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**REPORT OF INVESTIGATION
INTO THE GROUNDING OF
“ARKLOW RAIDER”
AT
RIVER BOYNE ENTRANCE
16th NOVEMBER 2010**

The Marine Casualty Investigation Board was established on the 25th March, 2003 under the Merchant Shipping (Investigation of Marine Casualties) Act, 2000.

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**REPORT No. MCIB/195
(No.8 of 2012)**

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1. SYNOPSIS

- 1.1 The “*Arklow Raider*” arrived at the port of Drogheda, Co. Louth, Ireland, on 10th November 2010 with a full cargo, which was discharged prior to loading a cargo of cement in bulk.
- 1.2 The vessel departed from Drogheda Port on the evening tide of the 16th November 2010. As the vessel passed the bar at the entrance to the River Boyne, it took the ground and became fast.
- 1.3 The vessel was successfully refloated on 19th November 2010. Once afloat, checks were made and the vessel was towed to Dublin. At Dublin, the cargo was transhipped to another vessel and the vessel entered dry dock for repairs to the hull and steering gear. Nobody was injured and no pollution occurred.

2. FACTUAL INFORMATION

2.1 Description of the vessel

The vessel is a general cargo ship with a single hold, with a capacity to carry containers. The accommodation and machinery spaces are located abaft the hold. Weather deck protection is provided by pontoon type steel hatch covers (See Appendix 8.1 which gives full details of the ship).

2.2 Principal Particulars:

Vessel Name:	<i>“Arklow Raider”</i>
Vessel Type:	General Cargo Ship
Year:	2007, Barkmeijer Stroobos, Holland
Flag:	Irish
Port of Registry:	Arklow
Official Number:	404061
MMSI:	250001268
I.M.O. Number:	9344540
Length Overall:	89.990 m
Breadth Moulded:	14.000 m
Summer Draft:	5.679 m
Summer Deadweight:	4,458 m.t.
Gross Tonnage:	2,999
Net Tonnage:	1,639
Main Engine:	MAK 6M25 RATED AT 1,499 Kw
Propulsion:	Variable Pitch Propeller
Steering:	Hydraulic with Becker Rudder
Service Speed:	11.5 knots
Classification:	Bureau Veritas
Entry No.:	07983E
Owner/Manager:	Invermore Shipping Ltd/Arklow Shipping Ltd.
Crew Carried:	7
Master:	Capt. Alan Jamieson

2.3 Equipment

The vessel was a modern cargo ship and, as such, it was well equipped with navigational aids and equipment. The bridge lay out comprised of a central control console, with two seats towards the centreline at the front of the

wheelhouse. The bridge had enclosed bridge wings with tables towards the front. The chart table was to port of the main console and at the front of the wheelhouse. The bridge equipment included:

- Sperry Marine Bridgemaster Radar with ARPA to port
- Sperry Marine Bridgemaster Radar to starboard
- Sperry Marine ECDIS Chart plotter displays, type VMS.NAVIECDIS-BE
- Sperry Marine ES 5100
- Sperry Marine Doppler speed log
- ICS NAV 5 Navtex receiver
- ICOM M401E VHF transceiver to port
- Sperry Marine Navpilot 4000 automatic steering
- Rudder angle indicator
- Joystick type steering control lever
- Bow thruster control lever
- Remote engine control lever (Bridge control system)
- Sperry Marine Gyro Compass, with wing repeaters
- Sperry Marine VHF transceiver, RT4822
- Engine gauges and manual override controls
- MX Marine FMX 420 GPS at chart table

The vessel was fitted with a hydraulic steering system, two rams and motors, coupled to the rudderstock by a “Clampax” coupling manufactured by KTR, Germany. The rudder was a Becker Marine design. The rudder was operated by a joystick, mounted in the centre of the main wheelhouse console.

