Coastal News

Newsletter of the NZ Society for Coastal Sciences and Engineering
A Technical Group of IPENZ

Number 1 July 1993

Renowned Coastal Engineer Visits Auckland

Contents

The name Bruun is synonymous with a wide range of authoritative guidelines on coastal engineering processes, including the stability of tidal inlets and sea level rise. It was, therefore, with great pleasure that the Coastal Society's Auckland chapter welcomed Per Bruun to its inaugural evening lecture in February.

Per's visit was organised by Terry Hume (Hamilton), where the coastal fraternity were given an entertaining lecture on a range of coastal engineering matters. Per also visited a variety of coastal environments, including Raglan, Tairua, Whangamata, Whiritoa and Waihi.

After Hamilton, John Duder took the opportunity to show him some of North Auckland's beaches, including Orewa, Omaha and Mangawhai. Then on February 6, Per enthusiastically addressed a group of over 30 scientists and engineers, showing a large number of slides.

Per gave a stimulating overview of a wide range of coastal engineering items. He made reference to his classic paper of July 1972, on the history of philosophy of coastal protection, given at the 13th Coastal Engineering Conference. In discussing breakwaters he emphasised the immensity of freak waves and showed some dramatic pictures as reinforcement. He noted that 20 to 22m waves are quite routine in the middle of the North Sea and 32m waves have been experienced in this relatively confined water body.

In the design of rubble mound breakwaters Per said that the periodicity of up rush and down rush was an important parameter to assess for model tests. The effect of down rush washing material back was well understood by earlier designers in previous centuries, who had developed a shape to give a flat toe to the breakwater, he said. He cautioned again the use of legged blocks such as dolos, as there are too many degrees of freedom, and he referred listeners to his textbook in this regard.

Per also argued that a piled pier using tension moorings could be much better than forming a breakwater harbour, and he tabled graphs showing rope tensions and the degree of surge and heave (longitudinal and vertical movement). The technique makes use of modern improvements in fender design proprietary with low recoil rather than an elastic response.

The second part of his talk referred to inlet bypassing using examples from Florida and Australia. There was too much risk of blocking with debris when using jet pumps, particularly at river outflows and large flood debris contributions, said Per. He encouraged the concept of fluidisation in buried pipes to remobilise material for current flushing.

Per also encouraged the use of shallow water hopper dredge in navigation inlets. Taking material from between the breakwaters and dumping it downdrift will help preserve littoral conditions, he said. He gave some examples of "At Bow" dumping, where a shallow draught dredger sprayed sand on the beaches as a renourishment exercise.

He described a new concept that uses a hydraulic "knife" to mobilise sediment for onwards flushing.

In the third part on coastal protection, he quoted the master dyke builder Andries Vierlingh of the Netherlands, who said, "water shall not be compelled by and fortse or it will return its fortse onto you".

Per argued against groynes in general principle and said there had been detrimental effects in Europe. He was optimistic about beach nourishment and recommended not dumping offshore for subsequent reworking back onto the beach, but rather spreading it evenly over the beach for a full-scale renourishment with a top berm width of 15 to 20 metres. He illustrated nourished beach initially at in 1 in 15, flattening off to 1 in 40.

In reference to by passing of sand materials, he quoted prices of US$4 to $6 a yard plus $1 for each 5000 feet of pumping but noted that Australian costs were cheaper, in the order of $2 a cubic metre for larger volumes.

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Chairman's Message

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This is the first of what I hope will become a regular newsletter for Coastal Society members.

First, an outline of the history of the Society. The idea of forming a national society arose out of the 10th Australasian Coastal Engineering Conference held in Auckland in December 1991. A meeting of interested people was held during the conference. At this time, a resolution to form a national coastal society was passed and a steering committee elected.

Several meetings of the steering committee were held during 1992 and the structure and rules of the Society were decided. It was agreed that the society would become a Technical Group of the Institution of Professional Engineers New Zealand (IPENZ). There were sound administrative reasons for taking this step and ample precedence for the fact that the majority of the members would probably not be engineers.

Towards the end of 1992, membership application forms were prepared and canvassing for members began. Progress with membership has been steady and I am pleased to report that at the time of preparing this newsletter, the Society has a paid-up membership of 88. This is well on the way to achieving the goal of 100 members in the first year.

