



Energy Efficient Safe SHip OPERAtion

Progress of 'Identification of ships and risk analysis of relevant marine accidents'

WP1, Task 1.2

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- Database
 - Focus on Container vessels & Passenger vessels
- Screening process → Accidents of interest
- Results
 - Descriptive analysis
 - Percentiles - Fleet
 - Fleet Rates
- Conclusions

Database inclusion criteria

- Ship Types: Container, Cruise, Ro-Pax, Pax
- GT \geq 400 gt
- Built Date \geq 1/1980
- Accident Date \geq 1/1990 – 11/2013
- Heavy weather conditions

384 accidents collected

Data Fields

- Ship Details (Name, Type, GT...)
- Ship Dimensions (L, B, D...)
- Machinery (Installed power, service speed...)
- Accident Details (Date, location, type...)

Initial exclusion criteria for accidents

- Hull/Machinery damage
- Fire and explosion
- Extreme weather conditions (e.g. hurricanes)
- Moored ships
- Tug assistance
- Inevitable contacts with floating objects

275 accidents excluded

- Further analysis of accidents
 - Based on accident reports for details
 - Exclusion of accidents related to human error

- Further exclusions
 - High Speed Crafts ($Fr > 0.5$)
 - Not serious accidents

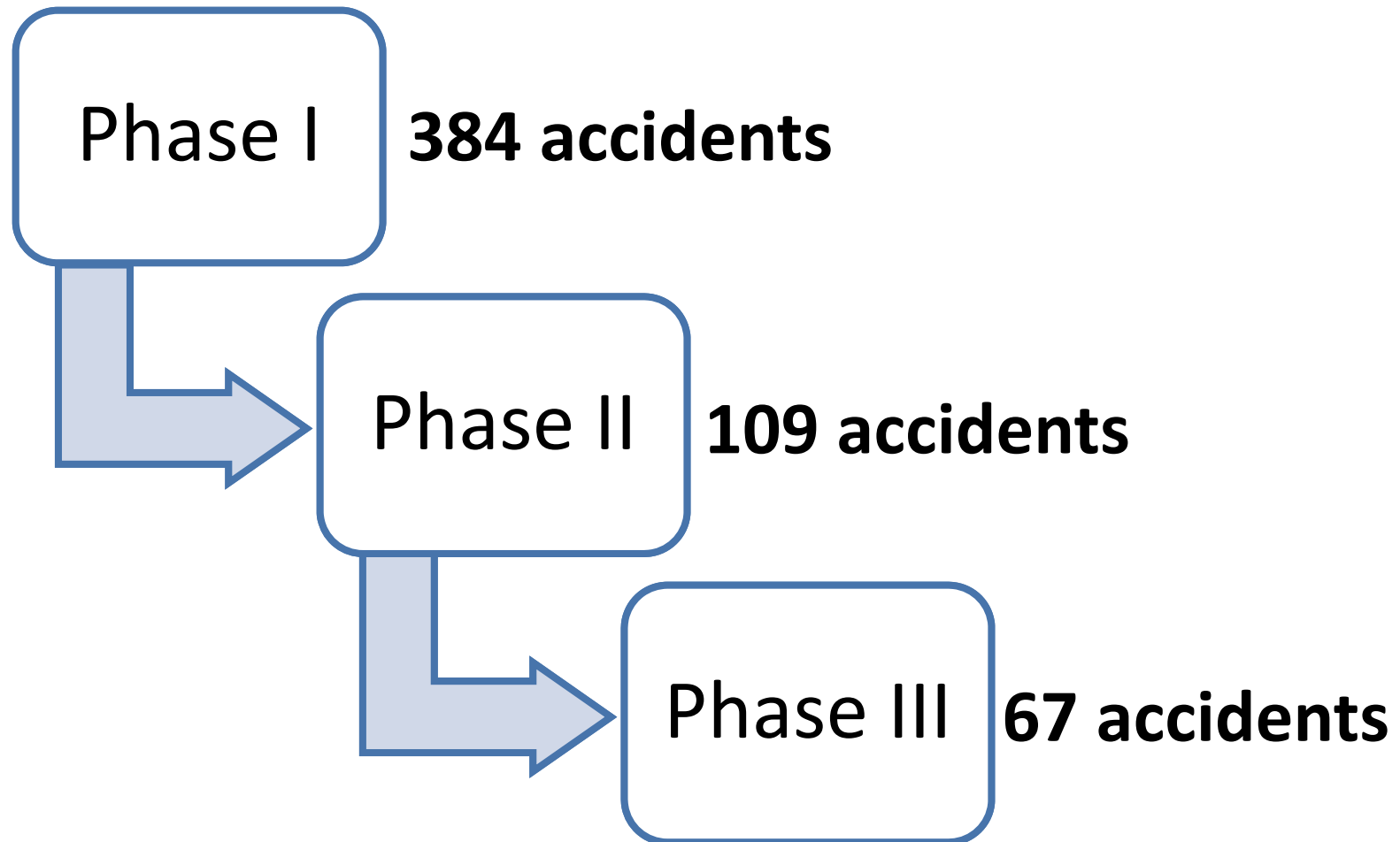
42 more accidents were excluded

Accidents of interest

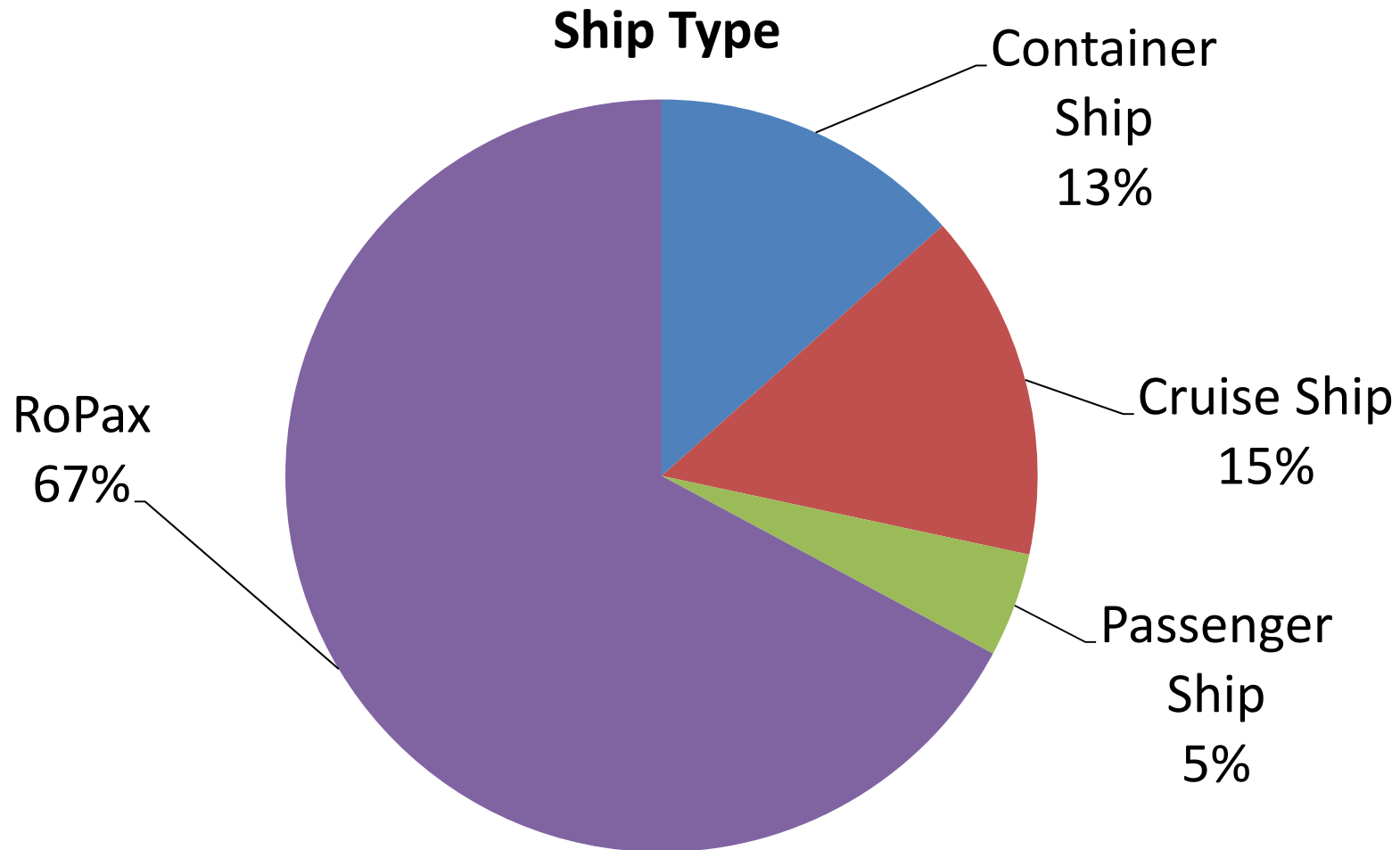


- Example of included accident:
Container Ship – **SANDY RICKMERS** – 4/2/2013
In collision with MT RYSTRAUM in the Kiel Canal
in strong winds
- Example of excluded accident:
RoPax ferry - **SUPERFAST VII** – 31/1/2008
Struck the breakwater whilst berthing with tug
assistance in heavy weather

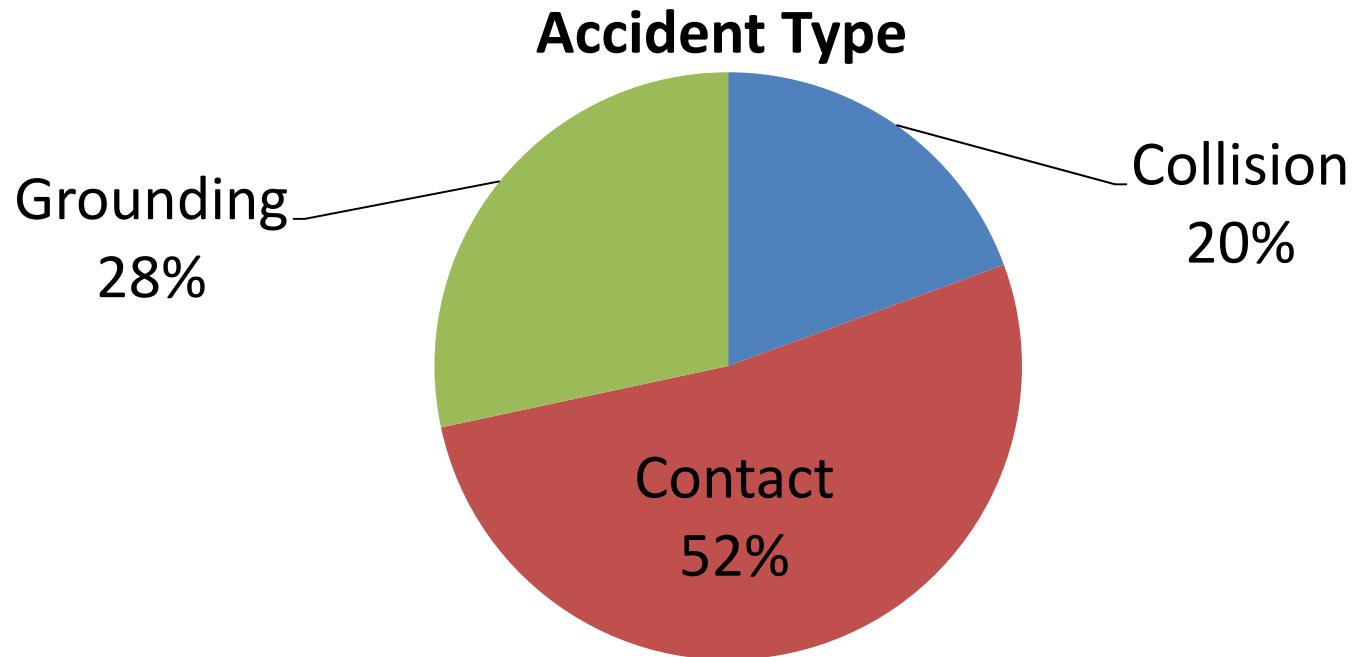
Screening Process



Descriptive analysis



Descriptive analysis



Location Type	Accidents	Percent
Restricted Waters	5	7.5
In Port	62	92.5
Total	67	100.0

