

# Coastal News

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and Engineering

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## Renowned Coastal Engineer Visits Auckland

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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 down-drift 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 on-wards 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 1 in 15, flattening off to 1 in 40.

In reference to bypassing 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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