



BETTER SHIPS, BLUE OCEANS

Stabiliteit boomkorkotters 2024

RvBB

- Onderzoek naar aanleiding van kapseizen
 - UK-165 'Lummetje'
 - UK-171 'Spes Salutis'
- Onderzoek uitgevoerd door Conoship in 2022
 - Conclusie: asymmetrische beladingscondities zijn risicovol
 - Voorstel voor extra conditie die moet voldoen aan de stabiliteitscriteria
 - Aanbeveling om de dynamica verder te onderzoeken
- Modeltesten: doel dynamica van het kapseizen in asymmetrische beladingstoestanden

- PRE-Simulaties
 - Digitaal model, berekeningen in tijdsdomein.
 - Bepalen modeltestcondities
- Modeltesten
 - Fysiek model
 - Geometrie van model en gewichtsverdeling gemodelleerd voor verschillende beladingscondities
 - Omgevingscondities (Wind/Golven/Kracht op de bomen)

- Verbetering simulaties
 - Tunen met model testen
- Brugsimulator
 - training

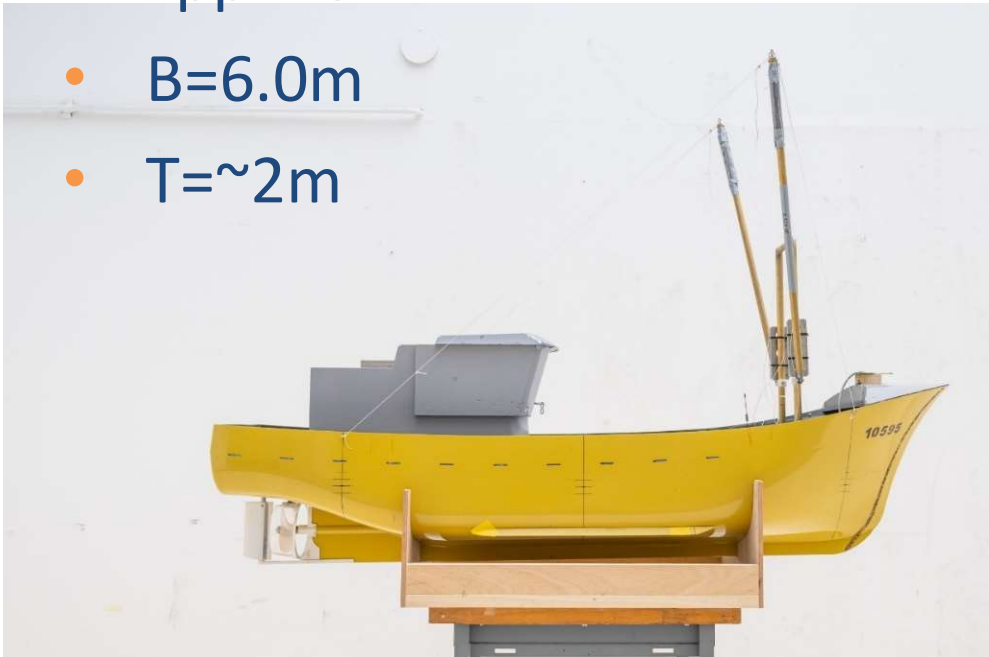
Selected model – Conoship report



Vessel Particulars		EuroCutter 20m	EuroCutter 20m HG	EuroCutter 20m DE	EuroCutter 24m v1	EuroCutter 24m v2	Cutter 35m	Cutter 2000hp	Cutter 2000hp LG	Cutter 44m 2975hp
Parameter	Unit				Open aft deck	Closed aft deck				
Length over all	[m]	19.99	19.99	19.99	23.10	23.97	37.15	42.90	42.90	44.60
Length between perpendiculars	[m]	17.81	17.81	17.81	20.40	21.09	32.86	38.10	38.10	39.10
Breadth moulded	[m]	5.80	5.80	5.80	6.20	6.85	8.50	8.50	8.50	9.00
Depth moulded (at 1/2 L)	[m]	2.60	2.60	2.60	2.71	3.65	4.70	5.30	5.30	5.10
Dimensions of fishing equipment										
Height of hauling point of catch (from base)	[m]	9.89	9.89	9.89	9.40	10.89	13.90	14.75	14.75	15.32
Height of rotation point of derrick (from base)	[m]	4.98	4.98	4.98	5.30	6.12	7.70	8.35	8.35	7.78
Breadth of rotation point of derrick (from CL)	[m]	0.40	0.40	0.40	1.15	2.10	2.50	2.40	2.40	2.70
Length of derrick	[m]	9.50	9.50	10.50	8.50	8.70	12.80	13.30	13.30	14.50
COG of derrick to length ratio	[%]	70%	70%	70%	70%	70%	70%	70%	70%	70%
Store position of derrick	[deg]	80	80	80	80	80	80	80	80	80
Weight of one derrick	[t]	0.78	0.78	0.83	1.77	1.77	2.60	4.29	4.29	5.04
Weight of beam trawl gear (one side)	[t]	1.35	1.95	1.55	1.75	2.30	5.00	8.50	6.00	9.50
VCG of beam trawl gear in store position	[m]	3.20	3.20	3.20	3.25	4.00	5.50	6.20	6.20	5.85
TCG of Beam trawl gear in store position	[m]	2.40	2.40	2.40	2.50	2.75	3.30	3.60	3.60	3.85
Weight of stern trawl gear	[t]	0.95	0.95	0.95	2.70	5.30	0.00	0.00	0.00	0.00
VCG of stern trawl gear	[m]	4.90	4.90	4.90	4.56	7.00	0.00	0.00	0.00	0.00
Height at safety release acting point	[m]	5.55	5.55	5.55	5.80	6.20	8.60	9.30	9.30	8.10
Breadth at safety release acting point	[m]	2.72	2.72	2.72	2.90	3.15	4.21	4.10	4.10	4.50
Details of basic loading condition										
Base loading condition		FISHING 100% Catch, 50% Consumables (Derricks in store position)								
Displacement	[t]	111.280	111.880	111.480	172.228	257.855	591.064	721.135	718.635	831.860
VCG'	[m]	2.550	2.553	2.551	2.498	2.843	3.679	3.900	3.892	3.680
TCG'	[m]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GM'	[m]	0.618	0.618	0.618	0.830	0.725	0.621	0.634	0.634	0.736
Maximum GZ value	[m]	0.262	0.262	0.262	0.249	0.247	0.314	0.360	0.360	0.400
Top of GZ curve at (approx.)	[deg]	25	25	25	20	30	35	40	40	35