The inaugural AGM was held during the IPENZ conference in Hamilton in February 1993. The members present formally approved the Rules of the Society and subscription levels and consolidated the former steering committee as the incoming management committee. The first meeting of the management committee was held in April 1993.

A network of regional representatives has been established and although most of these are not yet acting on behalf of the Society in any formal sense, it is expected that the future role of these people will assist significantly in the development of the Society. How the Society develops, of course, is also in the hands of its members, and while the management committee has the role in these early stages of directing the Society, gradually it will need to consider more and more the wishes of the membership.

The regional groups will thus form the backbone of the Society and provide the opportunity for regular meetings at which local matters concerning the coast can be discussed and members can meet to share items of common interest.

It remains to be seen in what form the regional groups will develop. While New Zealand was divided into 13 regions for the initial purposes of the Society, it is now clear that some of these groups are finding it more convenient to combine. The Auckland group, for example, now includes Northland and Waikato and is functioning well.

The Canterbury Coastal Group actually predates the foundation of the Coastal Society and has been meeting approximately twice yearly since 1990. It has attracted people involved in coastal activities from most parts of the South Island and upwards of 40 people have attended meetings on occasions.

Until the Society is large enough to justify running its own annual conference, it is proposed that meetings will be held in conjunction with the Marine Sciences Society and the IPENZ conference. It is recommended that members endeavour to attend at least one of these conferences and the first such opportunity is at the Marine Sciences conference in Nelson 25-28 August (see page 5).

The Society has already prepared a submission on the Draft New Zealand Coastal Policy Statement, although regrettably it had not been in existence for sufficient time to canvass members for their views. A working party has now been established, as requested by IPENZ, to prepare a statement on sea level rise, and members with views of this somewhat controversial topic are welcome to make their submissions.

Remember that the Society exists primarily for its members. You as a member are encouraged to use the newsletter to tell others what you are doing, find out what others are doing, and share any information that you feel may be of interest.

The management committee strongly believes that the work of the Coastal Society is very timely, particularly in view of the increasing focus on coastal resources as the source of much potential wealth, as well as pollution, and the challenge to manage the coast in a sustainable way.

John Lumsden
Chairman
Management Committee

NZSCE Management Committee

John Lumsden	CAE University of Canterbury (Chairman)	Ph (03) 364 2219
John Duder	Tonkin and Taylor Ltd, Auckland (Secretary)	Ph (09) 377 1865
Ken Grange	NIWA Oceanographic, Wellington	Ph (04) 386 1189
Bob Kirk	Geography Department, University of Canterbury	Ph (03) 364 2893
Terry Hume	NIWA Water Quality Centre, Hamilton	Ph (07) 856 7026
Andrew Laing	NIWA Oceanographic, Wellington	Ph (04) 386 1189
Robin Falconer	GeoResearch, Waikanae	Ph (04) 293 4659
Hamish Raine	Department of Conservation	Ph (04) 471 0726

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Per then finished off his presentation with his ten demands of coastal engineering.

- Thou shalt love thy shore and beach.
- Thou shalt protect it gainst the evils of erosion.
- Thou shalt protect it wisely yea, verily and work with nature.
- Thou shalt avoid that nature turns its full fortse gainst ye.
- Thou shalt plan carefully in thy own interest and in the interest of thine neighbour.
- Thou shalt love thy neighbour's beach as thou lovest thy own beach.
- Thou shalt not steal thy neighbour's property, neither shalt thou cause damage to his property by thy own protection.
- Thou shalt do thy planning in co-operation with thy neighbour and he shalt do it in co-operation with his neighbour and thus forth and thus forth. So be it.
- Thou shalt maintain what thou has built up.
- Thou shalt show forgiveness for the sins of the past and cover them up in sand.

J N Duder

Canterbury Region Activities

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The Canterbury Coastal Research Group (CCRG) was formed in 1990 under the initiation of the Canterbury Regional Council Coastal Investigations Officer. Personnel involved in the CCRG include:

- investigations, planning and engineering staff of the CRC and territorial authorities;
- staff and post-graduate students from University Departments;
- staff of DOC and NIWA;
- representatives of Timaru and Lyttelton Port Companies; and
- private consultants.

The group holds two seminars each year on research and planning issues relevant to the Canterbury Coast.

"What's been happening on the Canterbury Coast?" was the theme of the seminar held on 19 March.

