September 2018

Dear Colleagues,

Invitation to

Comparative Study on Interactions of Solitary Waves and a Horizontal Plate
ISOPE-2019 Honolulu, Hawaii, USA, June 16 - June 21, 2019

On behalf of ISOPE-2019 IHC, we invite you to join 'Comparative Study on Interactions of Solitary Waves and a Horizontal Plate' organized by International Hydrodynamics Committee (IHC) of ISOPE.

The purpose of this comparative study is to share the state of the art numerical analysis capability on interactions of solitary waves and a horizontal plate problem. In this comparative study, a sets of model tests data on solitary waves impact load on a horizontal plate will be provided. Details of the model test are described in a separated file.

Please refer an enclosed participation form for further process of comparative studies.

***Participation form due*: November 10, 2018** or earlier	*Numerical results deadline*:	**February 15, 2019**
	Circulation of preliminary report:	**March 15, 2019**
	Final report	**March 24, 2019**

How to join Comparative Study

(a) **E-mail** your participation form to yuxma@dlut.edu.cn or dcwan@sjtu.edu.cn if you'd like to submit a full paper to be included in the Conference Proceeding, please attach an abstract when submitting the participation form.
(b) IHC will send a standard data format in excel file to participant no later than end of December
(c) **Email** the standard data format to yuxma@dlut.edu.cn or dcwan@sjtu.edu.cn

*For **deadline extension***, do not hesitate to contact us

We look forward to seeing you next year in Honolulu, Hawaii.

Sincerely yours,

Prof. Yuxiang Ma, Session Organizer, Dalian University of Technology, China,
Prof. Decheng Wan, Session Co-organizer, ISOPE-2019 IHC Chair, Shanghai Jiao Tong University, China.

Executive members of International Hydrodynamic Committee (IHC)

Prof. Decheng Wan (IHC Chair), Shanghai Jiao Tong University, China, dcwan@sjtu.edu.cn ;
Prof. Yonghwan Kim, Seoul National Univ., Korea, yhwankim@snu.ac.kr ;
Dr. Shiqiang Yan, City Univ. London, UK, shiqiang.yan@city.ac.uk ;
Prof. Q.W. Ma, City Univ. London, UK, q.ma@city.ac.uk;
Prof. Jin S Chung, ISOPE, jschung@isope.org.

Encl. Call for papers

Application form for participation of ISOPE-2019 IHC Comparative Study on Interactions of Solitary Waves and a Horizontal Plate

Dear ISOPE-2019 IHC,

We are willing to participate in the Comparative Study on B Interactions of Solitary Waves and a Horizontal Plate organized by ISOPE-2019 IHC for the following topic(please mark with 'x'):

- Interactions of Solitary Waves and a Horizontal Plate ( )

We hope to receive detail mesh and calculation conditions information on the subject of comparative studies through the following email address, .

Name of Institute:

Address:

Contact Person:

-Name:

-Email:

Comparative numerical studies on interactions of solitary waves and a horizontal plate

General Description

Several cases of interactions between solitary waves and a horizontal plate will be carried out. The set of experiments is relevant to coastal structures such as bridges, piers and submerged breakwaters where the width of the structure is smaller than its wavelength. The idealized geometry can make the experiments as a benchmark to verify the ability of numerical models.

The experiments can be classified into two categories. One is the interaction of solitary waves with a submerged plate. Since there will be no air involved into water, the experimental data can be used to verify both the potential and CFD models. Another one is the interaction of larger solitary waves with a suspended plate. As the process will involve strong impact and air entrainment, it can be used to verify the ability of CFD models.

In each experimental case, the free-surface elevations along the wave flume are recorded by an array of wave gauges. The spatial surface profiles in the vicinity of the structures are captured by a high-speed camera and the velocity fields under the wave surface are obtained using a HSPIV (high speed particle image velocity) system. Hydraulic pressures on the plates are also measured by pressure sensors.

Experimental Setup

Experiments are carried out at the State Key Laboratory of Coastal and Offshore Engineering, Dalian University of Technology. A two-dimension wave flume of 20 m in length, 0.45 m in width and 0.3 m water depth is used to implement the experiments. Solitary waves (see Equation 1) are generated by a piston-type wave maker. The wave parameters are illustrated in Tables 1 and 2. The detailed experimental setup can be seen in Fig. 1 and Fig. 2.

