Experimental settings description

Benoît Gaurier*, Grégory Germain*, Jean-Valéry Facq*, Thomas Bacchetti*,
Lætitia Baudet† and Michel Birades†
*IFREMER, Marine Structures Laboratory, 62 200 Boulogne-sur-mer, France
Email: benoit.gaurier@ifremer.fr
†TOTAL S.A., DGEP/DTO/TEC/STR CSTJF, avenue Larribau, 64 018 Pau Cedex, France

I. Experimental cases

The experimental set-up is based on a smooth cylinder with a diameter $D = 200mm$. The marine growth repartition all around the cylinder is represented by 6 spheres with a constant diameter D_s, going inside the cylinder by one third of their diameters (figure 1). With this given repartition, the diameter of the sphere is $D_s = 120mm$ and the maximum external diameter is $D_{max} = D + 2 \times 2D_s/3 = 360mm$.

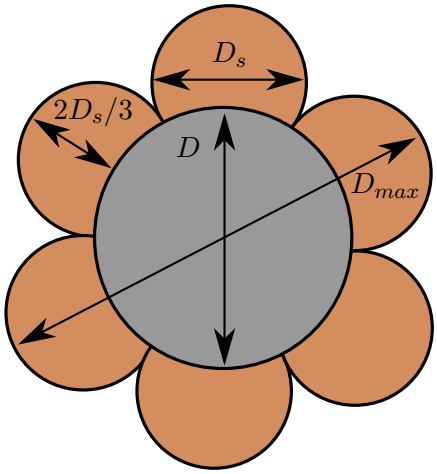


Figure 1: Schematic of the main cylinder (grey) and the marine growth repartition (orange) used for the tests

Two different marine growth have been tested: smooth spheres (figure 3a) and rough spheres (figure 3b). The roughness is obtained by subtracting the volume of small spheres with a diameter of $22mm$, going inside the main sphere by one sixth of their diameters and distributed all around it.

The main cylinder length is $L = 2091mm$. This length enables to have an exact number of spheres distributed all along. The mean depth of the cylinder is $1m$, *i.e.* located in the centre of the tank. The weight of the cylinder (with the mounting equipment) is $19kg$, without spheres. With the spheres, the total weight is then $107kg$.

An hexapod id used to impose motions to the cylinder (figure 3). The cylinder is fixed to the hexapod through a support structure, including three load-cells. Two 6-components load-cells are used on each side of the cylinder and located inside it. One bigger 6-components load-cell is positioned between the support and the hexapod (figure 2).