3. EVENTS PRIOR TO THE INCIDENT

- 3.1 The vessel arrived at Drogheda, in a laden condition, on 10th November 2010. The vessel berthed at Tom Roe Terminal East. On completion of discharge, the vessel shifted to Tom Roe Terminal West in order to load a cargo of cement in bulk. The times recorded on the vessel were for GMT +1 hour (Central European Time) whilst the times recorded by shore parties were GMT or local time.
- 3.2 Loading of the vessel was completed at approx. 02:45 hrs. on 15th November 2010 and the vessel lay over until the evening tide of 16th November to permit the cargo to settle. On the 15th and 16th November 2010, the Harbour Master was in contact with the vessel to discuss the planned departure draft.
- 3.3 On 16th November 2010, the Pilot boarded the vessel at 18:25 hrs. and completed the sailing plan with the Master. The vessel had to wait for an incoming vessel to pass before departing the berth. The incoming vessel advised the Pilot that there was a swell of between 1 and 2 metres at the river bar. The vessel departed the berth at approx. 19:00 hrs. and proceeded downstream. The distance from the berth to the Bar was approx. 3.5 nautical miles.
- 3.4 For the river passage, the vessel was conned by the Pilot with the Master observing (pilot steering vessel). At approx. 19:30 hrs., the vessel passed abeam of the Tower Light. Control of the vessel was passed over to the Master (Master steering vessel) and the Pilot positioned himself in the starboard bridge wing to watch the light sector. Speed was reduced slightly as the vessel approached the bar, reducing to 4.9 knots approx. just before the grounding.
- 3.5 As the vessel proceeded between the Tower Light and the training walls, it set to the north of the intended track. The course was corrected by applying starboard helm. When on the right path the vessel resumed its planned outward track. At 19:34 hrs., the Master reported that the vessel was not responding to the helm. Additional engine power was applied and the bow thruster engaged to bring the ship's head back on track.

4. THE INCIDENT

- 4.1 As the vessel approached the river bar, its speed was reportedly reduced. The data from the port's VTMS gave a speed over the ground of approximately 5.4 knots between the Green and Bull light marks. The speed was 5.1 knots as the vessel passed Aleria light. (See Appendix 8.2) The speed then dropped to 4.9 knots. At 19:30 hrs. the course was 053° T at 4.3 knots. The predicted time of high water was 19:54 hrs., the grounding occurred 20 minutes before the predicted high water. At 19:34 hrs. the vessel would not respond to rudder commands. The Master used both engine and bow thruster in an attempt to resume the correct course. At 19:35 hrs. the vessel touched bottom, veered to port and ran aground with the Aleria Light bearing 260° T X 183 metres (see Appendix 8.3)

5. EVENTS FOLLOWING THE INCIDENT

- 5.1 The Master checked all spaces and found the vessel was not making water. The main engines were left running and no crew were reported injured. Although the rudder indicator showed the helm in the “hard a starboard” position, observations of the vessel’s propeller wash indicated that the rudder was directed to port. The Irish Coast Guard and owners/managers of the vessel were notified of the incident.
- 5.2 The vessel was ballasted down to ease the motion on the seabed. The tide was ebbing and nothing further could be done until the following morning, 17th November 2010.
- 5.3 Efforts to refloat the vessel on the morning and evening tides on 17th November 2010 were unsuccessful.
- 5.4 By the evening of 17th November 2010 the tugs “*Huskie*” and “*Mourne Shore*” were in attendance. The weather had moderated but, although both tugs were made fast, they were only able to alter the vessel’s heading by a few degrees (see Appendix 8.4).
- 5.5 On the 19th November 2010, the tug “*Oakgarth*” had arrived on scene. Overnight the weather had improved but an attempt to refloat the vessel on the morning tide was unsuccessful. On the evening tide, the tugs “*Oakgarth*” and “*Mourne Shore*” were made fast to the “*Arklow Raider*”, with the tug “*Huskie*” and the pilot vessel “*Boyne Protector*” pushing, the vessel was refloated at 21:55 hrs.
- 5.6 When the vessel was in clear water, checks were made and the vessel’s compartments were found intact. No pollution had occurred. However, it was evident that there was a problem with the rudder. Arrangements were made to take the vessel to Dublin under tow.
- 5.7 The vessel arrived in Dublin on 20th November 2010. Arrangements were made to tranship the cargo to another vessel and it was then brought to the dry dock for hull and steering gear repairs.

