

2018-09-11

Summer School - Tuesday 11 September 2018 - Experimental planning I: Facilities and set-up

Perez-Collazo, C

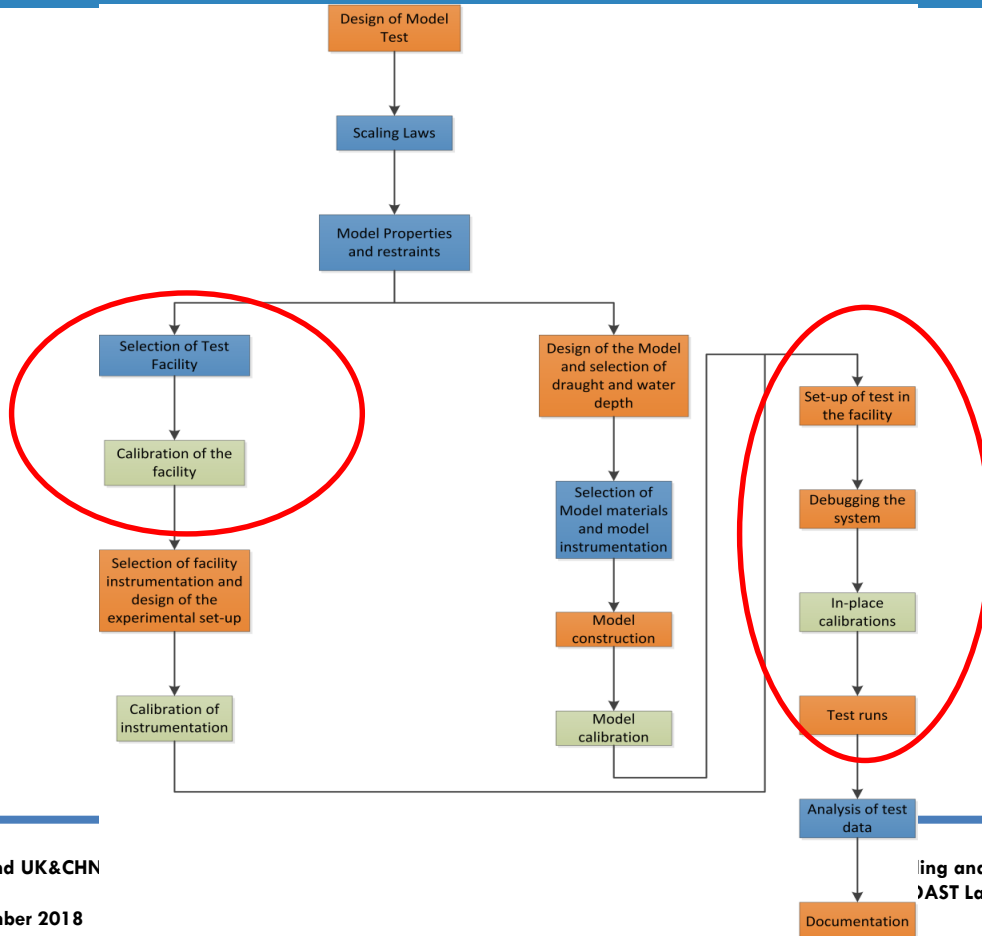
<http://hdl.handle.net/10026.1/12650>

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Please cite only the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

Experimental planning I: Facilities & set-up

Dr Carlos Perez-Collazo
11th Sep 2018







- Wave generation and absorption
- Basin and flume flow
- Towing tanks
- Blockage effects