The following theoretical solution is used to generate the solitary waves in the flume:

$$\eta(x,t) = H\,\mathrm{sech}^2\left[\sqrt{\frac{3H}{4h^3}}(x-ct)\right], \tag{1}$$

where η denotes the free surface elevation above the still water level; x and t denote the stream wise direction and time; H = wave height; h = water depth; and c = wave celerity that can be calculated as $c=\sqrt{g(h+H)}$.

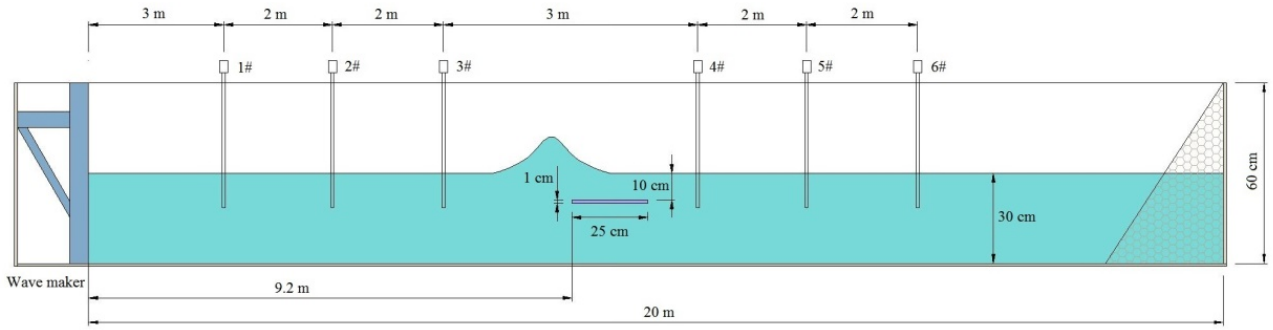

Figure 1. Layout of the experiment of a solitary wave interaction with a submerged plate.

Table1 Experimental parameters for the submerged cases

Case	Water depth h (cm)	Wave height H (cm)	Wave velocity c (m/s)
A	30	5.0	1.85
B		7.0	1.90

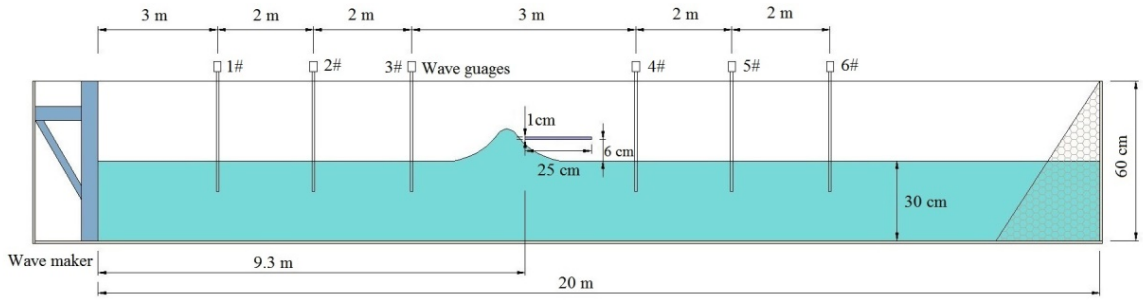

Figure 2. Layout of the experiment of a solitary wave interaction with a suspended plate

Table 2 Experimental parameters for the suspended cases

Case	Water depth h (cm)	Wave height H (cm)	Wave velocity c (m/s)
C	30	10.0	1.98
D		12.0	2.03

Data measurement

(1) Surface elevations

Time series of the surface elevations at six positons (x = 3 m, 5 m, 7 m, 10 m, 12 m, 14 m) are recorded. The time interval of sampling points is set as 0.02 s and the total sampling time is 60 s.

(2) Pressure

In the experiments, 24 pressure sensors are used to measure pressure induced by the solitary waves. The arrangement of the pressure sensors can be seen in Figure 3. The sampling rate is 400 Hz.

