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MCA Freeboard Investigations

- - Assessment of survivability of Fishing Vessels less than 15 metres LOA

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THE NIFPO PROJECT

- In 2010 the Northern Ireland Fish Producers Organisation (NIFPO) obtained grant aid to have 25 vessels between 10 metres and 15 metres length overall to have their stability assessed against the standard criteria. The vessels chosen were all decked vessels.
- The grant funds were provided by the Department of Agriculture and Rural Development Northern Ireland (DARDNI) operating under The European Fisheries Fund (Grants) Regulations (Northern Ireland) 2008
- After a competitive tender process two consultant Naval Architects were selected to assess the vessels.
- All vessels had the standard stability information books prepared following lifting lines of the hulls to produce lines plans.

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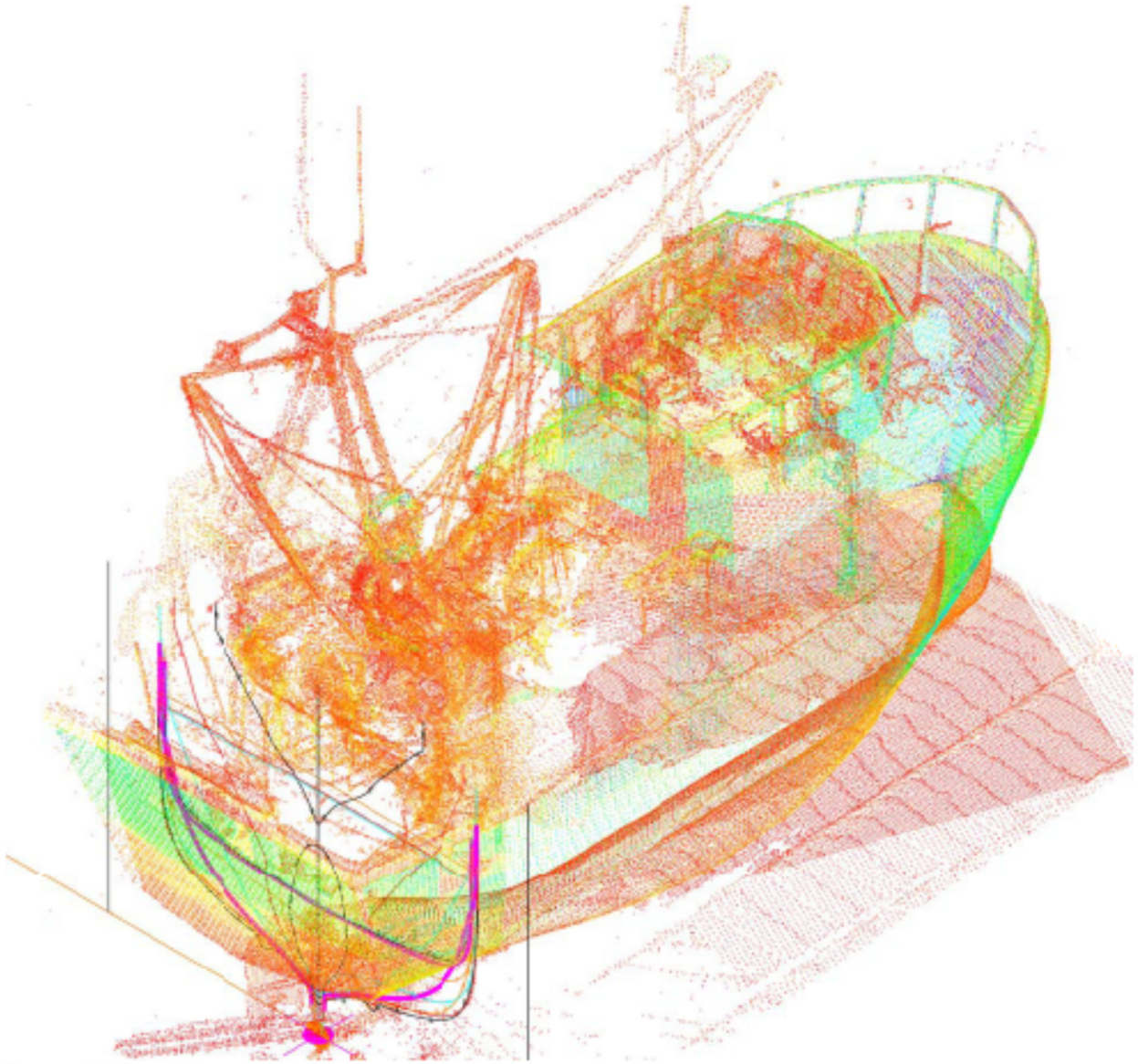