6. FINDINGS AND CONCLUSIONS

- 6.1 The vessel was repaired at Dublin. The Master was interviewed in Dublin on 12th January 2011, on board the m.v. “*Arklow Ruler*”. The “*Arklow Raider*” was then examined as it prepared to leave dry dock. A second visit was made on 21st February 2011 when the vessel was next in Dublin. Copies of relevant documents were obtained from various parties. The evidence included a video recording of the Vessel’s Electronic Chart Display, commonly referred to as ECDIS and the recording of the Drogheda Port’s Vessel Traffic Management System (relies on AIS signals). The investigation examined the British Admiralty Chart for the Port and the contents of the British Admiralty Sailing Directions, NP40, (Irish Coast Pilot). The Harbour Master and Pilot for the Port of Drogheda were interviewed and their individual reports examined (They were the only persons on the bridge at the time of the incident).
- 6.2 As only the Master was available, the investigation could only examine his Certificates of Competency. Copies of the other Officers Certificates of Competency were supplied by the owner when requested by the investigator.
- 6.2.1 The Master of the vessel was in possession of the required Irish Certificates of Equivalent Competency with the relevant limitation for the Master which was Unlimited trading on vessels of less than 3,000 Gross Tons. The Master also held a GMDSS General Operator’s Certificate of Competency issued on 30th April 1997. The certificates had been re-validated as required.
- 6.2.2 The Master advised that he was familiar with the Port of Drogheda and had entered several times as Master on various vessels since the 1980’s.
- 6.2.3 At the time of the incident the Master was on the bridge conning the vessel. The only other person on the bridge at the time was the Pilot. There was no watchkeeping Officer or lookout posted.
- 6.2.4 The Master advised that as the vessel cleared the Green Light tower the vessel set to the north of the channel. This was corrected by application of the helm and the vessel returned to the centre of the white light sector of the Directional Light close to the start of the south training wall.
- 6.2.5 The Master confirmed that the vessel sheered suddenly to port as it cleared the training wall marked by the Lyons Light. The vessel would not respond to helm orders. Use of both engine and bow thruster could not correct the situation. He did not feel the vessel touch the bottom until 19:35 hrs., approx. 30 seconds after the vessel failed to respond.
- 6.3 The Pilot was interviewed in the Offices of the Port of Drogheda, in the company of the Harbour Master.
- 6.3.1 It was determined that he held a Mate’s Home Trade Certificate of Competency,

issued in 1980. In 1987 he obtained a command endorsement for near continental service. He had worked for Bell Lines Ltd. of Waterford and had 12 years experience as Chief Officer. He commenced training as a Pilot at Port of Drogheda in November 1992 and obtained his licence on 21st December 1992.

- 6.3.2 The Pilot had been conning the vessel for the downstream passage until he handed over the helm to the Master on approaching the Tower Light. This was stated to be normal practice at the port.
- 6.3.3 The Pilot confirmed the Master's version of events.
- 6.3.4 The vessel's hours of work records for 16th November 2010 were examined, bearing in mind that the ship's time was 1 hour in advance of local time:
1. The Master commenced working at 18:00 hrs. following a logged period of rest, commencing at 12:00 hrs.
 2. The Chief Officer commenced work at 19:00 hrs. following a period of rest which commenced at 16:00 hrs.
 3. The Second Officer commenced work at 19:00 hrs. following a period of rest commencing at 15:00 hrs.
- 6.4 The vessel's Departure Stability Calculation for 16th November was examined. On comparing the recorded sailing drafts, it was noted that the vessel was sagged and that the port midships draft was greater than the aft draft (usually taken from the centreline of the transom in a fully laden condition). For the purpose of this report, one considers that the maximum draft of the vessel at the point of departure was 5.71 metres in brackish water (almost full fresh water) and not the 5.68 metres stern draft. The investigation is using the full Fresh Water allowance of 0.128 m for the vessel (as per the abstract from the Official Log Book where the sailing drafts and freeboards are entered before departure from port).
- 6.5 Information supplied by the port showed that the vessels' draft was deeper when it arrived than its departure draft.
- 6.6 Vessels moving from fresh water to salt water will undergo a change of draft. The draft will decrease as the salinity increases. The vessel will also undergo a change of trim, that is, the forward and after drafts will alter, normally increasing by the stern in a laden condition. The vessel will also be affected by squat as it passes through shallow areas where the under keel clearance is reduced. For this vessel when travelling at 5 knots the effect of squat can be as much as 0.30 metres.
- 6.7 The entrance to the port of Drogheda was examined. The mouth of the river enters the sea more or less in an easterly direction. The fairway has a maintained depth of 2.2 metres. The marks are significant. On the southern side