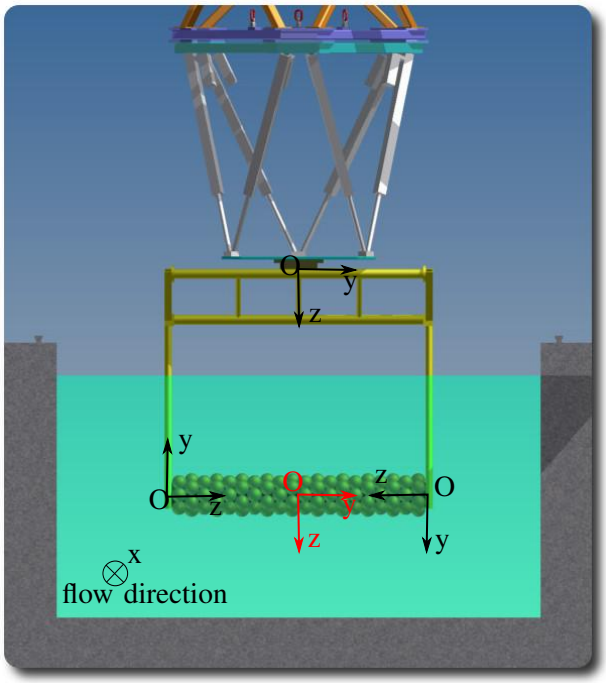
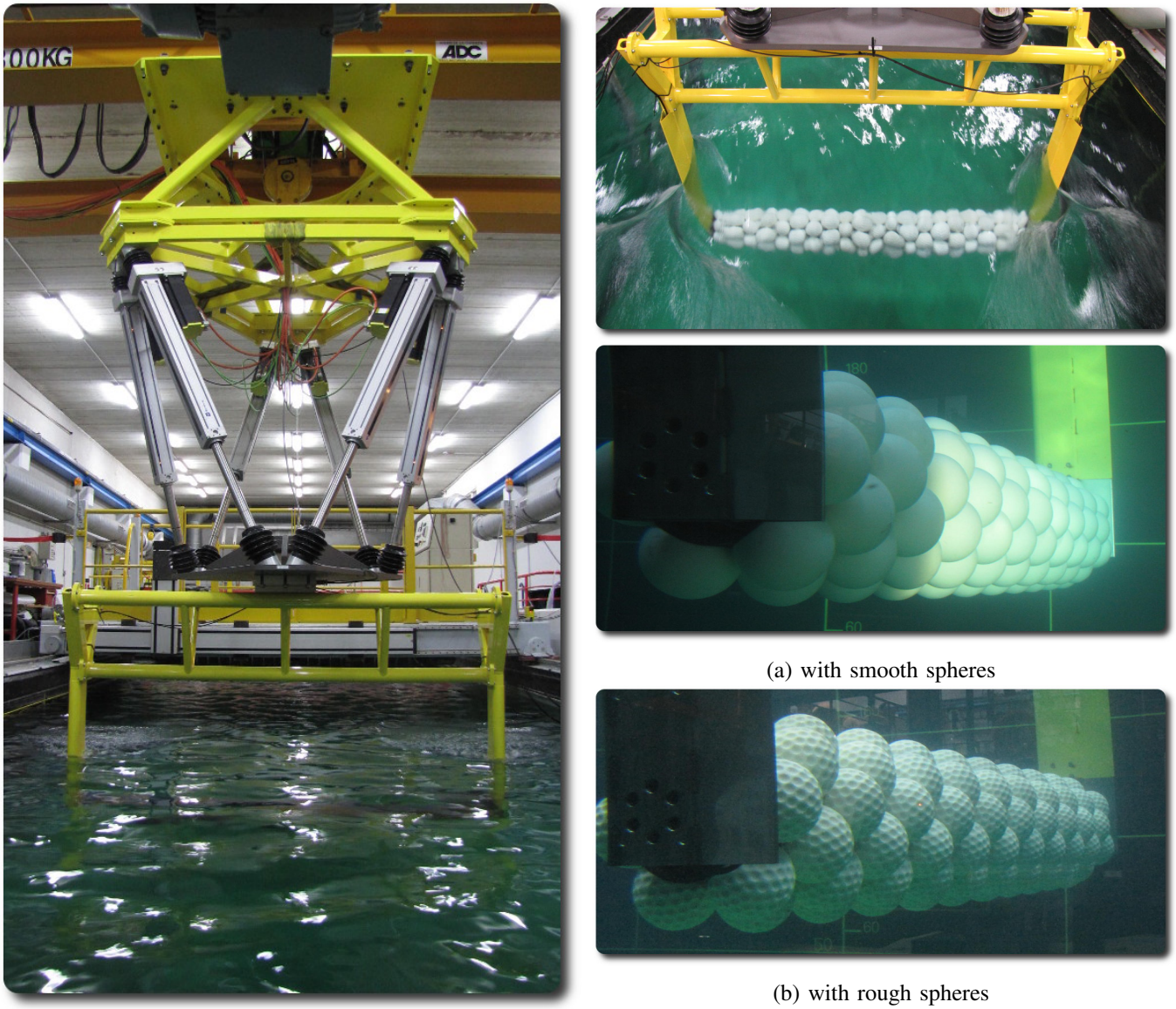


Figure 2: Schematic of the global set-up with axis system for the three load-cells (in black) and the main axis system (in red).

During the tests, the starboard side load-cell inside the cylinder has been damaged. Finally, only the port side (on the right hand side on figure 2) and the top load-cells can be used.

The forces acquisition is recorded in synchronisation with the motions imposed by the hexapod. The acqui-



(a) with smooth spheres

(b) with rough spheres

Figure 3: Experimental set-up in the flume tank of Ifremer at Boulogne-sur-mer

sition time is $100s$ for the pure current cases and 40 oscillation periods for cases with motions. The sample frequency is $f_s = 100Hz$.