- Wave makers
 - Deep water generation
 - Shallow water generation



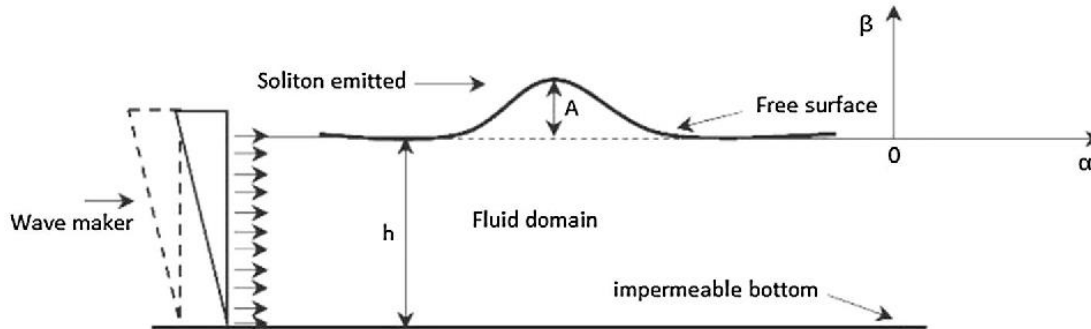


Table 4.1 Biésel transfer functions for four common types of wavemakers

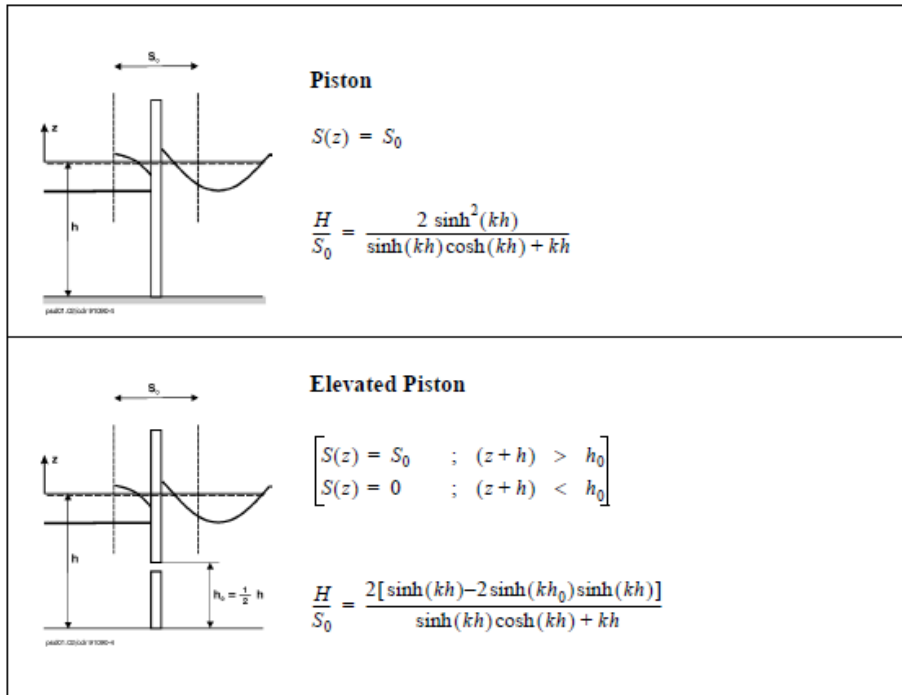


Image from: DHI. DHI wave synthesizer. User guides: DHI; 2005.