Isometric Laser Scan

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various stability and freeboard criteria

- MGN 281(F) Fishing Vessels Freeboard and Stability Information Booklet
- MGN 427
- • Full stability information, inclining experiment and calculation of loading conditions.
- • Small Commercial Vessel Code standard.
  inc ISO 12217-1
- • A modified small passenger vessel standard.
- • IMO Roll Period Approximation / DTI Roll Test
- • Wolfson Guidance.
- Nordic boat standard
- SEAFISH Construction Standards

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- All vessels where shown to comply with the standard stability criteria by the choice of loading conditions and operating profiles.
- Some vessels however, where shown not to meet the other recommended survivability elements of freeboard and down flooding points.
- These were a number of the standard production hulls which failed on down flooding point as the vents to the engine space were located in the bulwarks which where not solid to the full height as the required bulwark height was achieved by using top rails.

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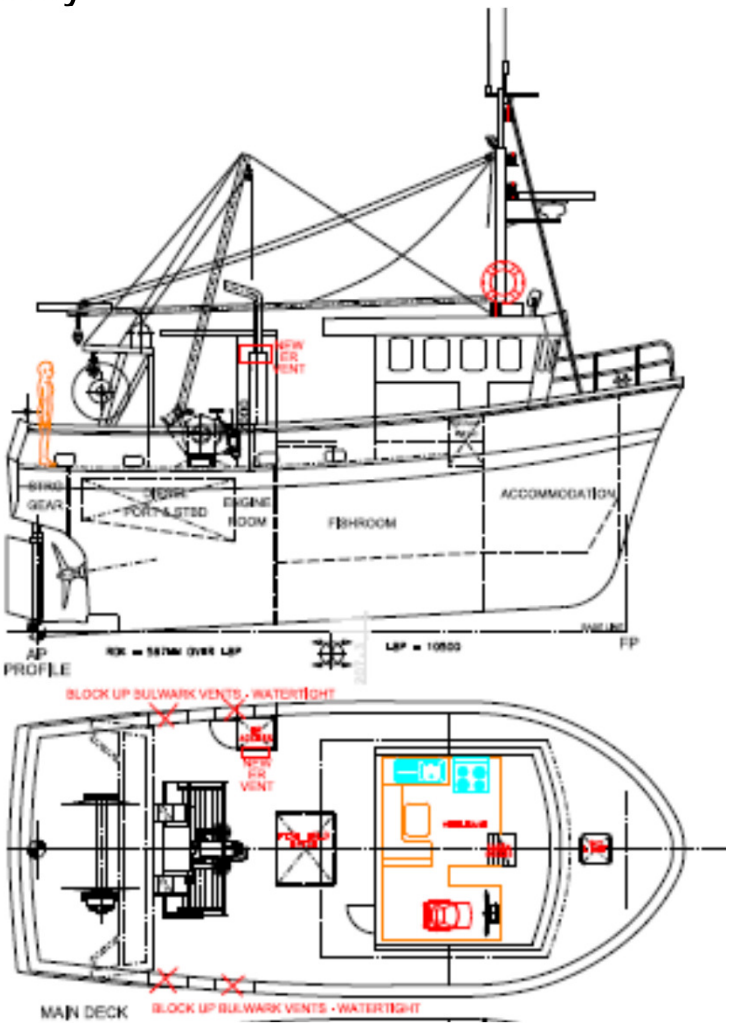

