cussons
TECHNOLOGY

P6335
Wave Absorber
Flexible Pitch
Design
And P6336

INTRODUCTION

.The P6335 Flexible Pitch Wave Absorber is to provide experiments on testing the performance of basic flexible pitch devices. A flexible pitch device uses a sea wall or large stationary body to form a base from which a float can pivot. The extraction of energy from the wave is more efficient in most wave conditions than a free-floating device. Prof Salter of Edinburgh created the original version of the pitch device and they are sometimes known as Salter's Ducks.

The engineering analysis of the energy that can be extracted from a wave using a pitch device is interesting and is a logical progression from the calculations related to the floating device. Conducting the experiment provides a realistic introduction to the complex issues involved with commercial wave absorbers.

In full-scale applications flexible devices are either used to directly drive an electrical generator or to compress a hydraulic fluid, in turn used to drive a generator. At a laboratory scale the inefficiencies in either of these methods complicates the analysis. Cussons P6335 Flexible Pitch Absorber is designed to operate with a special pump that provides an easily variable load and measurable output.

EXPERIMENTAL CAPABILITY

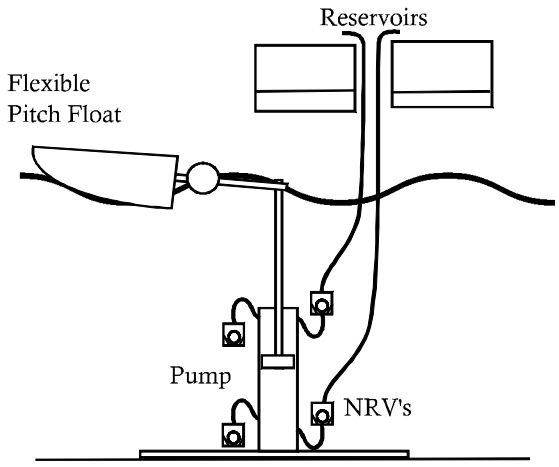
The P6335 Flexible Pitch Wave Absorber allows experiments related to the following topics to be conducted

- The energy available from a wave
- Buoyancy and Archimedes principle
- Relationship between wave form and buoyancy
- Potential Energy in a fluid
- Float shape in determining energy extraction

DESCRIPTION

Cussons P6335 Flexible Pitch Wave Absorber is designed for use in a 300mm wide wave channel with a depth of at least 200mm and wave heights of up to 100mm. Water depths of greater than 280mm will require the user to provide support blocks on which the wave generator can sit. It is particularly suited for use within Cussons P6275 5m Water Flow Channel (300mm wide) and Cussons P6285 Regular Wave Maker for 300mm channel. Other wave channel width's can be accommodated as a special product – please consult Cussons.

The wave absorber captures the wave's energy by using a floating device, with its trailing edge built as a pivot and clamped between the walls of the wave channel. The pitching device is extended beyond the pivot point by a lever used



P6335 Flexible Pitch Wave Absorber

to drive a double acting water pump. The double acting water pump comprises of a piston running within a vertical cylinder. Special low resistance Non Return Valves (NRV's) allow water to be drawn into the upper side of the cylinder as the piston descends, whilst at the same time pumping water up one outlet pipe. As the piston rises the NRV on the inlet to the upper side of the cylinder closes whilst the outlet NRV opens as water is pumped up the second outlet pipe. Similarly in the lower side of the cylinder, as the piston rises, the outlet NRV closes and the inlet NRV opens to admit water.

The outlet pipes are routed to two reservoirs mounted on an integrated support stand. The height of the reservoirs can be adjusted so that a variable head, (and hence a variable load) is applied. The amount of water collected over a number of wave cycles can be measured. It should be noted that as a relatively low head of water is pumped the resistance of the NRV's must be very low, and hence some leak back is inevitable. The efficiency of the absorber is therefore not accurate, but the engineering principles can still be studied and applied consistently. The pump and pitching device are all made from plastic eliminating rust. The float element of the pitch device is supplied with a pocket to which weights can be added. Three 200g weights, a 100g weight and a 50g weight is provided.

TENDER SPECIFICATION

The P6335 Flexible Pitch Wave Absorber is to provide experiments on testing the performance of basic flexible pitch wave absorbers and is to comprise of a pivoting float driving a water pump. The absorber is to be able to accept a range of different floating (pitching) bodies, such as Cussons P6336 pitch body range. The pump is to lift water into two reservoirs to allow the energy from the upstroke of the wave to be recorded separately from the down stroke. The unit is to be suitable for use in waves up to 100mm wave height, and in water depths greater than 200mm. The absorber is to be supplied with one pitch body.

PACKING DIMENSIONS

Length 0.7m Width 0.4m Height 0.4m

REQUIRED ACCESSORIES

A 300mm wave channel with wave generator is required such as Cussons P6275 Water Flow Channel and Cussons P6285 Regular Wave Maker, or access to suitable open water.

P6336 RANGE OF PITCH DEVICES

A number of factors affect the performance of a flexible pitch wave absorber. The shape of the pitch floats has some effect on the efficiency of the absorber whilst the area of the float will increase the length of the up thrust in longer wavelengths but may inhibit the stroke in shorter wavelengths.

Cussons P6336 Range of Pitching Devices includes four pitches, including a long large radius pitch float, a short large radius pitch float, a bluff pitch float and a small radius pitch float. Floats are made of medium density foam, and are each provided with pockets to which weights can be added.

Technical Specification A pack of four medium density foam pitch floats, suitable for use with Cussons P6335 Flexible Pitch Wave Absorber. The four floats are to include pockets, for weights to be added.

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