Three main testing configurations have been carried out. The first one is the pure current case, with flow velocities between $U = 0.15m/s$ and $U = 1.55m/s$. The second configuration concerns the pure motion case. For these tests, the imposed motions are sine functions with amplitude A_x (for surge) and frequency f. Both are chosen in order to be lower than the maximum loads accepted by the load-cells and lower than the maximum acceleration allowed by the hexapod. Table I gives the different values for A_x and f, for all the tested cases. The corresponding Keulegan-Carpenter number, Reynolds number and β ratio (equation 1) are given as well, with $D = 200mm$.

$$K_C = 2\pi\frac{A_x}{D}, \quad Re = 2\pi\frac{A_x f D}{\nu} \quad \text{and} \quad \beta = \frac{Re}{K_C} \quad (1)$$

For the current and motion cases, the same amplitudes and frequencies of motions have been tested with additional flow velocities of $U = [0.2; 0.4; 0.8]m/s$.

All these three test cases have been performed on the smooth cylinder, the cylinder with smooth balls and the cylinder with rough balls.

Table I: Studied parameters for the motion cases

A_x $[m]$	f $[Hz]$	K_C	$Re/10^4$	β
0.121	0.079	3.8	1.2	3158
0.185	0.052	5.8	1.2	2069
0.248	0.038	7.8	1.2	1538
0.312	0.031	9.8	1.2	1224
0.376	0.025	11.8	1.2	1017
0.439	0.022	13.8	1.2	870
0.121	0.316	3.8	4.8	12632
0.185	0.207	5.8	4.8	8276
0.248	0.154	7.8	4.8	6154
0.312	0.122	9.8	4.8	4898
0.376	0.102	11.8	4.8	4068
0.439	0.087	13.8	4.8	3478
0.121	0.553	3.8	8.4	22105
0.185	0.362	5.8	8.4	14483
0.248	0.269	7.8	8.4	10769
0.312	0.214	9.8	8.4	8571
0.376	0.178	11.8	8.4	7119
0.439	0.152	13.8	8.4	6087
0.121	0.789	3.8	12.0	31579
0.185	0.517	5.8	12.0	20690
0.248	0.385	7.8	12.0	15385
0.312	0.306	9.8	12.0	12245
0.376	0.254	11.8	12.0	10169
0.439	0.217	13.8	12.0	8696
0.175	0.709	5.5	15.6	28364
0.229	0.542	7.2	15.6	21667
0.283	0.438	8.9	15.6	17528
0.337	0.368	10.6	15.6	14717
0.392	0.317	12.3	15.6	12683
0.446	0.279	14.0	15.6	11143
0.286	0.533	9.0	19.2	21333
0.318	0.480	10.0	19.2	19200
0.350	0.436	11.0	19.2	17455
0.382	0.400	12.0	19.2	16000
0.414	0.369	13.0	19.2	14769
0.446	0.343	14.0	19.2	13714

II. INFORMATIONS ON THE FILES

The raw data are recorded in ASCII files (`.txt` extension). For pure current cases, one file is provided for a given configuration, named `runXXX.txt`. For pure motion and current + motion tests, two files are provided: one for the forces of the load-cells, named `runXXX.txt`, and another one for the motions of the hexapod, named `motionXXX.txt`.

The content of the forces files is constituted of 18 columns including:

- 6 columns for the port side load-cell with F_x, F_y and F_z the three forces expressed in N and M_x, M_y and M_z the three moments expressed in $N.m$. The axis system is the one shown on figure 2.
- 6 columns for the starboard side load-cell with the same components. Note that this load-cell has been broken during the tests. We advice not to use the data coming from this load-cell.
- 6 columns for the top load-cell with the same components and expressed with the same units.

The content of the hexapod files are constituted of 7 columns including:

- the time,
- the 3 translations, expressed in mm and given in the main axis system (shown in red on figure 2),
- the 3 rotations, expressed in deg and given in the same axis system.