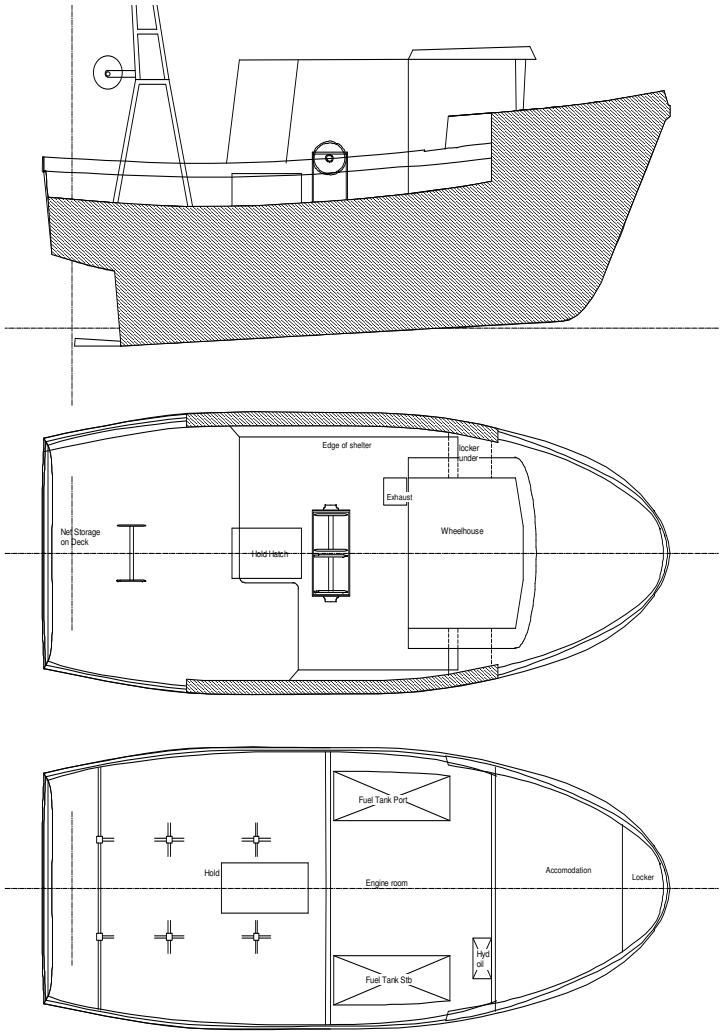

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allocated number	YEAR	HULL	OVERALL	Registered Length	REGISTERED Beam m	fishing method	max catch	lightweight	deadweight max	deadweight min	minimum freeboard amidships mm	
StabP01	1987	F	10.47	9.96	4.10	Static Gear Fishing Creels/Pots	1.00	16.01	2.40	1.48	635	
StabP03	1989	F	10.70		3.96	Trawling	2.00	25.96	3.73	2.07	402	fail FB aft
StabP04	1982	F	10.90		4.09	Trawling	2.00	19.54	3.31	1.75	472	**FAIL FB AFT**
StabP06	1987	F	11.32		4.27	Prawn Trawl	1.25	26.22	3.13	2.16	356	**FAIL FB AFT TRAWLING + vents**
StabP07	2000	S	11.53	10.42	4.30	Trawling and Dredging	2.75	36.21	6.65	4.08	498	**FAIL FB AFT TRAWLING**
StabP08	1989	F	11.59		4.53	Trawler	4.00	41.14	7.61	4.63	734	vents
StabP09	1988	S	11.89		4.53	Static Gear Fishing Creels/Pots	2.50	31.45	8.27	3.70	478	
StabP10	1985	F	12.19	11.64	5.02	Prawn Trawl	3.50	34.57	8.39	3.75	600	vents
StabP13	2000	S	13.70	11.98	5.24	Trawling	14.00	72.63	19.07	10.32	722	fail FB frd
StabP14	2005	S	13.70	11.98	5.30	Trawling	12.40	81.38	17.38	9.26	2.682 m	
StabP15	1965	W	13.72	11.99	4.72	Trawling	3.15	42.71	5.18	3.25	696	
StabP18	1963	W	14.02	12.13	4.85	Prawn Trawl	3.00	36.96	5.80	3.23	748	
StabP19	1969	W	14.14	**14.14**	**5.31**	Trawling	9.85	45.33	12.71	6.80	548	

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ROLL TEST

- **IMO Roll Period Approximation**
- Seventeen of the vessels were roll tested in the “as inclined” condition. If the time for one roll in seconds is greater than the beam in metres, the vessel can be said to be tender. Similarly if the time in seconds is less than the figure for beam, she may be said to be stiff.
- Of the 17 vessels,
- nine were assessed as being “stiff”,
- seven assessed as “tender” and
- one was near enough neutral.
- **DTI ROLL TEST**
- The roll test actual or indicated GM is calculated by
- $=(kB/T)^2$
- Where k = coefficient;
- B = breadth (metres);
- T = roll period (seconds);
- using a fixed value of k which is related to the vessel type as follows:-
- - deep sea fishing vessels 0.80
- - vessels with live fish well 0.60