Topics covered at the meeting included:

- the work of a DOC task group on a Coastal Sensitivity Index (CSI);
- a CRC report that highlights the inadequacies of the current sea-level recording sites and the need for a permanent long-term site in Canterbury;
- a CRC project aimed at assessing the effects of possible global warming on shoreline position;
- a summary and analysis of marine swell forecasts during 1992;
- sedimentation and erosion in the Avon-Heathcote catchment and estuary; and
- progress on coastal policy and planning issues.

Another meeting of the Canterbury Coastal Research Group is planned for later in the year.

Shallow Water Oceanography in Hong Kong

A shipping channel, only 11m of water, 50 ships a day, almost continuous bottom trawling, and the odd typhoon for good measure. Far from ideal conditions in which to collect tide, current and directional wave measurements continuously for a year.

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Not New Zealand of course — where would there be 50 ships a day! It was the Pearl River estuary near Hong Kong, but still relevant to New Zealand.

The work was done by EG&G Geos, New Plymouth, for ARCO Petroleum as part of an oceanographic and meteorological study off the South China coast. The data was required for design and operational planning for a 450-mile offshore gas pipeline.

In addition to the Pearl River estuary measurements, there were current meters, waverider buoys and meteorological buoys offshore in up to 100m water.

The instrument package used for the shallow water work is applicable for shallow water studies in New Zealand, so here we briefly describe it and our experiences.

The client required tidal height, current speed and direction, directional wave data and water temperatures for a year. The site had to be on the proposed pipeline route, and measurements in a shipping channel were desired.

The site was in the Hong Kong Macau ferry path, which accommodates at least 20 high speed ferries each day, and in the Pearl River, the main shipping channel to Guangzhou (Canton), where local fishing boats trawl for fish and shrimp almost continuously, particularly at night.

Clearly, an instrument mooring with a buoy was not practical. Only bottom-mounted instruments would be practical, and even then trawling would be a problem.

The figure shows the instrumental package designed for the task. A key element is the frame, which was designed to allow trawl nets to ride over it. It had to be strong but open so as to not influence the currents being measured.

The frame is built of stainless steel pipe sections that fit into joint collars. It is 2 metres square at the base for stability and 2 metres high. It was weighted with concrete blocks which formed a flat base resting on the mud with the corner legs penetrating the seabed. Careful calculation of the buoyancy of all the packages was required to not over weight it, as the bottom is very soft.

Within the frame there were several glass sphere floats,

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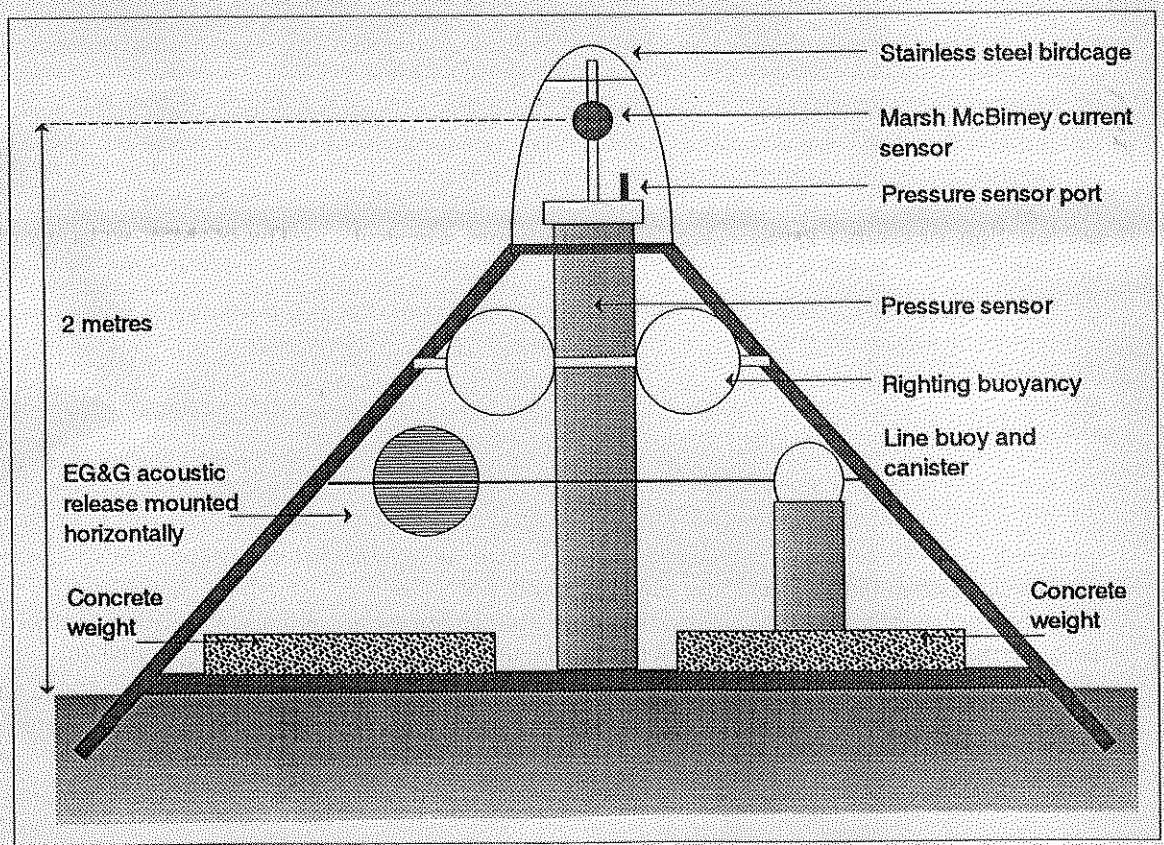