The following pages sum up all the provided files and give their corresponding name and testing configuration, for each test.

pure current

smooth cylinder

U [m/s]	name
0.00	zero01
0.20	run001
0.40	run002
0.60	run003
0.80	run004
1.00	run005
1.10	run006
1.20	run007
1.30	run008
0.00	zero02
0.00	zero03
0.20	run009
0.30	run010
0.40	run011
0.50	run012
0.60	run013
0.70	run014
0.80	run015
0.90	run016
1.00	run017
1.10	run018
1.20	run019
1.30	run020
1.40	run021
1.50	run022
0.00	zero04
0.00	zero05
1.55	run023
1.45	run024
1.35	run025
1.25	run026
1.15	run027
1.05	run028
0.95	run029
0.85	run030
0.75	run031
0.65	run032
0.55	run033
0.45	run034
0.35	run035
0.25	run036
0.15	run037
0.00	zero06

with smooth balls

U [m/s]	name
0.00	zero23
0.20	run107
0.40	run108
0.60	run109
0.80	run110
1.00	run111
1.10	run112
1.20	run113
1.30	run114
0.00	zero24
0.00	zero25
0.20	run115
0.30	run116
0.40	run117
0.50	run118
0.60	run119
0.70	run120
0.80	run121
0.90	run122
1.00	run123
1.10	run124
1.20	run125
1.30	run126
1.40	run127
1.50	run128
1.40	run129
1.30	run130
1.20	run131
1.10	run132
1.00	run133
0.90	run134
0.80	run135
0.70	run136
0.60	run137
0.50	run138
0.40	run139
0.30	run140
0.20	run141
0.00	zero26
0.00	zero27
1.55	run142
1.45	run143
1.35	run144
1.25	run145

with rough balls

U [m/s]	name
0.00	zero35
0.20	run201
0.40	run202
0.60	run203
0.80	run204
1.00	run205
1.10	run206
1.20	run207
1.30	run208
0.00	zero36
0.00	zero37
0.20	run209
0.30	run210
0.40	run211
0.50	run212
0.60	run213
0.70	run214
0.80	run215
0.90	run216
1.00	run217
1.10	run218
1.20	run219
1.30	run220
1.40	run221
1.50	run222
1.40	run223
1.30	run224
1.20	run225
1.10	run226
1.00	run227
0.90	run228
0.80	run229
0.70	run230
0.60	run231
0.50	run232
0.40	run233
0.30	run234
0.20	run235
0.00	zero38
0.00	zero39
1.55	run236
1.45	run237
1.35	run238
1.25	run239

pure current

1.15	run146	1.15	run240
1.05	run147	1.05	run241
0.95	run148	0.95	run242
0.85	run149	0.85	run243
0.75	run150	0.75	run244
0.65	run151	0.65	run245
0.55	run152	0.55	run246
0.45	run153	0.45	run247
0.35	run154	0.35	run248
0.25	run155	0.25	run249
0.15	run156	0.15	run250
0.00	zero28	0.00	zero40
0.00	zero29	0.00	zero41
0.15	run157	0.15	run251
0.25	run158	0.25	run252
0.35	run159	0.35	run253
0.45	run160	0.45	run254
0.55	run161	0.55	run255
0.65	run162	0.65	run256
0.75	run163	0.75	run257
0.85	run164	0.85	run258
0.95	run165	0.95	run259
1.05	run166	1.05	run260
1.15	run167	1.15	run261
1.25	run168	1.25	run262
1.35	run169	1.35	run263
1.45	run170	1.45	run264
1.55	run171	1.55	run265
0.00	zero30	0.00	zero42