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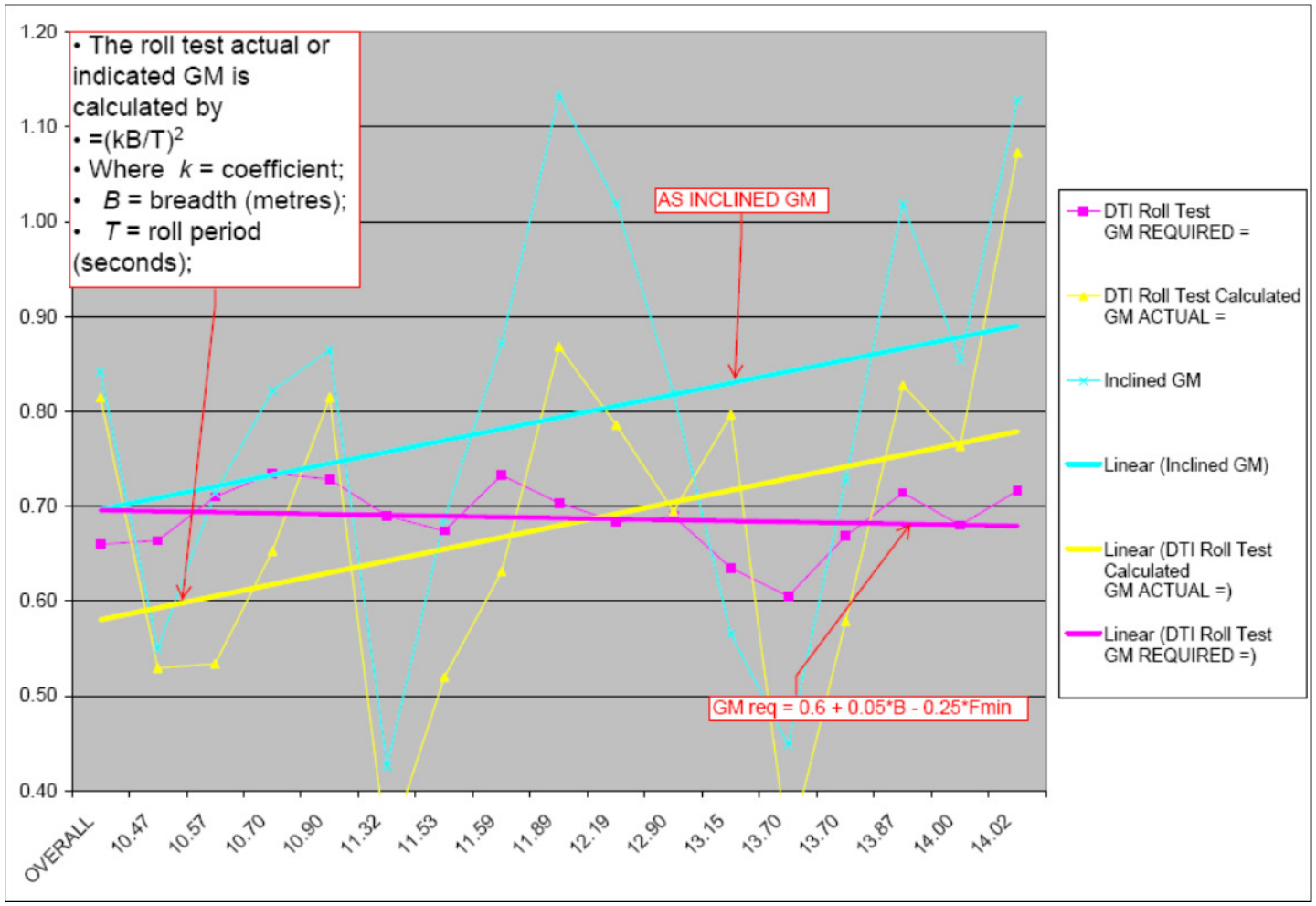
DTI ROLL TEST AND AS INCLINED GM