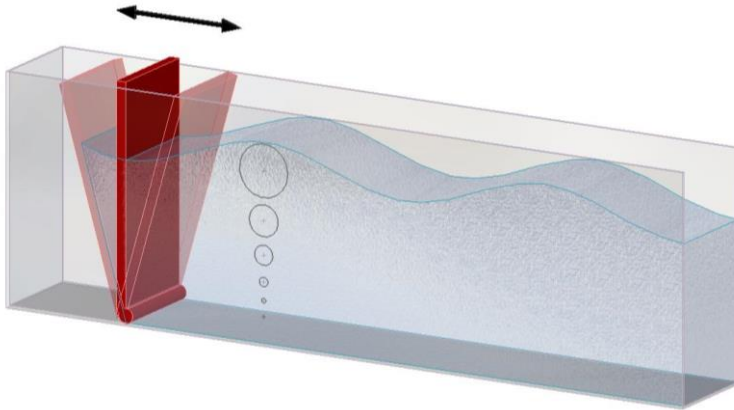


Table 4.1 Biésel transfer functions for four common types of wavemakers

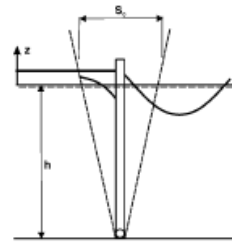
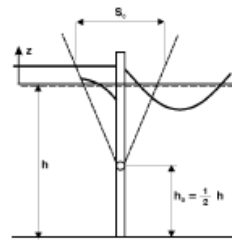
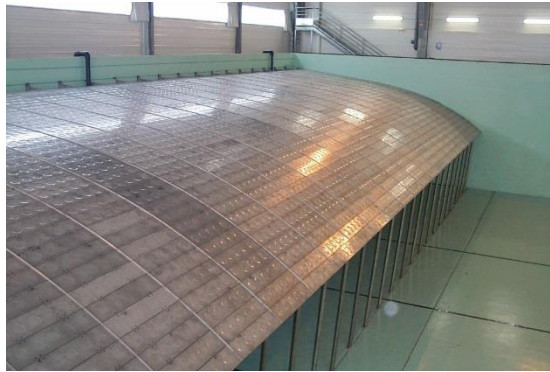
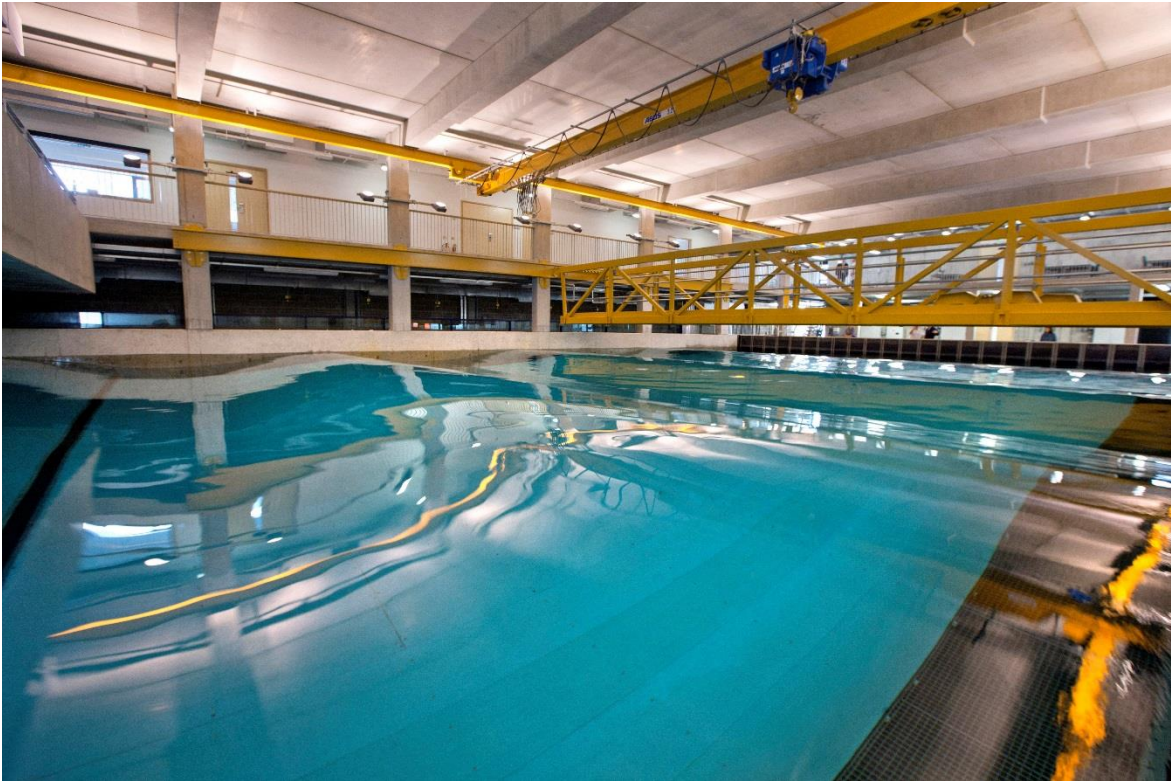
 <p style="font-size: small;">(p63 01.03(2) 91390-1)</p>	<p>Hinged</p>
	$S(z) = \frac{S_0}{h} (h + z)$
	$\frac{H}{S_0} = \frac{2 \sinh^2(kh)(1 - \cosh(kh) + kh \sinh(kh))}{kh(\sinh(kh)\cosh(kh) + kh)}$
 <p style="font-size: small;">(p63 01.03(2) 91390-2)</p>	<p>Elevated Hinged</p>
	$\left[\begin{array}{l} S(z) = S_0 \frac{h + z - h_0}{h - h_0} \quad ; \quad (z + h) > h_{0o} \\ S(z) = 0 \quad ; \quad (z + h) < h_0 \end{array} \right]$
	$\frac{H}{S_0} = \frac{2[\sinh(kh)((h - h_0)k\sinh(kh) - \cosh(kh) + \cosh(kh_0))]}{k(h - h_0)[\sinh(kh)\cosh(kh) + kh]}$

Image from: DHI. DHI wave synthesizer. User guides: DHI; 2005.