pure translations

smooth cylinder

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero65	0	0.000	
0.00	run506	121	0.079	surge
0.00	run507	185	0.052	surge
0.00	run508	248	0.038	surge
0.00	run509	312	0.031	surge
0.00	run510	376	0.025	surge
0.00	run511	439	0.022	surge
0.00	run512	121	0.316	surge
0.00	run513	185	0.207	surge
0.00	run514	248	0.154	surge
0.00	run515	312	0.122	surge
0.00	run516	376	0.102	surge
0.00	run517	439	0.087	surge
0.00	run518	121	0.553	surge
0.00	run519	185	0.362	surge
0.00	run520	248	0.269	surge
0.00	run521	312	0.214	surge
0.00	run522	376	0.178	surge
0.00	run523	439	0.152	surge
0.00	run524	121	0.789	surge
0.00	run525	185	0.517	surge
0.00	run526	248	0.385	surge
0.00	run527	312	0.306	surge
0.00	run528	376	0.254	surge
0.00	run529	439	0.217	surge
0.00	run530	175	0.709	surge
0.00	run531	229	0.542	surge
0.00	run532	283	0.438	surge
0.00	run533	337	0.368	surge
0.00	run534	392	0.317	surge
0.00	run535	446	0.279	surge
0.00	run536	286	0.533	surge
0.00	run537	318	0.480	surge
0.00	run538	350	0.436	surge
0.00	run539	382	0.400	surge
0.00	run540	414	0.369	surge
0.00	run541	446	0.343	surge
0.00	zero66	0	0.000	

pure translations

with smooth balls

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero77	0	0.000	
0.00	run642	121	0.079	surge
0.00	run643	185	0.052	surge
0.00	run644	248	0.038	surge
0.00	run645	312	0.031	surge
0.00	run646	376	0.025	surge
0.00	run647	439	0.022	surge
0.00	run648	121	0.316	surge
0.00	run649	185	0.207	surge
0.00	run650	248	0.154	surge
0.00	run651	312	0.122	surge
0.00	run652	376	0.102	surge
0.00	run653	439	0.087	surge
0.00	run654	121	0.553	surge
0.00	run655	185	0.362	surge
0.00	run656	248	0.269	surge
0.00	run657	312	0.214	surge
0.00	run658	376	0.178	surge
0.00	run659	439	0.152	surge
0.00	run660	121	0.789	surge
0.00	run661	185	0.517	surge
0.00	run662	248	0.385	surge
0.00	run663	312	0.306	surge
0.00	run664	376	0.254	surge
0.00	run665	439	0.217	surge
0.00	run666	175	0.709	surge
0.00	run667	229	0.542	surge
0.00	run668	283	0.438	surge
0.00	run669	337	0.368	surge
0.00	run670	392	0.317	surge
0.00	run671	446	0.279	surge
0.00	run672	286	0.533	surge
0.00	run673	318	0.480	surge
0.00	run674	350	0.436	surge
0.00	run675	382	0.400	surge
0.00	run676	414	0.369	surge
0.00	run677	446	0.343	surge
0.00	zero78	0	0.000	

pure translations

with rough balls

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero43	0	0.000	
0.00	run266	121	0.079	surge
0.00	run267	185	0.052	surge
0.00	run268	248	0.038	surge
0.00	run269	312	0.031	surge
0.00	run270	376	0.025	surge
0.00	run271	439	0.022	surge
0.00	zero44	0	0.000	
0.00	zero45	0	0.000	
0.00	run272	121	0.316	surge
0.00	run273	185	0.207	surge
0.00	run274	248	0.154	surge
0.00	run275	312	0.122	surge
0.00	run276	376	0.102	surge
0.00	run277	439	0.087	surge
0.00	zero46	0	0.000	
0.00	zero47	0	0.000	
0.00	run278	121	0.553	surge
0.00	run279	185	0.362	surge
0.00	run280	248	0.690	surge
0.00	run281	312	0.214	surge
0.00	run282	376	0.178	surge
0.00	run283	439	0.152	surge
0.00	run284	121	0.789	surge
0.00	run285	185	0.517	surge
0.00	run286	248	0.385	surge
0.00	run287	312	0.306	surge
0.00	run288	376	0.254	surge
0.00	run289	439	0.217	surge
0.00	zero48	0	0.000	
0.00	zero49	0	0.000	
0.00	run290	175	0.709	surge
0.00	run291	229	0.542	surge
0.00	run292	283	0.438	surge
0.00	run293	337	0.368	surge
0.00	run294	392	0.317	surge
0.00	run295	446	0.279	surge
0.00	run296	286	0.533	surge
0.00	run297	318	0.480	surge
0.00	run298	350	0.436	surge
0.00	run299	382	0.400	surge
0.00	run300	414	0.369	surge
0.00	run301	446	0.343	surge
0.00	zero50	0	0.000	