the training wall extends to eastward between the Tower Light and the Lyons Light. In certain tidal conditions this training wall is submerged to a depth of 0.7 metres. On the northern side the training wall commences just to eastward of the Bluff Light. Again, this extends to eastward and can be submerged to a depth between 0.1 to 0.7 metres, dependent on tidal conditions.

- 6.8 The weather was considered. The incoming pilot advised the Pilot on board the “*Arklow Raider*” that the swell at the bar was between 1 and 2 metres. The weather recorded at the M2 data buoy (moored quite close to Drogheda in the Irish Sea) shows:

18:00 hrs. Wind Direction was 144.5°T with a speed of 26.3 knots and gusting to 35.5 knots. The significant wave height was 2.3 metres.

19:00 hrs. Wind Direction was 141.7°T with a speed of 26.1 knots and gusting to 33.7 knots. The significant wave height was 2.5 metres.

20:00 hrs. Wind Direction was 149.8°T with a speed of 27.6 knots and gusting to 37.7 knots. The significant wave height was 2.7 metres (See Appendix 8.4).

- 6.9 The wind speeds recorded by the data buoy show that the winds ranged between Force 6 and 8, described as between “Strong Breeze” and “Gale”. The significant wave height would tend to verify the incoming pilot’s account of conditions at the Bar (from the Pilot Book, one considers that the River Bar is located between the inner ends of the training walls, marked by the South Bull and Bluff Lights).
- 6.10 From the Pilot Book it was established that in southerly winds the height of tide increases at the entrance to Drogheda. Some silting can result from prolonged southerly winds. This information was confirmed by the Harbour Master.
- 6.11 By co-incidence, the dredger “*Lough Foyle*” arrived at the port on 17th November 2010 and commenced dredging the maintained section of the channel or fairway. Copies of correspondence provided by the Port shows that the dredger was scheduled to call at Drogheda on that date and that its arrival and operations were co-incidental to the time of the incident.
- 6.12 The availability of locally based tugs was raised during the course of the investigation. Dublin Port has four tugs. However, it is important to understand that these are designated by Dublin Port as harbour tugs and their licensed area of operation is within the Port of Dublin port limits. For these vessels to operate outside these limits Dublin Port would need to change the operation of the vessels in accordance with statutory requirements for sea-going tugs.

