate at present. Work on the cost functions is advancing also.

After much people and soul searching by Kostas, we have a new research assistant starting soon. Angus M'Cleod, BEng IV last year, is coming to work with Kostas on his tidal turbine wakes EPSRC project. Congratulations Kostas and good luck Angus. Stephanie Rigby, formerly of Applied Science, also joins us as the School's new environmental engineering lecturer.

In association with the FERG bulletin we are starting a FERG technical library. Each publication will include technical reports from current research in the group. This will hopefully build up a useful reference library and also provide practice for future publications in more prominent journals. We will start with one article in each bulletin and hope to build up as the research group expands. Reports may

be submitted to me at any time for publication in a future bulletin.

Since the last bulletin we have had 3 good FERG meetings. Kicking off in February we had Dimla's swansong with the OPT-Current project. A well received update on the project plan and method. Charles Gough came up from Strathclyde University in March. He discussed the turbine wakes experimental work associated with the tidal project at the Denny Water Tank. A very exciting programme of work was detailed using Laser Doppler Anemometry to measure the wake effects. Last month, our own Robert Morgan presented an overview of his MPhil (Development of a Downhole Jetsub for Extended Reach and Horizontal Well Drilling) as he finally submitted it for judgement. Good luck Rob with your viva and your job with the Wood Group.

Please remember that the FERG meetings and bulletins are intended to keep the whole group informed as to what each member is doing. This allows the spread of knowledge and encourages the present and future research within the group. In addition copies of the bulletins go to faculty heads and other schools. Thus we inform the university of our research interests with a view to collaborative projects.

One final note: FLUENT is coming soon to a SUN room near you. Be afraid. Be very afraid...

*Guy T Melville*  
*Vice-Convenor FERG*



### ***PhD.....its a start!***

This is my first contribution.....but I guess it won't be the last!!

Most of you probably know a little about me by now - how much and what (mmmm...that could be a little dodgy!) I have no idea. I have been at RGU now since the middle of February, mainly trying to get my PhD proposal completed - 'The Environmental Impacts of Tidal Stream Energy'. This I have succeeded in doing, but no doubt changes and glitches will occur over the preceding years. Years!! That sounds soooooo daunting! That aside I am excited about being here and working with Ian and Kostas. I have a strong interest in tidal stream energy (good job really!!) and have been researching the area at different levels over the past 2 years within my undergraduate and Masters degree. Many questions have come to mind as my research has progressed, but such questions went far beyond the scope of those research projects. I am hoping that by having the opportunity to do a PhD in the same area, I will become closer (or even succeeding) in finding the answers to those questions.....though I envisage more questions cropping up than ever before!!

### **SARAH**



### ***You never get rid of these little frogs!!!!***

Lots of things happened since the last Newsletters! First of all, I finally submitted the final black copies of my PhD thesis! So I should graduate on the 4th of July! Again, thank you to Ian, Babs and also everyone who supported during these 3 long years! Merci!

My work is going fine. Since the beginning of the year, we have done 7 consultancy projects using the results of my PhD work. We are also trying to develop another application of my work. We are going to start a big advertisement campaign so watch out for those leaflets and magazines!!!!

At the end of April, I went on a boat trip for two weeks with the Marine Labs (in Torry). We studied the disturbance of a cutting pile in the Moray Firth. We did grab sampling, seabed imaging (using Roxann and side-scan sonar), trawling, fishing, water

filtration, sediment trap, currents data measurement...etc! It was busy and I learnt lots of new techniques (new for me!). We are hoping to use some of the data to validate our drill-cuttings dispersion model (the one developed by Ian). The new boat 'Scotia' is absolutely fantastic and very well equipped!!!!

Apart from that, here Philip has been working on Heavy crude flow modelling (the subject of his MPhil with SOME). We are also manufacturing some innovative completion systems at the moment. Our recent projects have covered areas such as sand prediction and wellbore stability.

Well, that's it for this time! I hope to see some of you at my wedding on the 26th of August in Froggyland!!!!!!