current + translations

smooth cylinder

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero63	0	0.000	
0.20	run488	121	0.789	surge
0.20	run489	185	0.517	surge
0.20	run490	248	0.385	surge
0.20	run491	312	0.306	surge
0.20	run492	376	0.254	surge
0.20	run493	439	0.217	surge
0.20	run494	175	0.709	surge
0.20	run495	229	0.542	surge
0.20	run496	283	0.438	surge
0.20	run497	337	0.368	surge
0.20	run498	392	0.317	surge
0.20	run499	446	0.279	surge
0.20	run500	286	0.533	surge
0.20	run501	318	0.480	surge
0.20	run502	350	0.436	surge
0.20	run503	382	0.400	surge
0.20	run504	414	0.369	surge
0.20	run505	446	0.343	surge
0.00	zero64	0	0.000	
0.00	zero61	0	0.000	
0.40	run452	121	0.079	surge
0.40	run453	185	0.052	surge
0.40	run454	248	0.038	surge
0.40	run455	312	0.031	surge
0.40	run456	376	0.025	surge
0.40	run457	439	0.022	surge
0.40	run458	121	0.316	surge
0.40	run459	185	0.207	surge
0.40	run460	248	0.154	surge
0.40	run461	312	0.122	surge
0.40	run462	376	0.102	surge
0.40	run463	439	0.087	surge
0.40	run464	121	0.553	surge
0.40	run465	185	0.362	surge
0.40	run466	248	0.690	surge
0.40	run467	312	0.214	surge
0.40	run468	376	0.178	surge
0.40	run469	439	0.152	surge
0.40	run470	121	0.789	surge
0.40	run471	185	0.517	surge
0.40	run472	248	0.385	surge
0.40	run473	312	0.306	surge
0.40	run474	376	0.254	surge

0.40	run475	439	0.217	surge
0.40	run476	175	0.709	surge
0.40	run477	229	0.542	surge
0.40	run478	283	0.438	surge
0.40	run479	337	0.368	surge
0.40	run480	392	0.317	surge
0.40	run481	446	0.279	surge
0.40	run482	286	0.533	surge
0.40	run483	318	0.480	surge
0.40	run484	350	0.436	surge
0.40	run485	382	0.400	surge
0.40	run486	414	0.369	surge
0.40	run487	446	0.343	surge
0.00	zero62	0	0.000	
0.00	zero59	0	0.000	
0.80	run416	121	0.079	surge
0.80	run417	185	0.052	surge
0.80	run418	248	0.038	surge
0.80	run419	312	0.031	surge
0.80	run420	376	0.025	surge
0.80	run421	439	0.022	surge
0.80	run422	121	0.316	surge
0.80	run423	185	0.207	surge
0.80	run424	248	0.154	surge
0.80	run425	312	0.122	surge
0.80	run426	376	0.102	surge
0.80	run427	439	0.087	surge
0.80	run428	121	0.553	surge
0.80	run429	185	0.362	surge
0.80	run430	248	0.269	surge
0.80	run431	312	0.214	surge
0.80	run432	376	0.178	surge
0.80	run433	439	0.152	surge
0.80	run434	121	0.789	surge
0.80	run435	185	0.517	surge
0.80	run436	248	0.385	surge
0.80	run437	312	0.306	surge
0.80	run438	376	0.254	surge
0.80	run439	439	0.217	surge
0.80	run440	175	0.709	surge
0.80	run441	229	0.542	surge
0.80	run442	283	0.438	surge
0.80	run443	337	0.368	surge
0.80	run444	392	0.317	surge
0.80	run445	446	0.279	surge
0.80	run446	286	0.533	surge