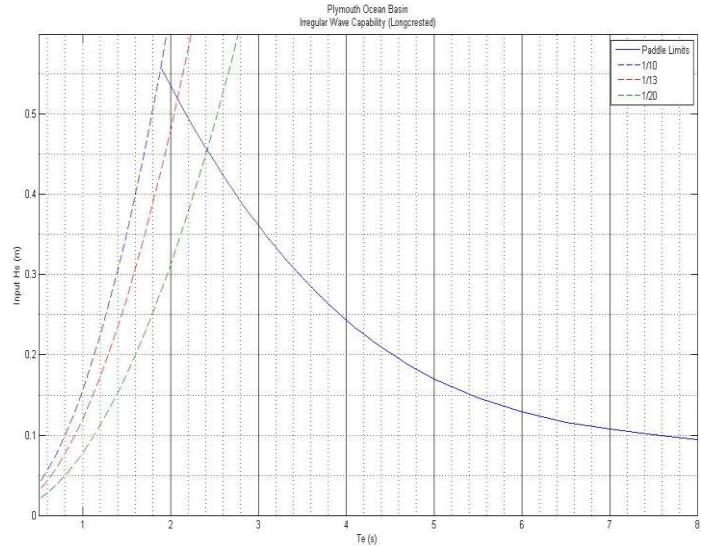
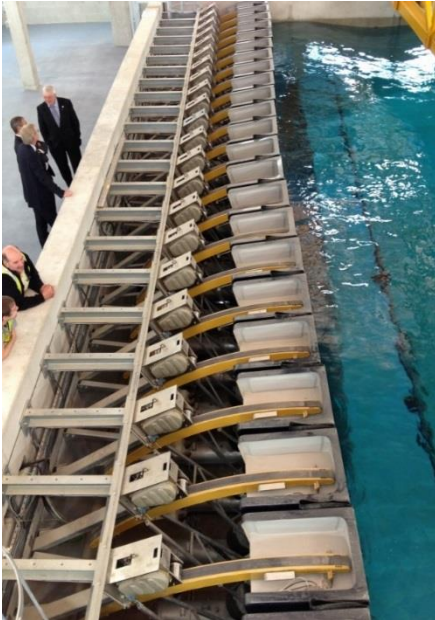
Images from:
<http://www4.e-design.co.uk>

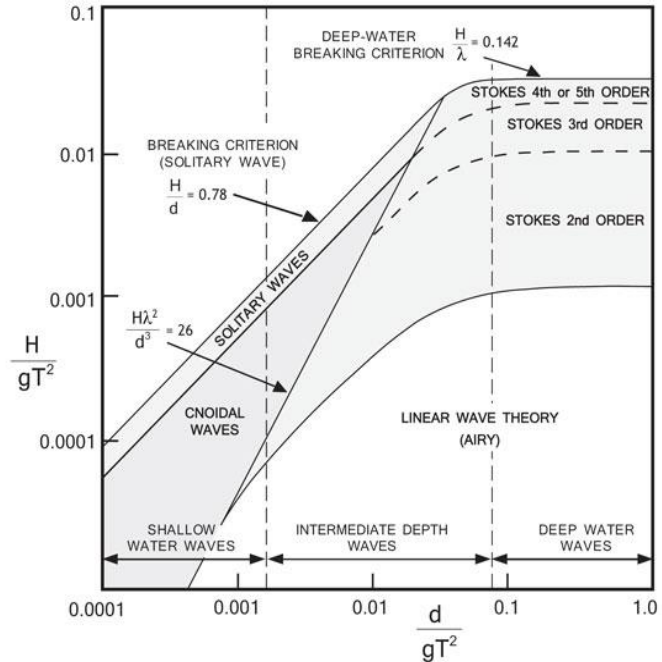












Waves

Model width to tank width $> 5 : 1$

Currents

Cross-section of the model to
cross-section of the channel $< 10\%$.

Test series	TRL Level	Facility	2D-3D	Test duration
Series A: Linear regular waves	1-4	flume-basin	2D	50-100 waves (300 if resonance)
Series B: Non-linear regular waves	3-5	flume-basin	2D	
Series C: Long-crested irregular waves	1-5	flume-basin	2D	1 h full scale or (> 700 waves)
Series D: Spectral shape	2-5	flume-basin	2D-3D	
Series E: Directional long-crested waves	2-5	Basin	3D	
Series F: Short-crested waves	2-5	Basin	3D	
Series G: Combined waves and ocean currents	2-5	flume-basin	2D-3D	test specific
Series R: Repeatability	1-5	flume-basin	2D-3D	

Test series	TRL Level	Facility	2D-3D	Test duration
Series H: Long-crested	2-5	flume-basin	2D-3D	3 hrs (full scale)
Series I: Long-crested and directional	3-5	flume-basin	2D-3D	
Series J: Short-crested	3-5	basin	3D	
Series K: Combined wave and ocean current	3-5	basin	3D	
Series R: Repeatability	2-5	flume-basin	2D-3D	