EG&G GEOS trawl-resistant frame. The frame uses an acoustic release, and survived at least ten trawl impacts during the Pearl River work.

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which may seem counterproductive to the weights, but actually keep the frame vertical when it is free-dropped to the sea floor.

Retrieval of the instrument for data recovery was required every eight weeks and divers were not to be used. The common technique of a ground line that could be grappled for was impractical as fishing trawlers would unintentionally do just that.

The solution was to fit an acoustic release. When commanded, it released a rod that had been restraining a float to which was attached 30m of light but strong lifting line.

On a typical service visit we would arrive onsite in a fishing vessel, lower the acoustic release command transducer over the side, ping away, then anxiously scan the sea for the float.

With the float on the surface the frame could be lifted to the deck level for down loading of the data to a portable computer and cleaning of the instruments and frame. Biofouling was significant and shells and weed had to be removed each time.

Biofouling dictated that the current meters used should not have moving parts. We used the Marsh-McBirney electromagnetic sensor, which has the added advantage that it is small, 10cm in diameter.

A Paroscientific sensor was used for pressure and data was logged in a Tattletale computer. Data processing later derives the directional waves from pressure and velocity, although one has to recognise lack of high frequency wave information due to the depth. You can beat the physics!

So what did we achieve? Virtually 100% data return, including a local typhoon which went up the estuary. (We got a full strength typhoon at an offshore mooring.) Tidal range of 3m, currents up to 1.5m/s and waves up to 2m. Not very drastic stuff, but important.

What did we learn about operating in such conditions? Well, from evidence of reorientation of the frame in the direction data, we know that the package survived at least 10 trawl impacts. The acoustic release float and lift line provides an easy reliable means of retrieving an instrument package and collecting long-term data in a busy estuary is practical. Finally, the Pearl River shrimps are excellent eating.

Robin Falconer

Marine Sciences Society President Urges Closer Links with NZSCE

The NZ Marine Sciences Society was formed in 1960 to encourage research and provide a means of communication among persons interested in marine science in New Zealand and overseas. It is a continuing advocate for the need to increase funding for marine research, particularly as exploitation pressures grow on our coastal ecosystems and fisheries resources.

The NZMSS encourages students to participate in its activities, and each year assists students attending the annual conference as well as presenting travel awards to students attending their first overseas conference.

In recent years, submissions on science policy, research vessels, marine reserve proposals, research strategy reviews, and regional coastal plans have occupied much of the Council's time.

The NZMSS represents a wide range of interests and institutional affiliations and can often provide a balanced perspective on each issue.

The NZMSS has over 300 members, including most of NZ's marine scientists, technicians and students. Traditionally, we have been especially strong in fisheries science, biological sciences and physical oceanography, and the apparent dominance at the annual conferences by biologists and ecologists (despite the best efforts of conference organisers) has perhaps not encouraged large numbers of engineers and planners to join.

I believe the new NZ Society for Coastal Sciences and Engineering has the potential to draw these disciplines closer together. This is timely as dialogue between interest groups would be especially valuable over issues generated by the Resource Management Act and in the new climate where a business consultancy approach is being taken by CRIs and universities. It is vital, therefore, that a very close association be developed and maintained between the two societies so that traditional boundaries do not become entrenched in each, to the detriment of information exchange.