Percentiles - Fleet

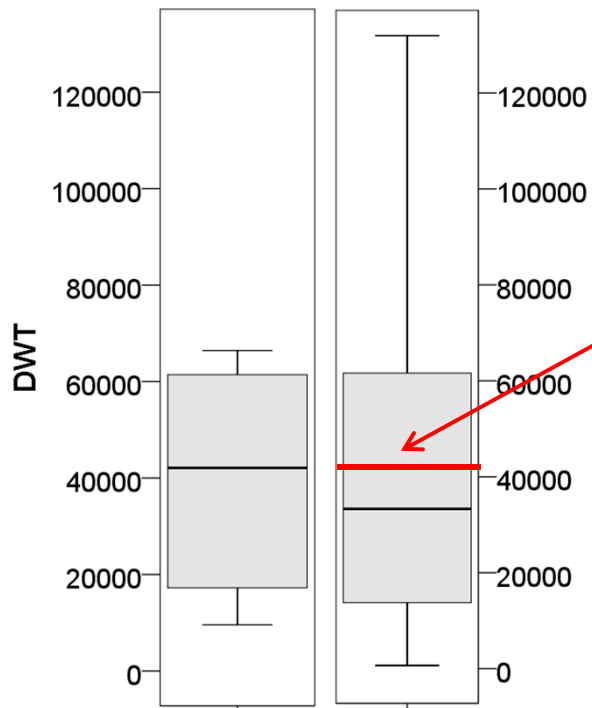
Container Ship	LOA	TEU	DWT	MCR Power [kW]
75th Percentile	275.10	4469	61428	40720
Lower Bound	261.30	4022	55285	36648
Upper Bound	288.90	4916	67571	44792
MSC LORENA (IMO: 9320403)	275.00	4870	59587	39952
Divergence	-0.04%	8.97%	-3.00%	-1.89%

RoPax	LOA	GRT	DWT	MCR Power [kW]
75th Percentile	179.70	28138	5493	23040
Lower Bound	170.70	25324	4944	20736
Upper Bound	188.70	30952	6042	25344
KAITAKI (IMO: 9107942)	181.60	22365	5794	23040
Divergence	1.06%	-20.52%	5.48%	0.00%

Container Ships

— 50th Percentile

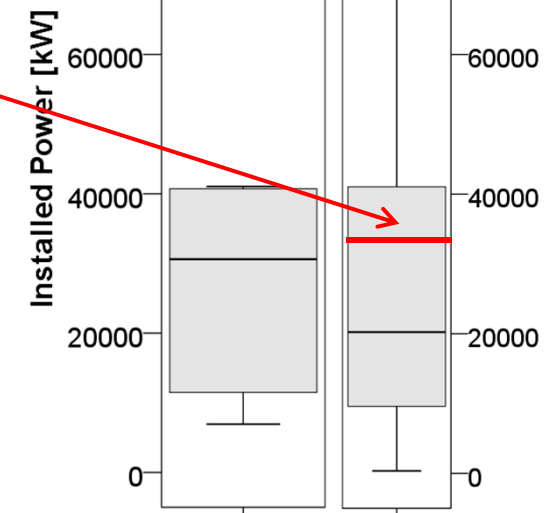
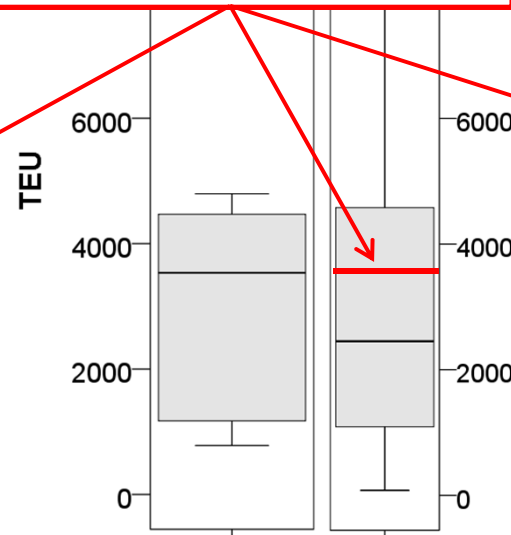
Sample (Acc.) – Fleet (2013)