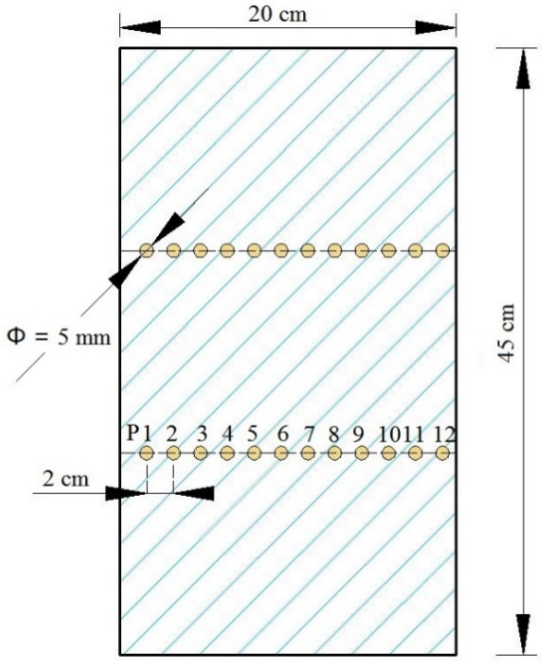

Figure 3. Arrangement of the pressure sensors on the horizontal plate.

(3) Snapshots
During the experiments, snapshots in the spatial domain between x = 9.1 m and x = 9.8 m (see FOV B in Figure 4) will be captured using a high speed camera.

(4) Velocity fields
The variations of velocities during the interaction process will also be measured using a PIV system in the FOV A zone illustrated in Figure 4. The maximum space interval of the velocity point is set as 5 mm, and the sampling frequency is set to 100 Hz. The data format of the velocities is outline in Table 3. The coordinal system of the velocity fields is shown in Figure 5.

Table 3 Velocity format

Time (s)	X(m)	Y(m)	U(m/s)	V(m/s)
t	X	Y	u	v

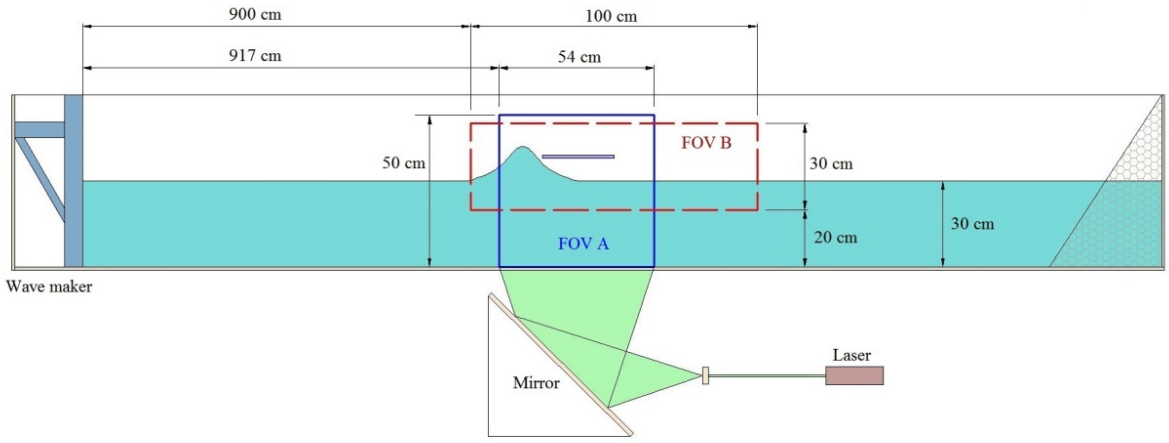

Figure 4: Schematic diagram of the fields of view (FOV). FOV A, velocity fields; FOV B, snapshots.

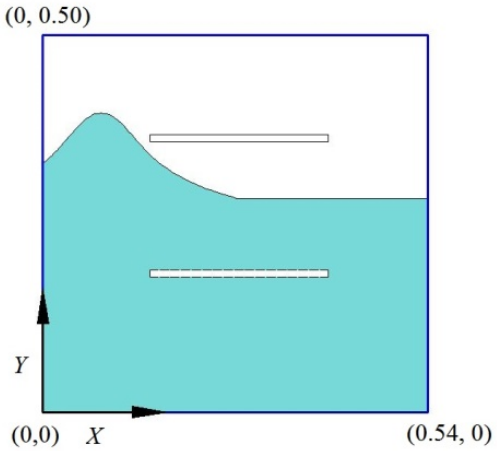

Figure 5: Coordinate system of the velocity fields