- 6.13 The Vessel Traffic Management System (VTMS) operated by the Port was preserved. However, it relied on AIS transmissions rather than GPS data and therefore the image produced tended to jump on the display. However, there was sufficient data to indicate the speed of the vessel and the time of the grounding was confirmed enabling the investigator to draw a conclusion with respect to the cause of loss.
- 6.14 In determining the cause of the casualty it is considered the following played a major factor:
- The weather, the wind and waves would be close to beam on as the vessel emerged from the relative shelter of the training walls and cause the vessel to roll and possibly pitch.
 - The under keel clearance of the vessel, that is the difference between the depth of water available in the channel and the draft drawn by the vessel in its laden condition and the combined effect of squat on the clearance.
 - The Master's knowledge of the port was good and he knew the Pilot well.
 - The Pilot controlled the vessel during the major element of the river passage with the Master taking over as the vessel approached the bar. Thus, the Master was not free to observe what was happening and take evasive action sooner (Refer MCIB report No.58 published on 20/02/2004).
 - There were no reports of alarms on the bridge that would indicate either engine or steering gear failures.
- 6.15 There was a failure to appreciate the effect that the swell would have on the vessel's maximum draft. By calculation it can be shown that the actual under keel clearance of the vessel, that is the gap between the seabed and the underside of the keel, was not more than 0.488 metres in calm conditions. Further calculation shows that if the vessel was heeled by as little as 4° due to rolling the action the under keel clearance would be zero. The weather would make the vessel roll as it cleared the confines of the training wall and this is where the incident occurred (A 4° roll is slight and would not be remarked on).
- 6.16 Another factor, which is more difficult to quantify, is the effect that pitching would have on the vessel's deepest drafts. This is important when one considers that there was only 65 mm clearance between the base of the rudder and the aftermost part of the keel. Thus, in shallow conditions, if the vessel was pitching the rudder was vulnerable to ground contact.
- 6.17 The vessel suffered damage to the port bilge keel as shown in Appendix 8.5.

7. RECOMMENDATIONS

- 7.1 All Masters, Pilots and Harbour Masters should be aware of the effect that rolling has on increasing the draft of a vessel and take this into account when determining a safe under keel clearance for a vessel. It may be safer to postpone departure especially when speed must be reduced for squat reasons as the effects of weather are greater at slow speed.

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Appendix 8.1 Arklow Raider - Principal Particulars.

M.V. Arklow Raider

Port of Registry	Arklow	Yard	Barkmeijer Stroobos, Holland
Call Sign	E I X S	Year of Build	2007
IMO No.	9344540	Class	Bureau Veritas
MMSI No.	250001268	Class Notation	I + HULL + MACH + AUT-UMS
Inmarsat-C (Telex)	+(581) 425000234		MON-SHAFT STRENGTHBOTTOM
	+(581) 425000235		
Email	425000234@stratosmobile.net	Class No.	07983E
GSM telephone (Irish)	+ 353 (87) 9213735	Official No.	404061



© Bert van der Kuijl

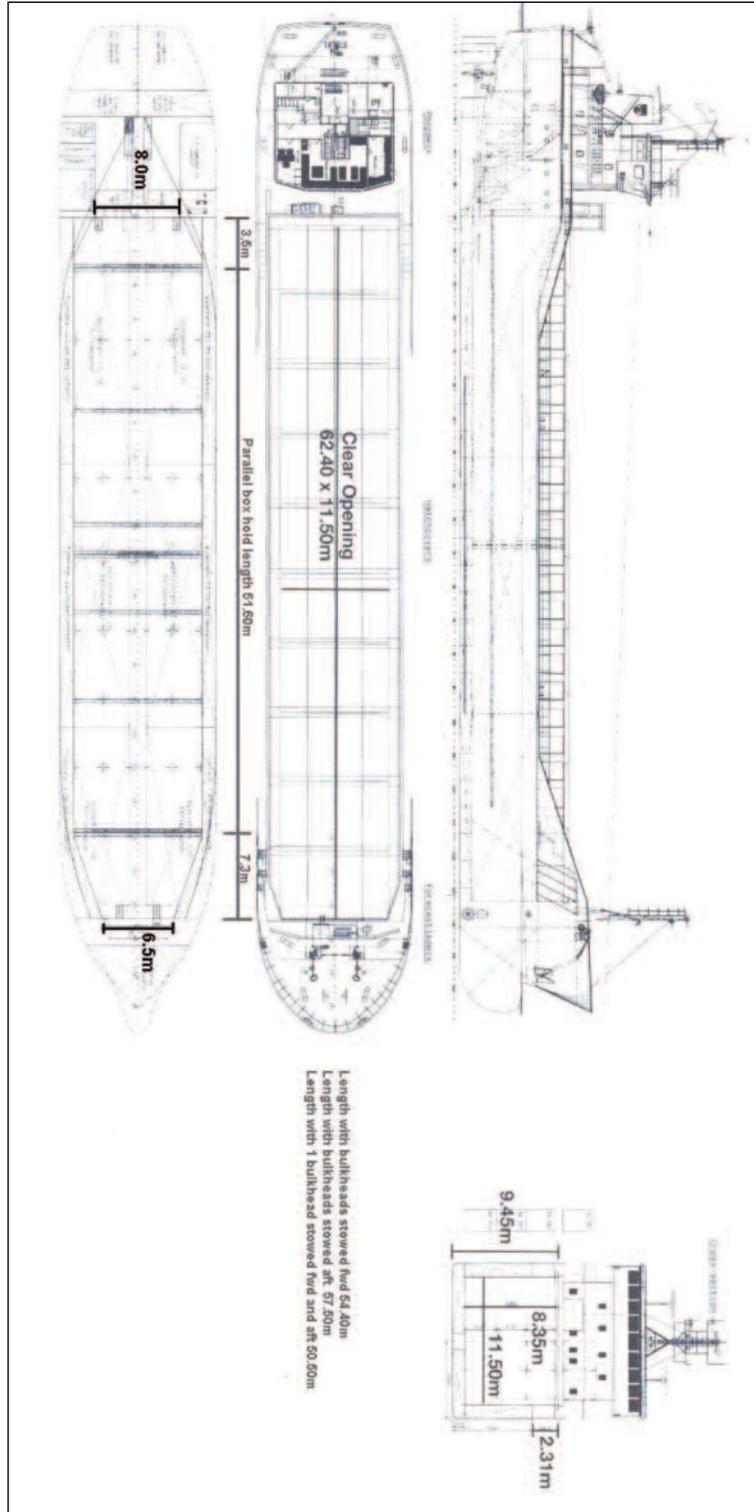
Photo shows mv Arklow Raven (sister ship)