The NZMSS welcomes the NZSCE to the family and extends an invitation to all members to attend the NZMSS Annual Conference at the Quality Hotel, Nelson, from 25-28 August, at which there will be joint sessions on coastal processes and toxic algal blooms. For more information and suggestions for themes and papers, contact Dr Paul Gillespie, Cawthorn Institute, Private Bag 2, Nelson.

Ken Grange
President, NZMSS
NIWA-Oceanographic
Wellington

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Coastal Engineering: A Partnership with Nature

The 11th Australasian Conference on Coastal and Ocean Engineering will be held 23-27 August. The venue is the Sheraton Breakwater Hotel in Townsville, Queensland.

Coastal Engineering: A Partnership with Nature is the theme of this year's conference. Over 120 papers on a wide range of coastal and open ocean engineering topics will be presented. A number of these include environmental science issues.

Immediately preceding the conference is a three-day residential course on Coastal Zone Management. The course will be held on Magnetic Island and Professor Bill Kamphuis of Queens University in Canada is the guest speaker.

For further information on the conference or the short course, contact:

The Convention Manager
11th Australasian Conference
on Coastal and
Ocean Engineering
P O Box E181
Queen Victoria Terrace
ACT 2600
Phone 616 270 6570
Fax 616 273 2012

NZ Geography Conference '93

The Department of Geography at Victoria University is hosting this year's New Zealand Geography Conference from 30 August to 2 September.

For more information contact:

Geography Conference
Department of Geography
Victoria University of
Wellington
P O Box 600
Wellington

The NZ Marine Sciences Conference 25-28 August

The NZMSS Annual Conference will be held at the Quality Hotel, Nelson, from 25-28 August.

The programme includes joint sessions on coastal processes and toxic algal blooms. For more information and suggestions for themes and papers, contact:

Dr Paul Gillespie
Cawthorn Institute
Private Bag 2
Nelson

1994 Water Conference

Implementing the Resource Management Act is the theme of the 1994 Water Conference, which will be held at Waikato University from 29-31 August 1994.

The conference is aimed at anybody involved and concerned with the development, use and conservation of water resources.

Topics will include:

- History and development of the RMA
- National policy statements and standards
- Regional policy statements
- Regional plans
- Consents
- Economic instruments
- Water conservation orders, enforcement and hazards
- Gaps in environmental monitoring and research
- Case law

For more information, contact:

Water Conference 1994
P O Box 4168
Hamilton East
Fax (07) 838-4058

Notice

The Auckland chapter of the Society is having its second function on July 21st at the School of Engineering. Social starts at 5.30, meeting 6.00 to 8.00pm.
The Auckland Regional Council will give presentations on:

Coastal Monitoring and Hazard Assessment

David Greig

The Future of Regional Sand Extraction

Tristine Kelly

Regional Coastal Policy Statement

Louise Gobby

Enquiries to :
John Duder Ph 377 1865 or
Glen Christian Ph 3737 599 Ext 8185

NZ Society for Coastal Sciences and Engineering Members

Name	Affiliation
Ms Wendy Bailey	EG&G Geos
Mr Rene Bakx	Waimakariri District Council/Private Consultant
Mr Alan Betts Alan Betts	Consulting Engineer
Mr Peter Bolton	Base Consulting Engineers
Mr Barrie Cameron	
Mr R J Carter	Port of Wellington Ltd
Dr Stephen Chiswell	NIWA Oceanographic
Dr Collin Christian	Dept of Civil Engineering University of Auckland
Dr Brian Coffey	Brian T Coffey and Associates Ltd
Mr Nicholas Collins	EG&G Geos
Ms Michelle Creamer	Massey University (graduate student)
Mr Allen Crosby	Principal KRTA Ltd
Mr Gordon Cuthbert	Fraser Thomas Partners Cons. Engineers
Mr John de Bueger	Global Engineering
Dr Willem de Lange	Dept of Earth Sciences University of Waikato
Mr Malcolm Douglass	Porirua City Council
Mr Alistair Dryden	
Mr John Duder	Director Tonkin and Taylor
Mr Robert Duncan	Retired
Mr Jim Eade	SOPAC (South Pacific Applied Geoscience Commission)
Dr Robin Falconer	GeoResearch Associates
Ms Sue-Ellen Fenelon	Auckland Regional Council
Mrs Wilhelmina Flick	Spicer Oppenheim
Mr Rob Forlong	Department of Conservation
Mr Gregory Foster	Earth Science Dept University of Waikato
Mr Malcolm Greig	NIWA Oceanographic
Mr R J Hall	Canterbury Regional Council
Mr John Harding	Beca Carter Hollings and Ferner
Ms Jenny Hart	Works Consultancy Auckland
Dr Wayne Hastie	Wellington Regional Council
Mr David Hay	Works Consultancy Services Ltd
Professor Terry Healy	University of Waikato
Dr Ron Heath	NIWA Oceanographic
Mr Michael Jacobson	Department of Conservation
Mr Richard Johnson	Waimakariri District Council
Dr Steve Joynes	Hydraulic Modelling Services
Mr Mike Kelley	EG&G Geos
Assoc Prof Bob Kirk	Geography Department, University of Canterbury
Mr R B Knowles	R B Knowles & Associates Ltd Consulting Engineers
Mr Takis Koutsos	Hawke's Bay Regional Council
Dr Andrew Laing	NIWA Oceanographic
Mr David Le Marquand	Ministry for the Environment (Auck)
Mr John Lumsden	Ctr for Adv Engineering/Coastal Engineering Consultant
Mr Garry Macdonald	Beca Steven, Director Environmental Eng
Mr Andrew MacDuff	Carson Mills Project Management
Mr Geoff McAlpine	Department of Conservation
Dr Bruce McCabe	McCabe Environmental Consultants Ltd
Mr Terence McCarthy	Connell Wagner Rankine and Hill Ltd

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Name	Affiliation
Mr Ralph McCorkindale	McCorkindale Associates
Mr B C Mischewski	Development Consultants Ltd
Mr William Mitchinson	Mitchinson McGregor (Consulting Engineers)
Dr Mike Moore	NIWA Oceanographic
Mr D Neale	Department of Conservation
Mr Scott Nodder	NZ Oceanographic Institute NIWA
Mr Gavin Palmer	Environment Waikato
Dr Mike Patrick	Royds Garden Ltd
Mr David Peacock	Gisborne District Council
Mr Grant Pearce	Tonkin and Taylor Ltd.
Mr Richard Pope	Carrington Polytechnic
Mr Stephen Priestley	Beca Carter Hollings & Ferner Ltd
Mr Gregory Shaw	Plans & Calcs
Ms Angela Sheffield	Perry Aggregates Ltd
Dr Mike Shepherd	Massey University
Mr Ralph Simpson	Retired
Mr Martin Sinclair	Eliot Sinclair and Partners Ltd
Mr John Smart	J Smart Consulting Engineer
Dr David Smith	Barrett Fuller & Partners
Mr Harley Spence	Coastline Consultants, Director
Mr Basil Stanton	NIWA
Mr Peter Steel	Beca Carter Hollings & Ferner
Mr Andrew Swales	Auckland Regional Council
Dr Betty Terzaghi	ex-DSIR
Mr Sergei Terzaghi	Murray North Consultants Ltd
Mr W G Thomson	Argo Thomson Ltd.
Mr Derek Todd	Canterbury Regional Council
Mr Stephen White	Taranaki Regional Council
Mr John White	Consultant
Mr David White	EG&G Geos
Mr Brian Wilson	Brian Wilson Consulting Engineer
Ms Jean Wolfenden	University of Auckland Psychology Dept
Prof Ian Wood	Civil Engineering Dept University of Canterbury
Ms Lesley Woudberg	Waimakariri District Council

Coastal Society Welcomes Corporate Members

The Society is now seeking corporate membership and it may be advantageous for some members to encourage their employing organisation to take up this form of membership.

A corporate member may nominate up to eight staff members, who will enjoy all the benefits of individual members. The annual fee is $200.

Forms for this purpose can be obtained from the Secretary (John Duder). Corporate members will be encouraged to submit articles for the newsletter about their activities.

Coastal News

Present plans are to publish *Coastal News* twice a year, although as the Society grows, this will become more frequent. Members should feel free to contribute material that would be of interest to others.

Material for *Coastal News* can be sent to:

- John Lumsden
  Centre for Advanced Eng
  University of Canterbury
  Private Bag 4800
  Christchurch
  Fax (03) 364 2069
- John Duder
  Tonkin & Taylor
  P O Box 5271, Auckland
  Fax (09) 307 0265