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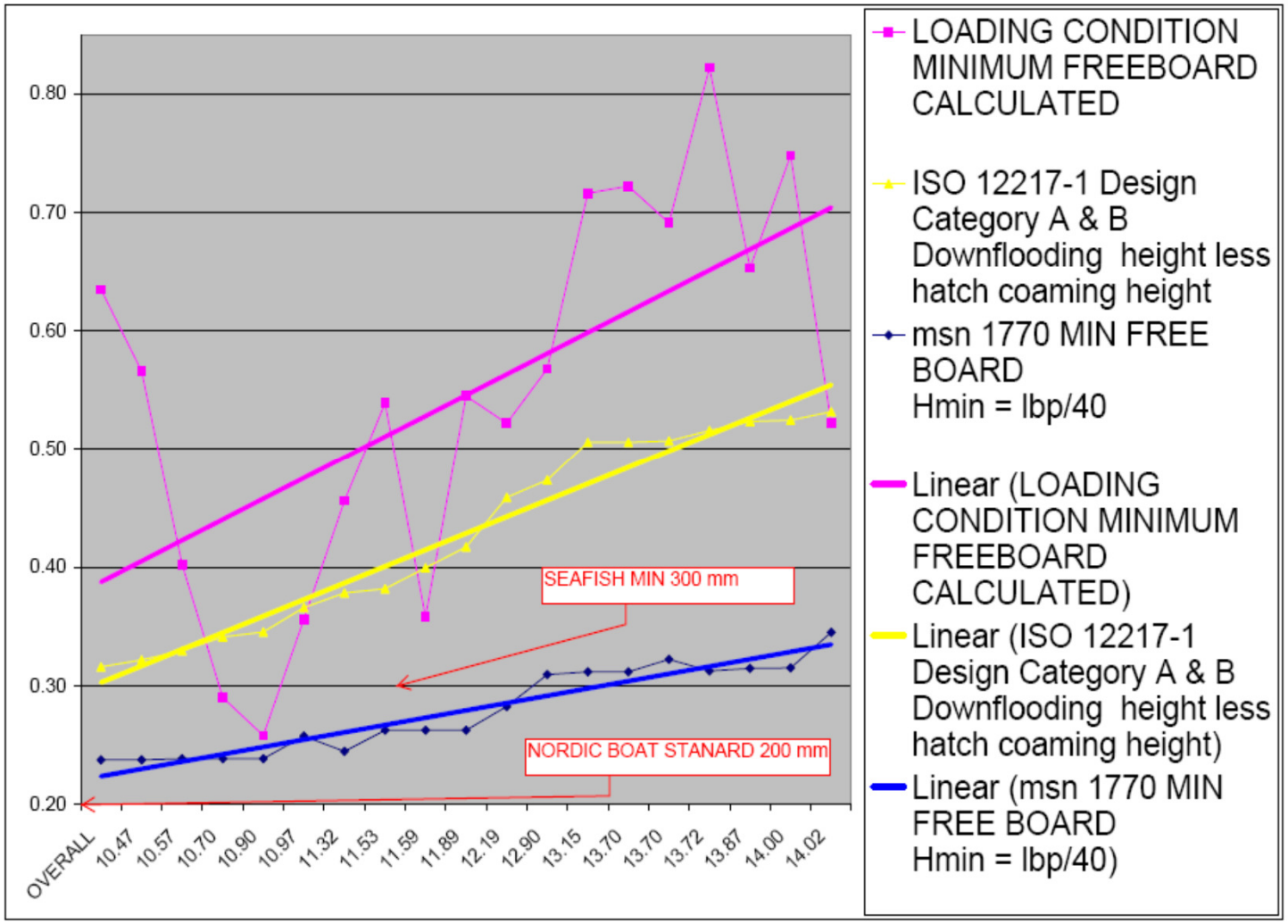
ISO 12217-1 MID WAY BETWEEN CALCULATED AND STATUTORY MINIMUM FREEBOARD