PARTICI

DWT = 41974 t
TEU = 3534
MCR = 35998 kW

Sample (Acc.) – Fleet (2013)



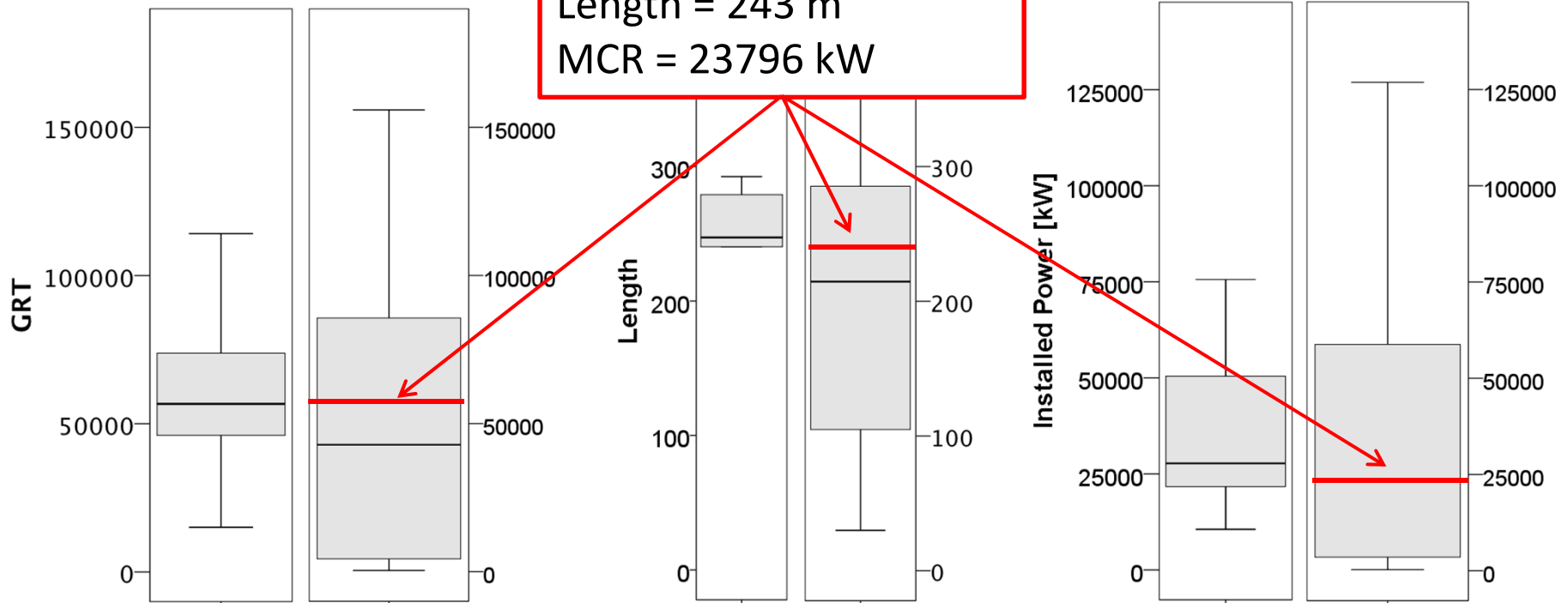
Cruise Ships

— 50th Percentile

THOMSON DREAM
 GRT = 54763 gt
 Length = 243 m
 MCR = 23796 kW

Sample (Acc.) – Fleet (2013)

Sample (Acc.) – Fleet (2013)