MODEL

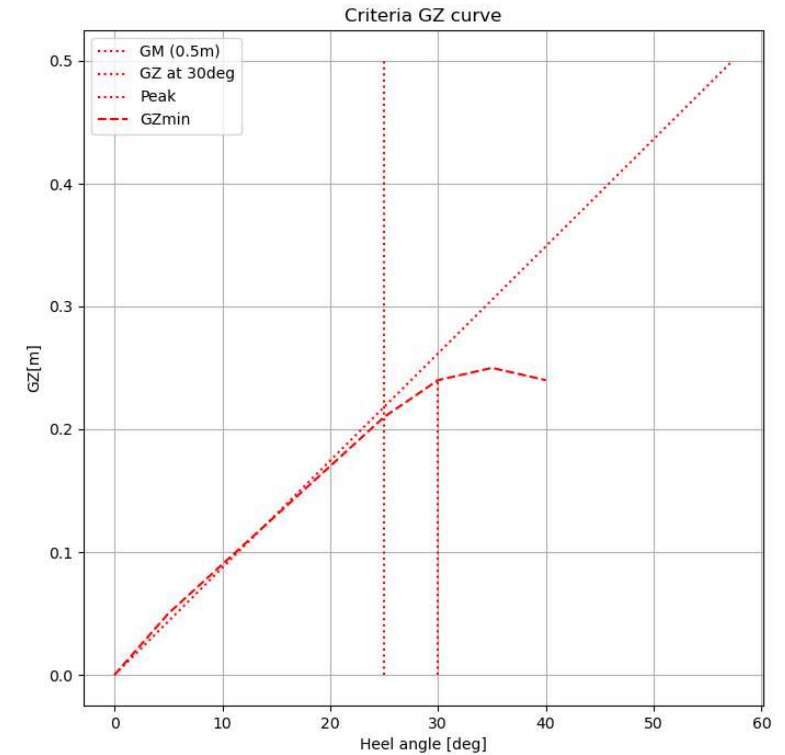
- $L_{pp}=20.1\text{m}$
- $B=6.0\text{m}$
- $T\sim 2\text{m}$