0.80	run447	318	0.480	surge
0.80	run448	350	0.436	surge
0.80	run449	382	0.400	surge
0.80	run450	414	0.369	surge
0.80	run451	446	0.343	surge
0.00	zero60	0	0.000	

current + translations

with smooth balls

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero71	0	0.000	
0.20	run578	121	0.789	surge
0.20	run579	185	0.517	surge
0.20	run580	248	0.385	surge
0.20	run581	312	0.306	surge
0.20	run582	376	0.254	surge
0.20	run583	439	0.217	surge
0.20	run584	175	0.709	surge
0.20	run585	229	0.542	surge
0.20	run586	283	0.438	surge
0.20	run587	337	0.368	surge
0.20	run588	392	0.317	surge
0.20	run589	446	0.279	surge
0.20	run590	286	0.533	surge
0.20	run591	318	0.480	surge
0.20	run592	350	0.436	surge
0.20	run593	382	0.400	surge
0.20	run594	414	0.369	surge
0.20	run595	446	0.343	surge
0.00	zero72	0	0.000	
0.00	zero73	0	0.000	
0.40	run596	121	0.079	surge
0.40	run597	185	0.052	surge
0.40	run598	248	0.038	surge
0.40	run599	312	0.031	surge
0.40	run600	376	0.025	surge
0.40	run601	439	0.022	surge
0.40	run602	121	0.316	surge
0.40	run603	185	0.207	surge
0.40	run604	248	0.154	surge
0.40	run605	312	0.122	surge
0.40	run606	376	0.102	surge
0.40	run607	439	0.087	surge
0.40	run608	121	0.553	surge
0.40	run609	185	0.362	surge
0.40	run610	248	0.269	surge
0.40	run611	312	0.214	surge
0.40	run612	376	0.178	surge
0.40	run613	439	0.152	surge
0.40	run614	121	0.789	surge
0.40	run615	185	0.517	surge
0.40	run616	248	0.385	surge
0.40	run617	312	0.306	surge
0.40	run618	376	0.254	surge

0.40	run619	439	0.217	surge
0.40	run620	175	0.709	surge
0.40	run621	229	0.542	surge
0.40	run622	283	0.438	surge
0.40	run623	337	0.368	surge
0.40	run624	392	0.317	surge
0.40	run625	446	0.279	surge
0.40	run626	286	0.533	surge
0.40	run627	318	0.480	surge
0.40	run628	350	0.436	surge
0.40	run629	382	0.400	surge
0.40	run630	414	0.369	surge
0.40	run631	446	0.343	surge
0.00	zero74	0	0.000	
0.00	zero67	0	0.000	
0.80	run542	121	0.079	surge
0.80	run543	185	0.052	surge
0.80	run544	248	0.038	surge
0.80	run545	312	0.031	surge
0.80	run546	376	0.025	surge
0.80	run547	439	0.022	surge
0.80	run548	121	0.316	surge
0.80	run549	185	0.207	surge
0.80	run550	248	0.154	surge
0.80	run551	312	0.122	surge
0.80	run552	376	0.102	surge
0.80	run553	439	0.087	surge
0.00	zero68	0	0.000	
0.00	zero69	0	0.000	
0.80	run554	121	0.553	surge
0.80	run555	185	0.362	surge
0.80	run556	248	0.269	surge
0.80	run557	312	0.214	surge
0.80	run558	376	0.178	surge
0.80	run559	439	0.152	surge
0.80	run560	121	0.789	surge
0.80	run561	185	0.517	surge
0.80	run562	248	0.385	surge
0.80	run563	312	0.306	surge
0.80	run564	376	0.254	surge
0.80	run565	439	0.217	surge
0.80	run566	175	0.709	surge
0.80	run567	229	0.542	surge
0.80	run568	283	0.438	surge
0.80	run569	337	0.368	surge
0.80	run570	392	0.317	surge

0.80	run571	446	0.279	surge
0.80	run572	286	0.533	surge
0.80	run573	318	0.480	surge
0.80	run574	350	0.436	surge
0.80	run575	382	0.400	surge
0.80	run576	414	0.369	surge
0.80	run577	446	0.343	surge
0.00	zero70	0	0.000	