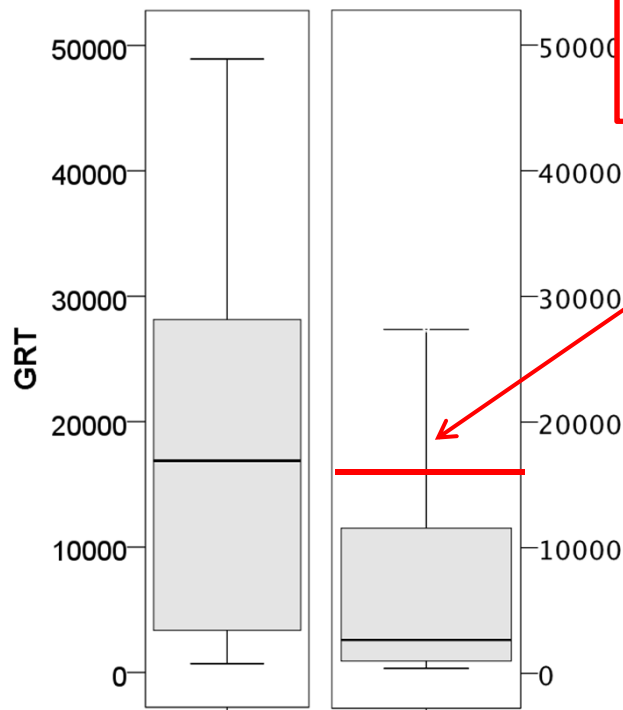
RoPax Ships

— 50th Percentile

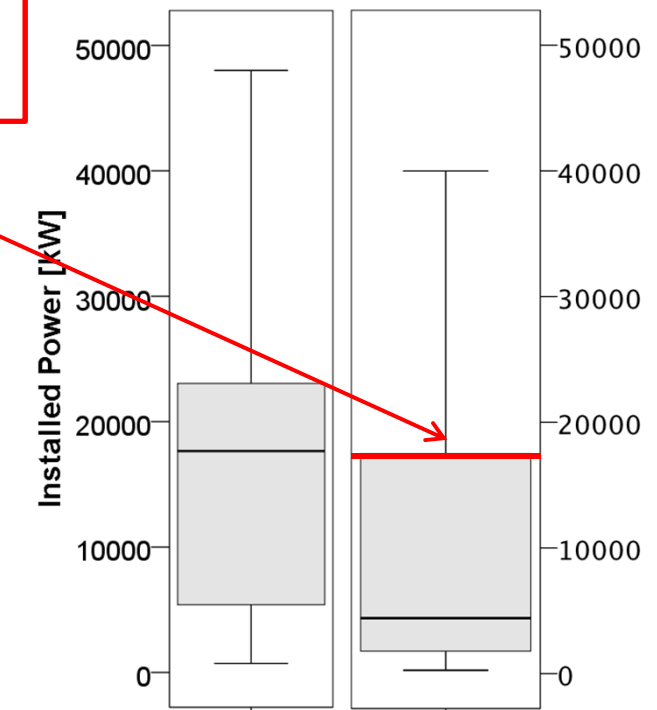
ROSELLA

GRT = 16879 gt
Length = 136 m
MCR = 17652 kW

Sample (Acc.) – Fleet (2013)



Sample (Acc.) – Fleet (2013)



Fleet Rates

Fleet-At-Risk Selection Criteria	
Container	Cruise & RoPax
IACS Class	GT ≥ 1000 gt
Period: 1990-2012	LOA ≥ 80 m
	Built ≥ 1982
	IACS Class
	Period: 1994 - 2010
<i>Source: Contiopt project</i>	<i>Source: GOALDS project</i>

Frequencies			
	Container	Cruise	RoPax
Fleet-At-Risk	54992	2641	5528
Valid Accidents	8	9	20
Rates	1.45E-04	3.41E-03	3.62E-03

Conclusions

- Contacts are the most frequent accidents of interest
- The median of the ships in the accident related sample seems to be larger compared to the median of the (current: 2013) fleet
- Container ships up to 5000 TEU (e.g. feeders) are more at risk than larger vessels of this type
- Calculated frequencies indicate a real problem