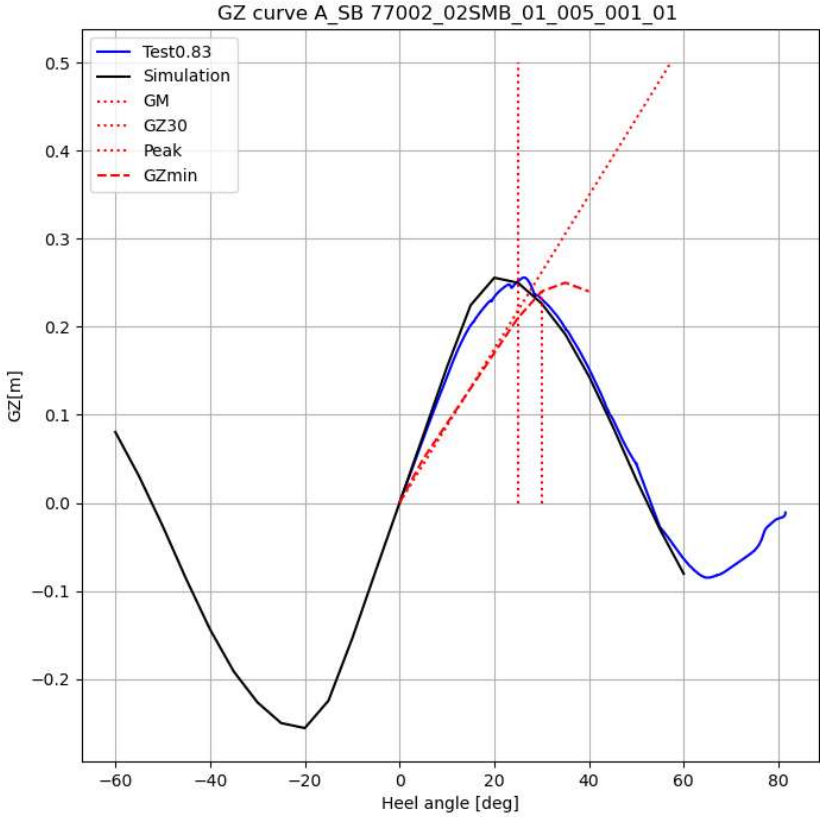
- Displacement $\sim 150\text{ t}$

GZ criteria

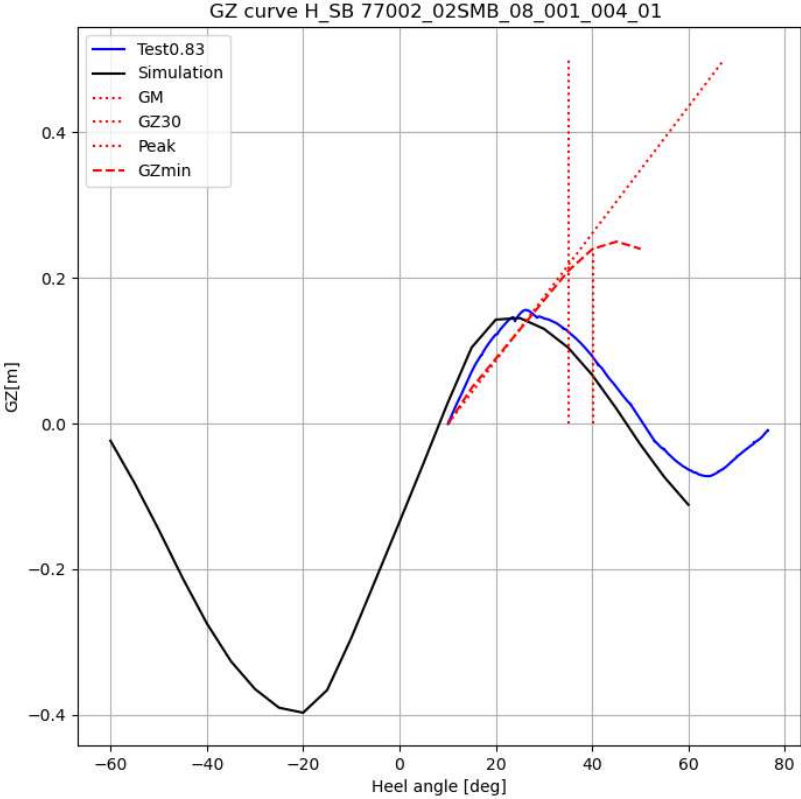
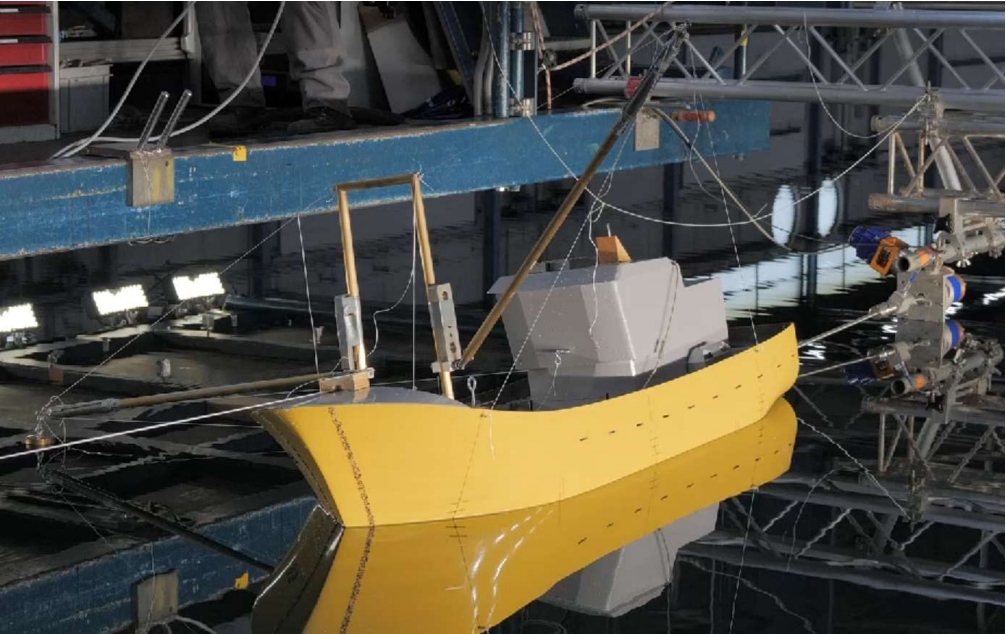
Criteria	Value	Unit
1. GM	0.5	m
2. Righting arm at 30° angle of heel	0.24	m
3. Area under righting lever curve up to 30° angle of heel	0.066	m*rad
4. Area under righting lever curve up to 40° angle of heel	0.108	m*rad
5. Area under righting lever curve between 30° and 40° angle of heel	0.036	m*rad
6. Angle of maximum righting arm should	25(30)	deg