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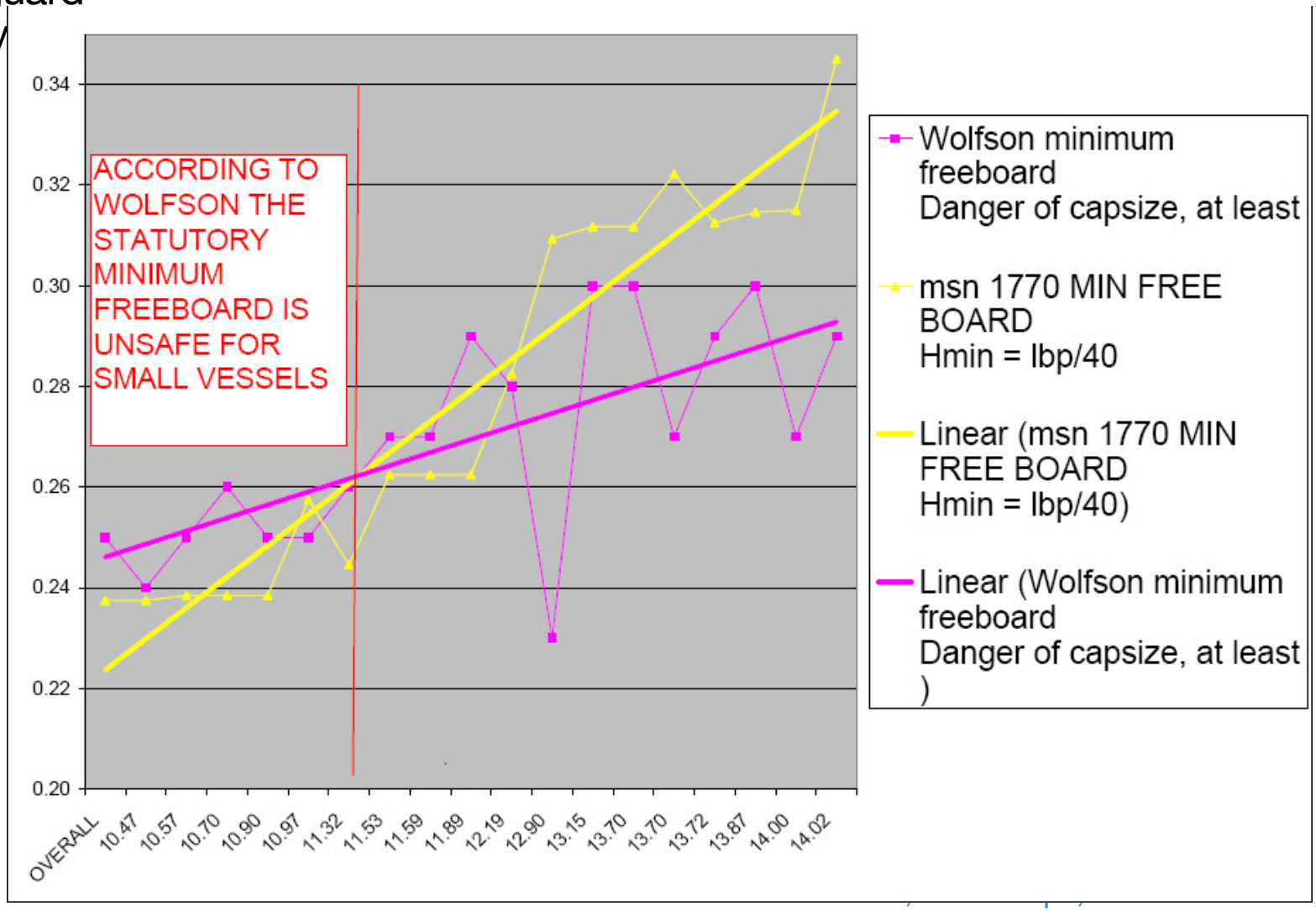
Wolfson Minimum Freeboard “Danger of capsize”; compared to the minimum freeboard (LBP/40)