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero75	0	0.000	
0.40	run632	121	0.553	heave
0.40	run633	185	0.362	heave
0.40	run634	248	0.269	heave
0.40	run635	312	0.214	heave
0.40	run636	376	0.178	heave
0.80	run637	121	0.553	heave
0.80	run638	185	0.362	heave
0.80	run639	248	0.269	heave
0.80	run640	312	0.214	heave
0.80	run641	376	0.178	heave
0.00	zero76	0	0.000	

current + translations

with rough balls

U [m/s]	name	A [mm]	f [Hz]	translation
0.00	zero57	0	0.000	
0.20	run398	175	0.709	surge
0.20	run399	229	0.542	surge
0.20	run400	283	0.438	surge
0.20	run401	337	0.368	surge
0.20	run402	392	0.317	surge
0.20	run403	446	0.279	surge
0.20	run404	286	0.533	surge
0.20	run405	318	0.480	surge
0.20	run406	350	0.436	surge
0.20	run407	382	0.400	surge
0.20	run408	414	0.369	surge
0.20	run409	446	0.343	surge
0.20	run410	121	0.789	surge
0.20	run411	185	0.517	surge
0.20	run412	248	0.385	surge
0.20	run413	312	0.306	surge
0.20	run414	376	0.254	surge
0.20	run415	439	0.217	surge
0.00	zero58	0	0.000	
0.00	zero51	0	0.000	
0.40	run302	121	0.316	surge
0.40	run303	185	0.207	surge
0.40	run304	248	0.154	surge
0.40	run305	312	0.122	surge
0.40	run306	376	0.102	surge
0.40	run307	439	0.087	surge
0.40	run308	121	0.553	surge
0.40	run309	185	0.362	surge
0.40	run310	248	0.690	surge
0.40	run311	312	0.214	surge
0.40	run312	376	0.178	surge
0.40	run313	439	0.152	surge
0.40	run314	121	0.789	surge
0.40	run315	185	0.517	surge
0.40	run316	248	0.385	surge
0.40	run317	312	0.306	surge
0.40	run318	376	0.254	surge
0.40	run319	439	0.217	surge
0.40	run320	175	0.709	surge
0.40	run321	229	0.542	surge
0.40	run322	283	0.438	surge
0.40	run323	337	0.368	surge
0.40	run324	392	0.317	surge

0.40	run325	446	0.279	surge
0.40	run326	286	0.533	surge
0.40	run327	318	0.480	surge
0.40	run328	350	0.436	surge
0.40	run329	382	0.400	surge
0.40	run330	414	0.369	surge
0.40	run331	446	0.343	surge
0.00	zero52	0	0.000	
0.00	zero55	0	0.000	
0.80	run362	121	0.079	surge
0.80	run363	185	0.052	surge
0.80	run364	248	0.038	surge
0.80	run365	312	0.031	surge
0.80	run366	376	0.025	surge
0.80	run367	439	0.022	surge
0.80	run368	121	0.316	surge
0.80	run369	185	0.207	surge
0.80	run370	248	0.154	surge
0.80	run371	312	0.122	surge
0.80	run372	376	0.102	surge
0.80	run373	439	0.087	surge
0.80	run374	121	0.553	surge
0.80	run375	185	0.362	surge
0.80	run376	248	0.690	surge
0.80	run377	312	0.214	surge
0.80	run378	376	0.178	surge
0.80	run379	439	0.152	surge
0.80	run380	121	0.789	surge
0.80	run381	185	0.517	surge
0.80	run382	248	0.385	surge
0.80	run383	312	0.306	surge
0.80	run384	376	0.254	surge
0.80	run385	439	0.217	surge
0.80	run386	175	0.709	surge
0.80	run387	229	0.542	surge
0.80	run388	283	0.438	surge
0.80	run389	337	0.368	surge
0.80	run390	392	0.317	surge
0.80	run391	446	0.279	surge
0.80	run392	286	0.533	surge
0.80	run393	318	0.480	surge
0.80	run394	350	0.436	surge
0.80	run395	382	0.400	surge
0.80	run396	414	0.369	surge
0.80	run397	446	0.343	surge
0.00	zero56	0	0.000	

support blank

U [m/s]	name
0.00	zero31
0.15	run172
0.25	run173
0.35	run174
0.45	run175
0.55	run176
0.65	run177
0.75	run178
0.85	run179
0.95	run180
1.05	run181
1.15	run182
1.25	run183
1.35	run184
1.45	run185
1.55	run186
0.00	zero32
0.00	zero33
1.50	run187
1.40	run188
1.30	run189
1.20	run190
1.10	run191
1.00	run192
0.90	run193
0.80	run194
0.70	run195
0.60	run196
0.50	run197
0.40	run198
0.30	run199
0.20	run200
0.00	zero34