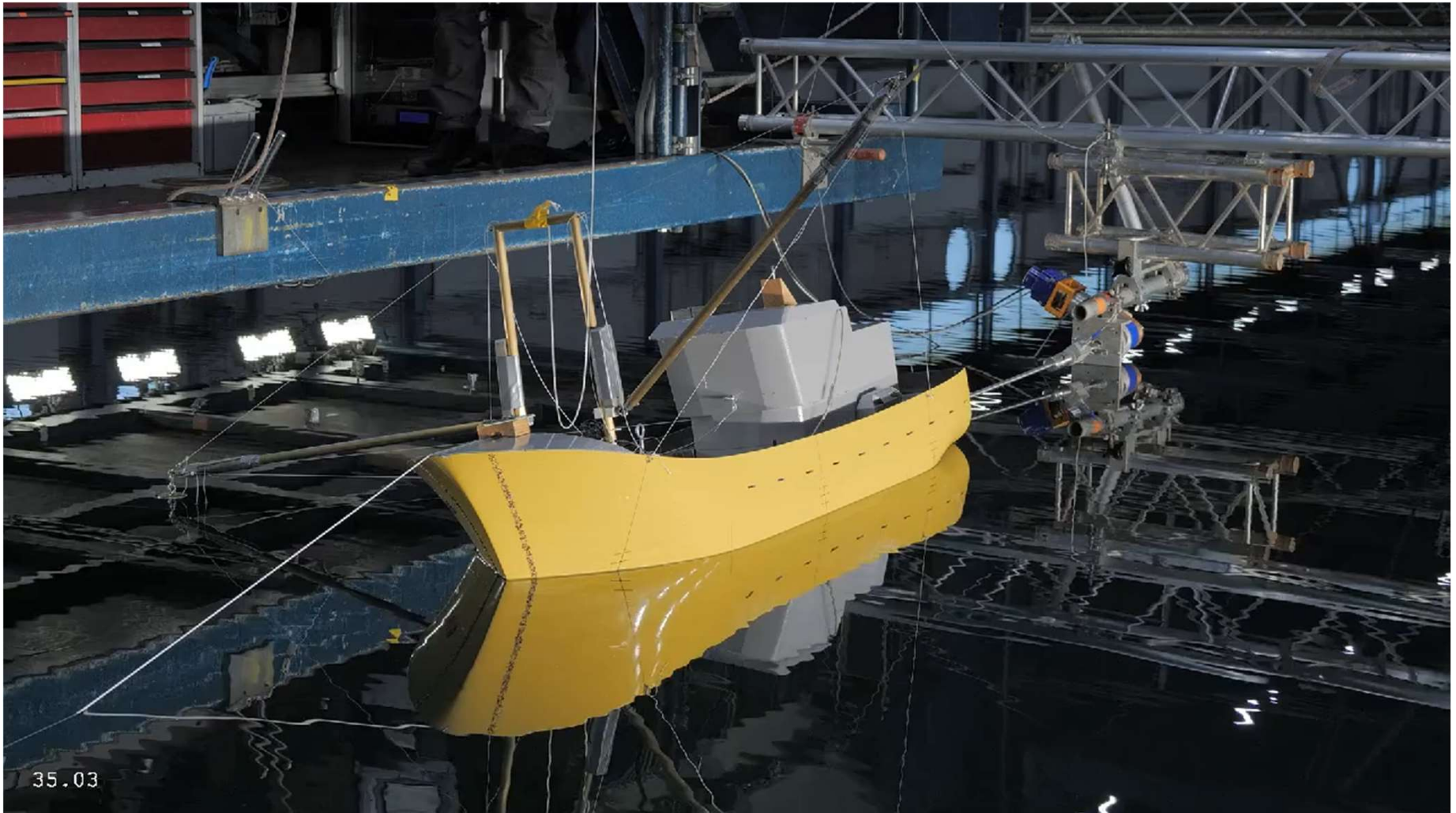
GZ - symmetric



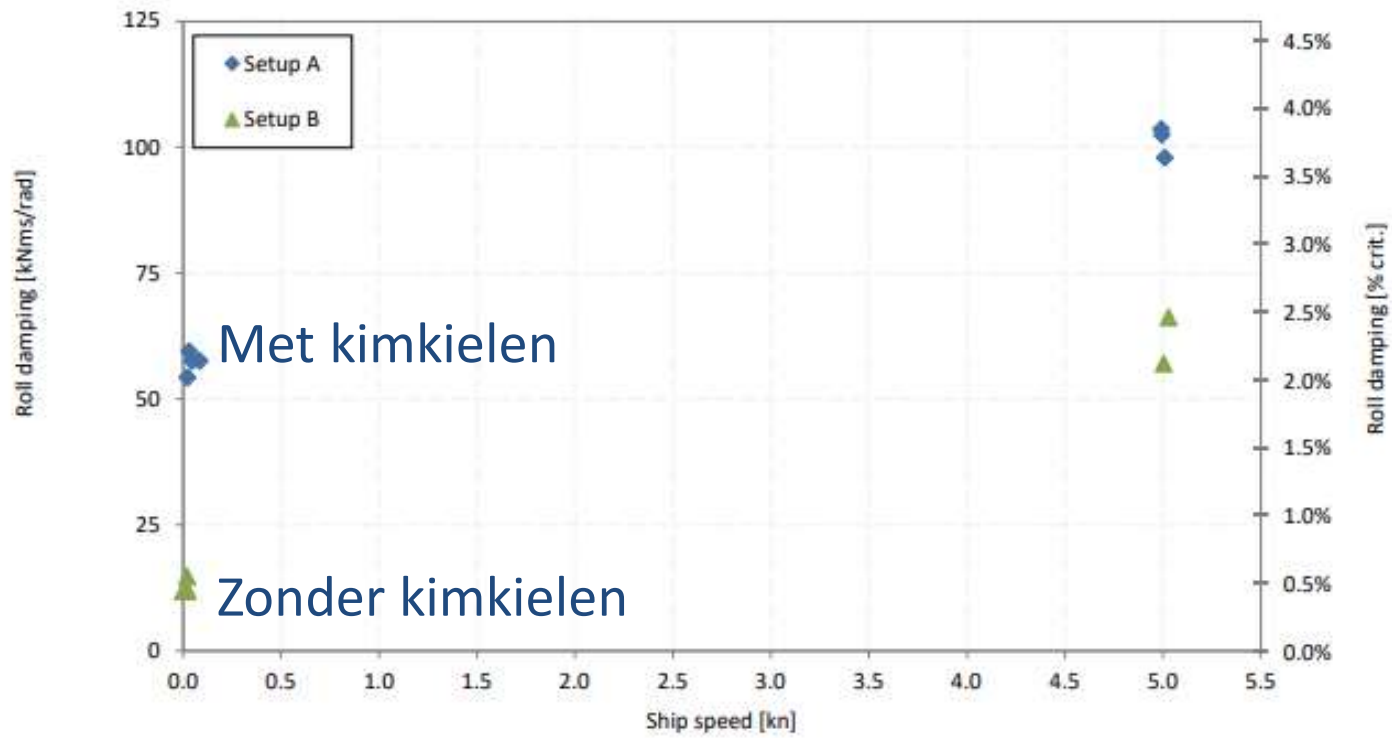
GZ – asymmetric – Condition H



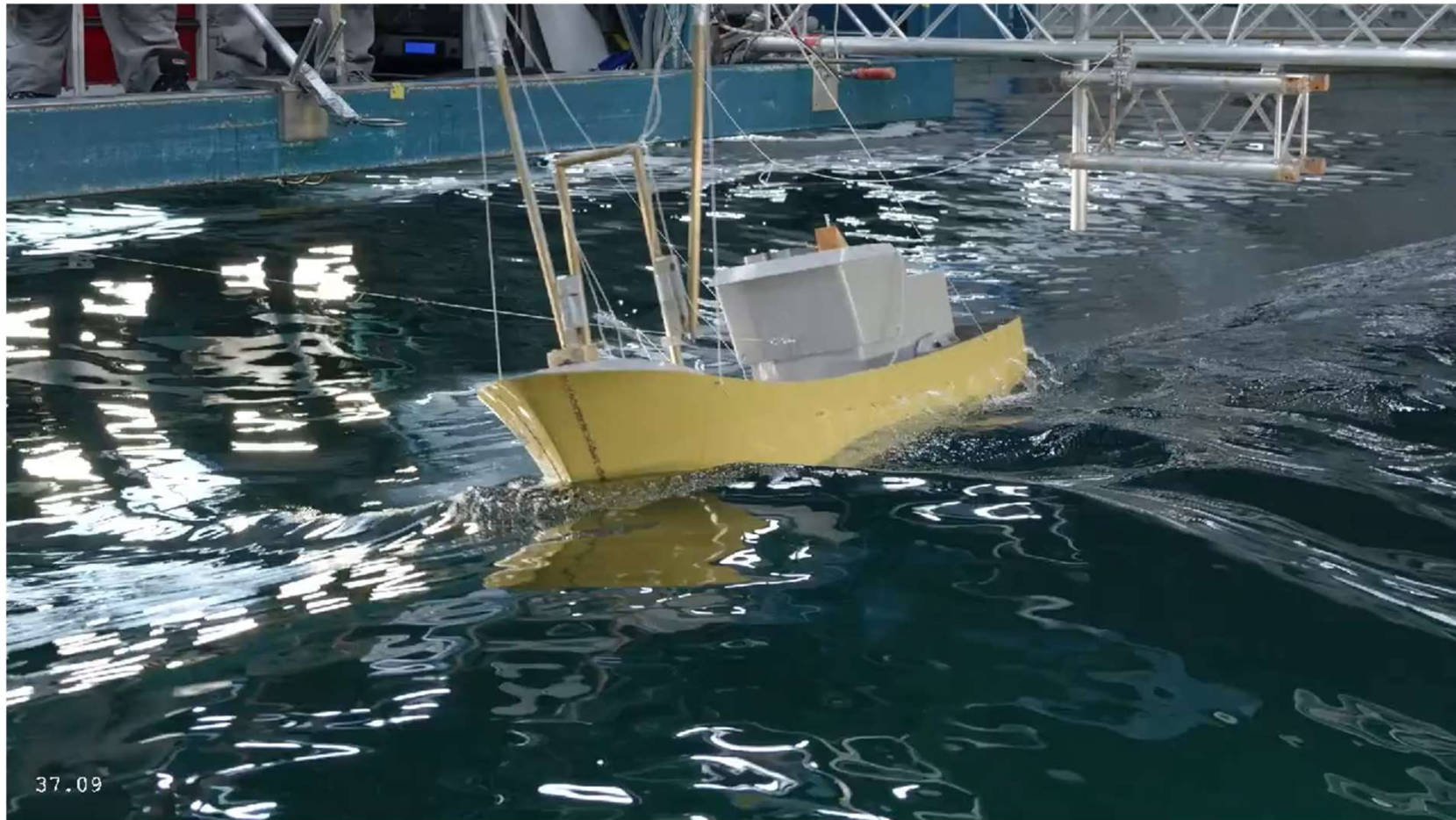
GZ meeting



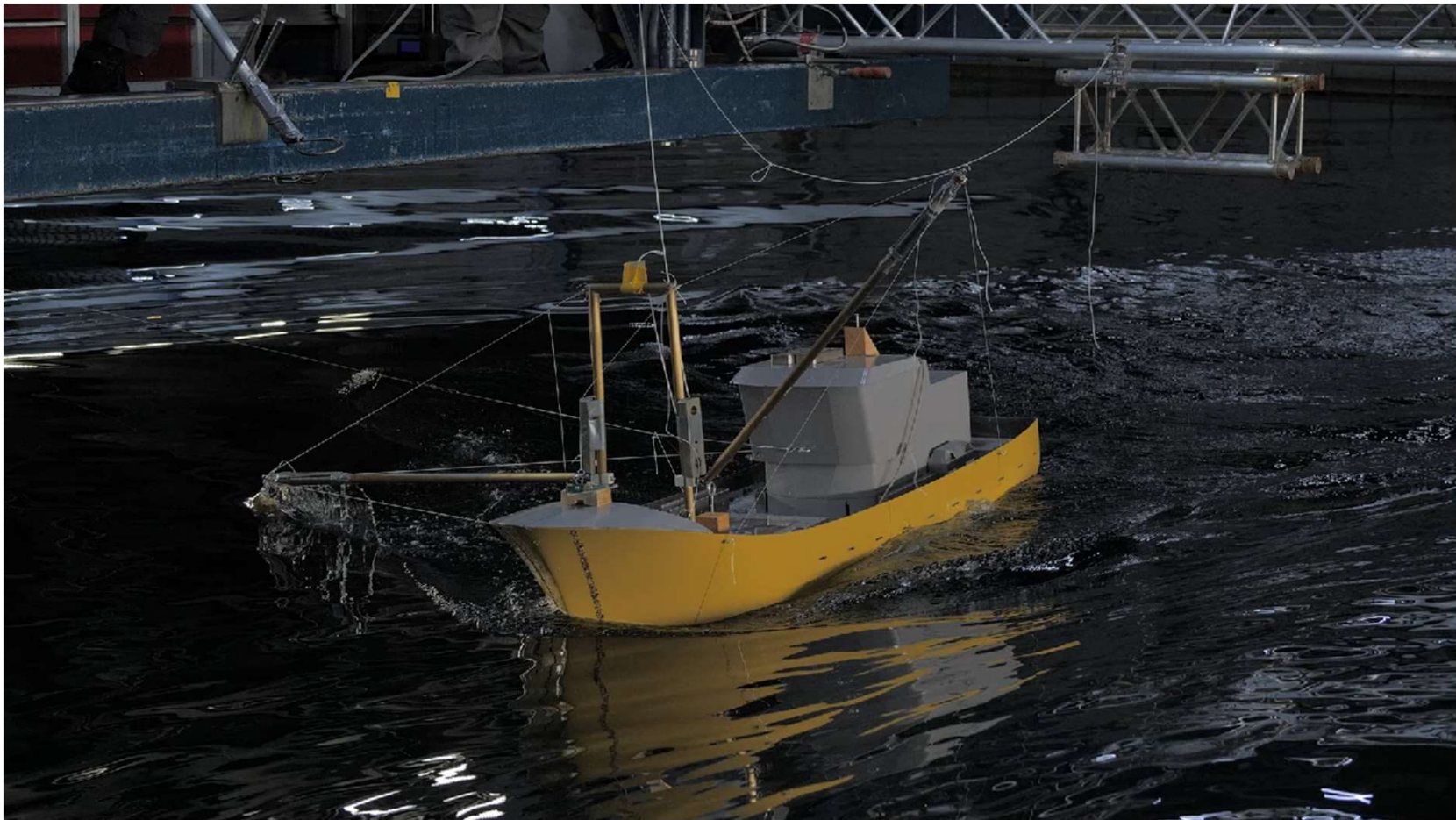
Roll damping