### ***Linda***



### ***Hi Everybody,***

The European project (ENDOW) on Offshore Wind Farms has already started (1/3/2000). We had the kick-off meeting in Syracousa, Sicily in April. The first payment from the Commission (about 26,000 Euros) is expected soon.

Angus MacLeod, past BEng student is coming to work for the EPSRC project on Tidal Current Turbine Wakes (official starting date 12/6/2000).

Next week, I am going to the US to present three papers at the ISOPE-2000 conference in Seattle:

"On the Interaction of Pipelines on the Seabed"

Authors: K. G. Rados, D. Pitt, D. M. Macfarlane and D. E. Dimla Snr

"Site Assessment Methodology for Offshore Tidal Current plants: A Preliminary Investigation"

Authors: D. E. Dimla Snr., I. G. Bryden and K. G. Rados

"Thermochemical Modelling of Glass Reinforced Plastic Pipes Subject to Fire"

Author: R Looyegh

After the conference, I am going to Monterey, California to give an invited lecture at the Naval Postgraduate School. Title: "Wind and Tidal Energy

Applications". In an hour talk, the current research activities of our group (projects) as well as previous research achievements and future targets will be presented. Collaboration with the institution is more than welcome.

Really busy period ...

**Kostas Rados**



### ***Environmental & Oil Well Considerations***

We have 3 MSc Offshore Engineering students placed with BP Amoco for their project studies. They will be carrying out *Energy Efficiency Audits* on the offshore platforms Magnus, NW Hutton and Thistle. In order to do this, BPA will be putting them through the RGIT survival course. Will look good on their CV's.

Two other MSc OE students, in conjunction with Aberdeen University, are carrying out field studies for EOR on onshore mature assets.

I have received requests for the analysis and determination of particle size distribution for drill cuttings, scheduled to be disposed of onshore.

In conjunction with external collaborators, I am involved with organising and preparing papers for an industrial seminar on *Decommissioning & Well Abandonment - Best Practices*. Presentation is scheduled for October 2000.

We held our first (successful) steering committee meeting on Thursday 25<sup>th</sup> May, for the ESPRC funded *Engineering Network - Drilling & Production Engineering*. Douglas is the principle investigator, with myself and Prof Penman / Dr Deans (AU) as Co-investigators.

**Mike Croft**  
**May Edition Editor**



### ***Non-linear Modelling of Flexible Structures***

This report describes the development of a non-linear model of a single electro-hydraulic actuator system as a transfer function giving the open loop relationship between the input voltages and forces acting on the beam at the point of actuation.

In the first part of the report, a physical model of the electro-hydraulic actuator is produced considering the non-linearities present. Consideration is given to a symmetric actuator controlled by a four-way electro-hydraulic servo-valve, applying forces to a dynamic structure, in this case a cantilever beam representing aircraft wing. The driven load may have compliance, structural damping and inertia characteristics. In the second part beam and coupling model is produced. Consideration is given to simple beam in transverse vibration. Free and forced vibration responses are obtained using the natural frequency and Eigen function. Report is concluded with a discussion on the simulation results produced for the transfer function produced using MATLAB™.

**Asher Mahmood**



### ***Shock Horror Revelation***

#### **“RGU now World Leading Academic Institution for Research into Tidal Current Power”**

Yesterday, speaking in a private forum, Professor Ian Bryden announced that the RGU is now internationally recognised as the world leader in research into this vitally important new energy source. Already the University is home to 3 major tidal current projects involving: Professor Bryden himself, Dr Kostas Rados, Mr Guy Melville and Ms Sarah Dacre. The total value of these projects currently approaches £1,000,000! The University is also currently seeking support for an additional two tidal current projects involving Mr Donald MacFarland and, once again, Professor Bryden. The University has also been approached by an industrial consortium to participate in the installation of a tidal current turbine in Luing.

The following article has been prepared by professor Bryden as a beginners guide to tidal current power.

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.