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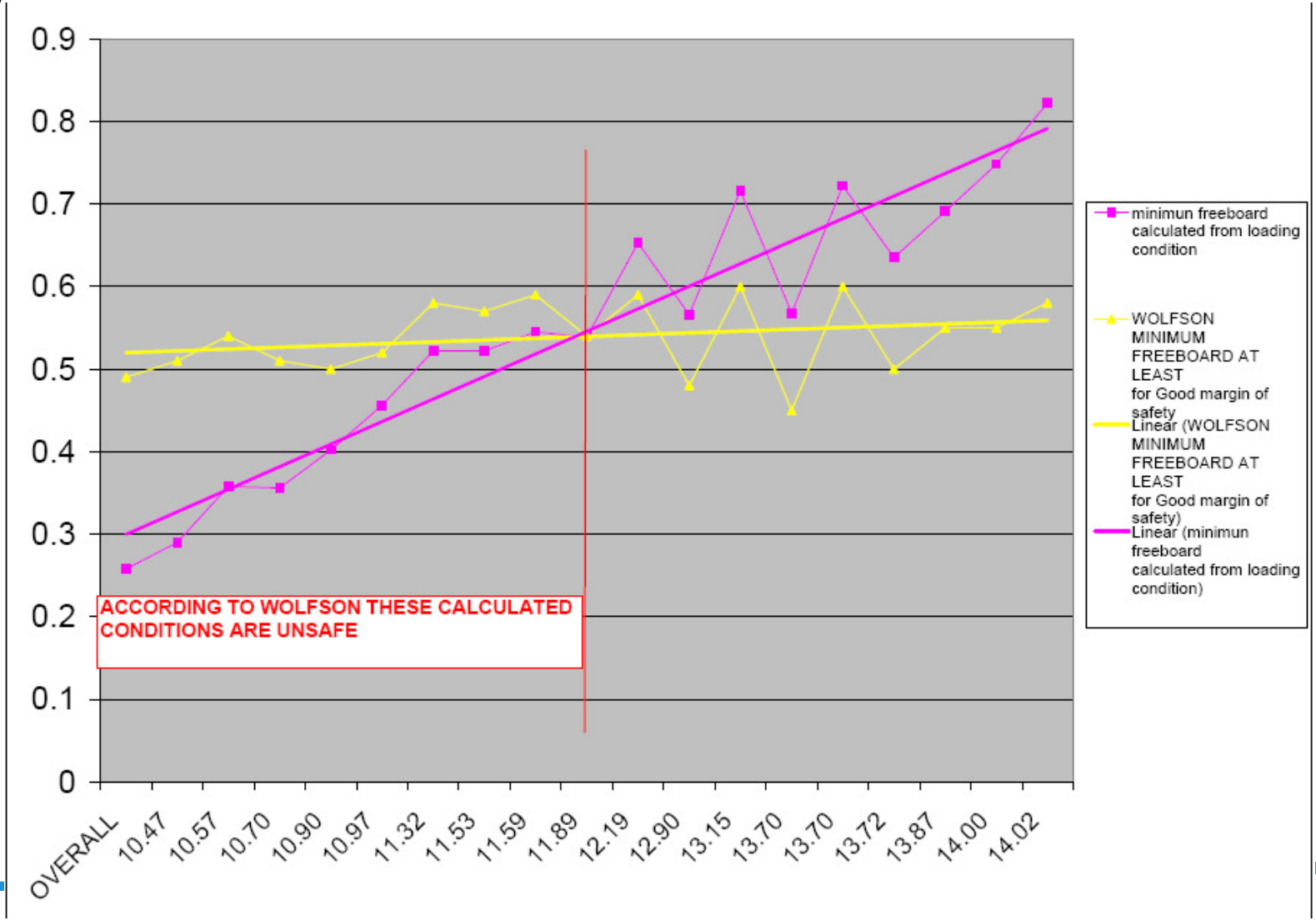
Wolfson Minimum Freeboard for Good Margin of Safety



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Conclusion.

- The analysis has shown that decked vessels between 10 and 15 metres length overall can be operated to comply with the intact stability recommended for vessels over 15 metres LOA.
- Some vessels characterised by having a forward wheelhouse and open aft deck were found to not meet the minimum freeboards recommended to prevent the vessel being “pooped”. The same vessels were also identified as to having down flooding points that do not meet the recommendations for survivability due to the location of the engine room ventilation ducts.
- The IMO simplified roll period test is shown to be capable of identifying vessels which would not comply with the DTI roll period test and could be used as guidance with respect the intact criteria as to whether or not further investigation is required, particularly when modifications to vessels are being considered with a test before and after.
- The Wolfson method is shown to be more pessimistic than the standard stability/survivability criteria for freeboard expect for when the vessels is longer than 13 metres when the vessel would be deemed to be unsafe if Wolfson was applied.
- The Wolfson method however would seem to judge unsafe vessels with standard stability information books.

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Conclusion cont.

- Survivability is not dependent on meeting righting lever criteria alone but also freeboard. A lack of freeboard will result in earlier immersion of the deck. This can be delayed by being a stiff vessel. Any survivability standard therefore needs to consider both.

- Freeboard guidance is varied with
- MSN 1770
- Seafish
- Nordic Boat Standard
- Load line
- Wolfson
- ISO 12217-1 standard
- As stated in the 1975 Rules
- ***freeboard will be adequate*** to provide:—
- (a) compliance with the stability criteria;
- (b) reasonable safety for men working on deck;
- (c) reasonable safety to the vessel from the entry of water into enclosed spaces having regard to the closing appliances fitted

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