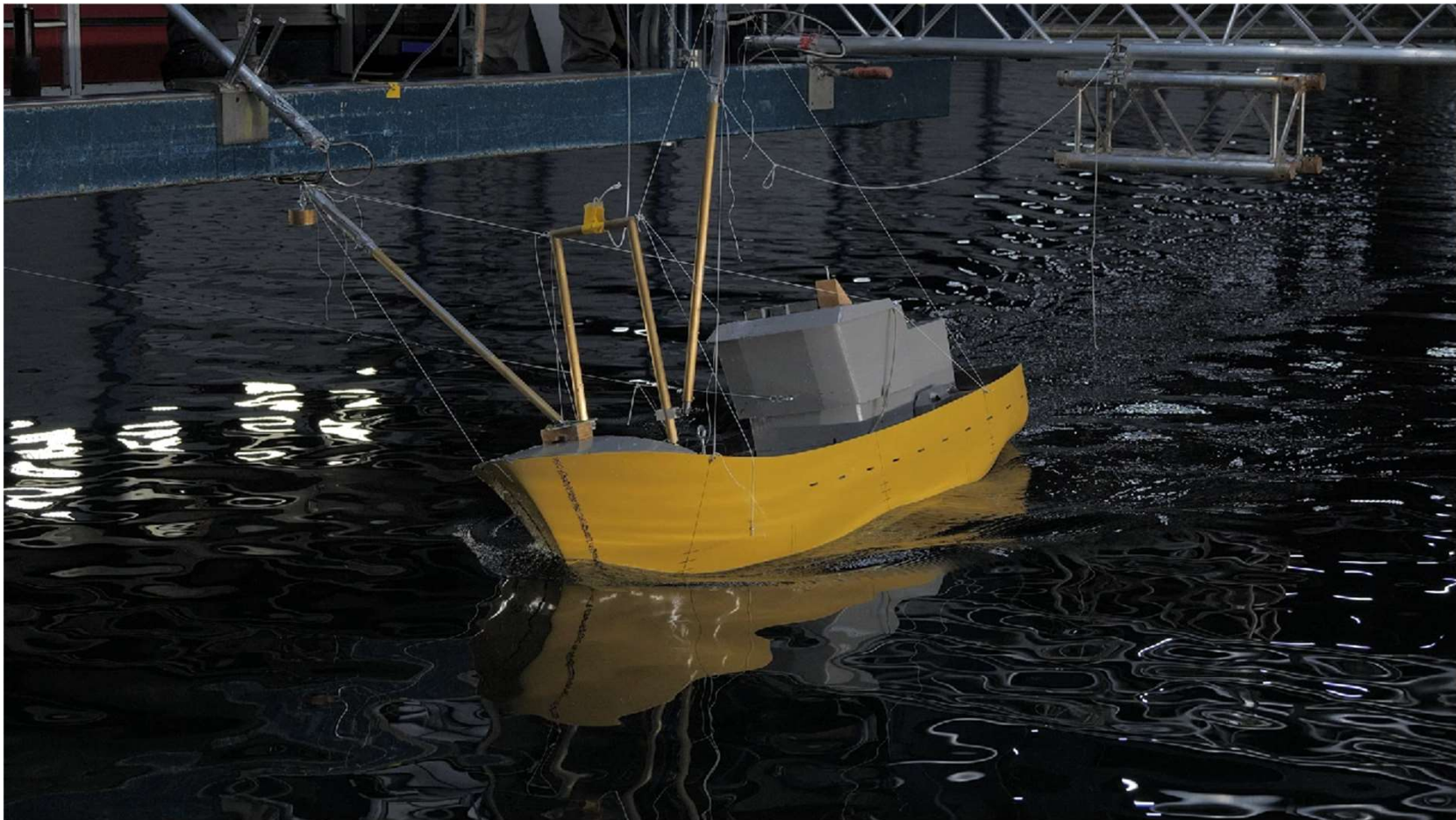
Test in regelmatige golven Conditie



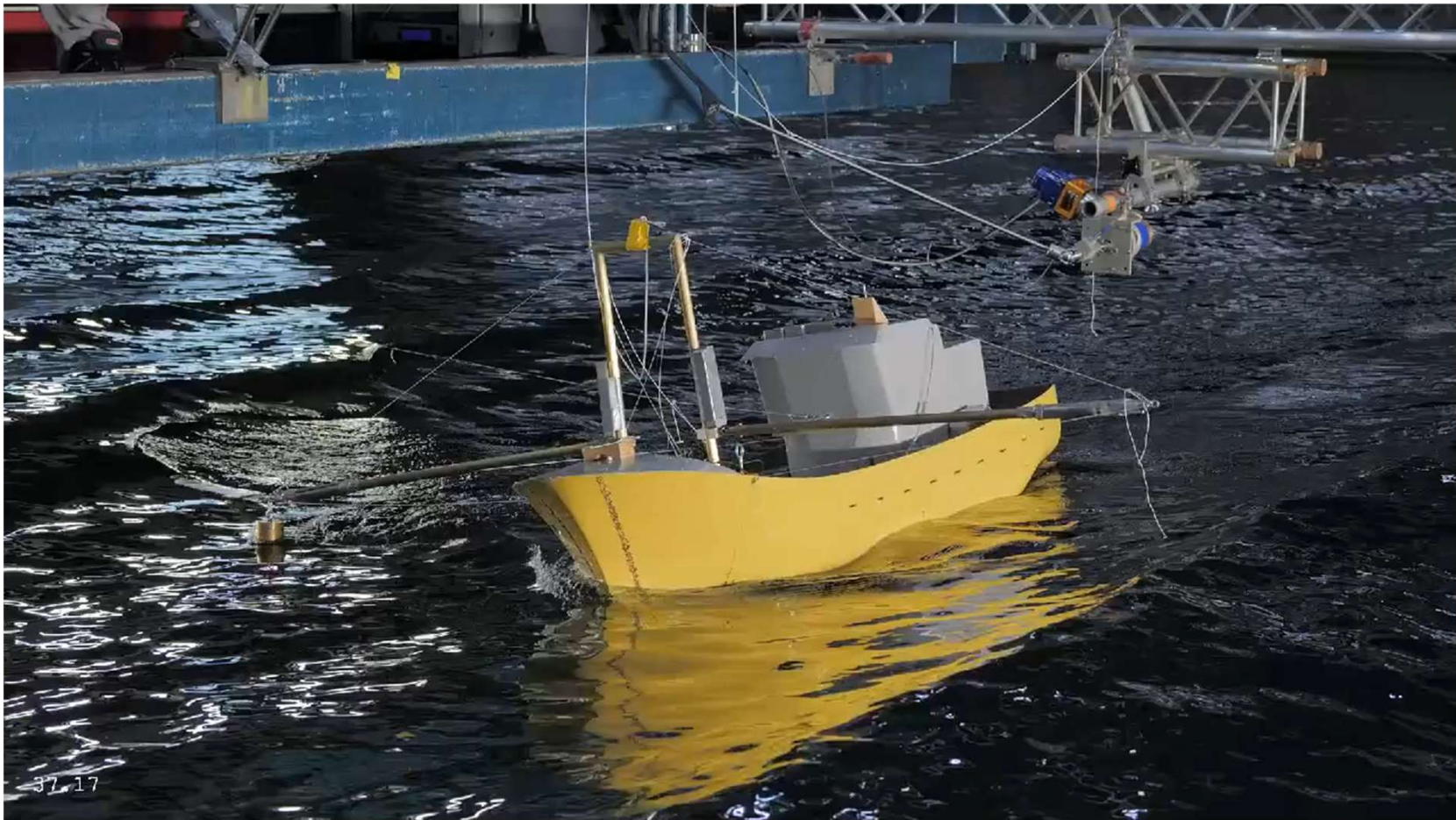
Test in regelmatige golven Conditie H



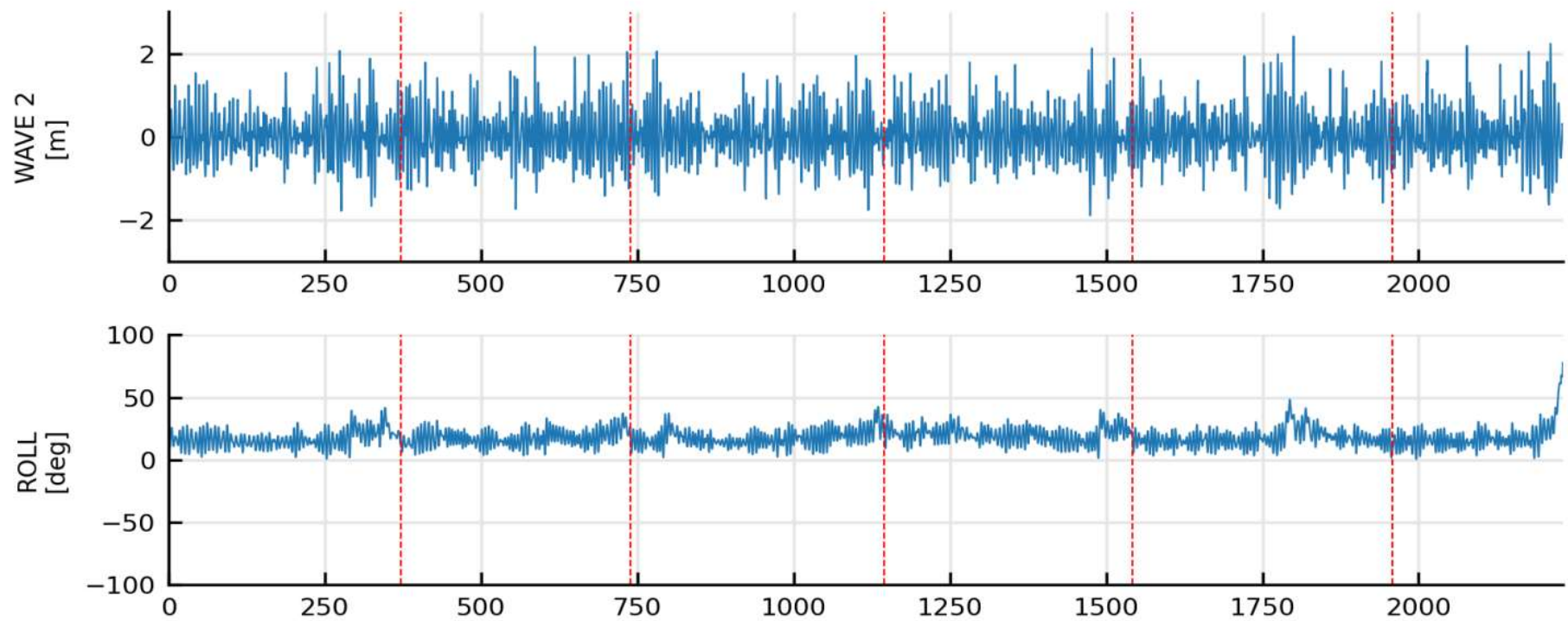
Test in regelmatige golven Conditie H



Test in onregelmatige golven

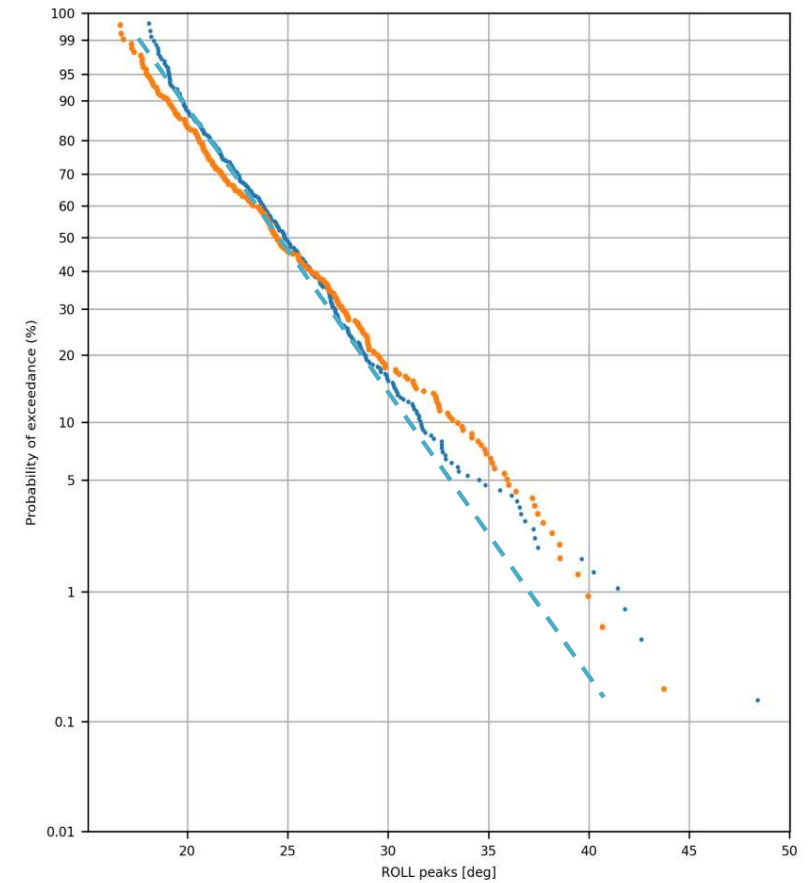
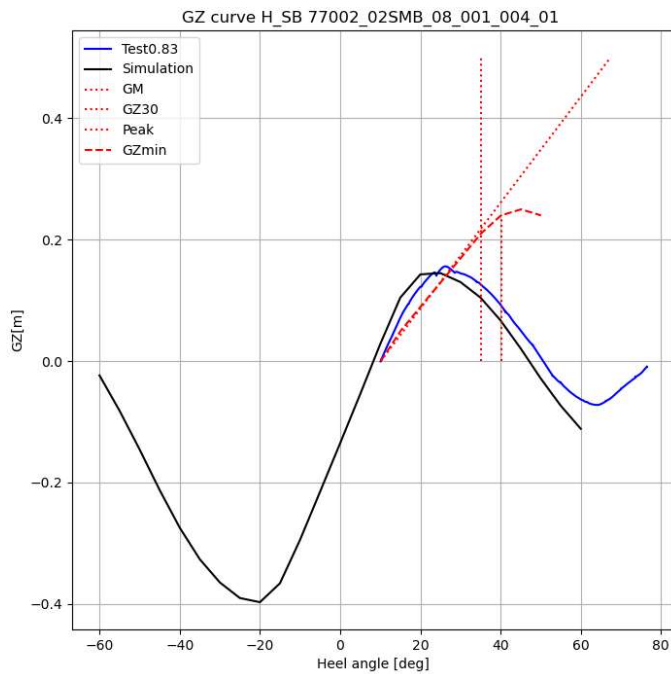


Test in onregelmatige golven - meting



Distribution of roll motions

- ★ $H_s = 2.50 \text{ m}$ - $T_p = 5.50 \text{ s}$ - $V_s = 5 \text{ kn}$ - Wind force = 30 kN
- $H_s = 3.00 \text{ m}$ - $T_p = 6.00 \text{ s}$ - $V_s = 5 \text{ kn}$ - Wind force = 30 kN



- Observatie tijdens de testen
 - Als je voldoet geen kapseis
 - Asymmetrische beladingscondities kunnen risicovol zijn
- Model vs realiteit
 - ½ eeuw vs ½ uur -> Welke condities kom je tegen in werkelijkheid
 - Met simulaties de grens nauwkeuriger
- Welke omgevingscondities zijn relevant bij asymmetrische condities?
 - niet vissen bij BF9
 - Wat is aanvaardbaar risico voor operaties die kort duren, zoals binnen halen van de vangst