Photo courtesy of Bert van der Kuijl

Principal Particulars

Length OA	89.99m	Hold Capacity: Grain & Bale	Main Engine:
Length BP	84.98m	Incl. bulkheads 207391 ft ³ /5873 m ³	MaK 6M25 1499kW with Scana Volda
Breadth Mid	14.00m	B/H stowed midships 206541 ft ³ /5849 m ³	Gearbox and controllable pitch propeller
Breadth Ext	14.18m	Portable bulkheads (2) may be placed in	Auxiliaries:
Depth Mid	7.15m	9 positions for cargo separation	2 x Sisu Diesel 645BSBIG 180kW 1500rpm
Summer Load Draft	5.679m	Containers:	Generators:
Min. airdraft is	20.60m	Hold	2 x Stamford 210Kva
at max. ballast draft of	4.40m	Deck	1 x shaft alternator M8BM315MB4 400kVA
min. coaming ht above waterline	6.40m	Hatches: Roden Staal pontoon system	Speed: abt. 11.5knots
GT	2999	Maximum hatch top loading 1.5m ²	Consumption:
NT	1639	Maximum tank top loading 15mt/m ²	In port – abt. 0.75t Gas Oil per day
Displacement	5906t	Bottom strengthened for loading aground	At sea – abt. 7.50t HFO per day
Total Deadweight	4485t	Tank top strengthened for heavy cargoes	Equipment:
Ballast	1839m ³	Engine room bulkhead A60 insulated	GMDSS (A3), 2x radars, navtex,
Fuel – HFO	150.52m ³	CO ₂ fire extinguishing system in hold	echosounder, speed/distance log
Fuel – GO	36.42m ³	Engine room fitted with CO ₂ and flexi-fog	2x GPS receivers, A/P,
Fresh Water	88m ³	Certified for the carriage of dangerous	gyro/magnetic compasses,
Lub Oil	8m ³	goods of IMO Class 4.1, 4.2, 4.3, 5.1	1x electric bowthruster 250kW
29/09/2010		and 5.2 (packaged)	E. & O. E.

Appendix 8.1 Arklow Raider - Principal Particulars.



Arklow Raider

Appendix 8.2 Training wall inside Aleria Light submerged.



Appendix 8.3 Screen shots of vessel departing Drogheda Port.

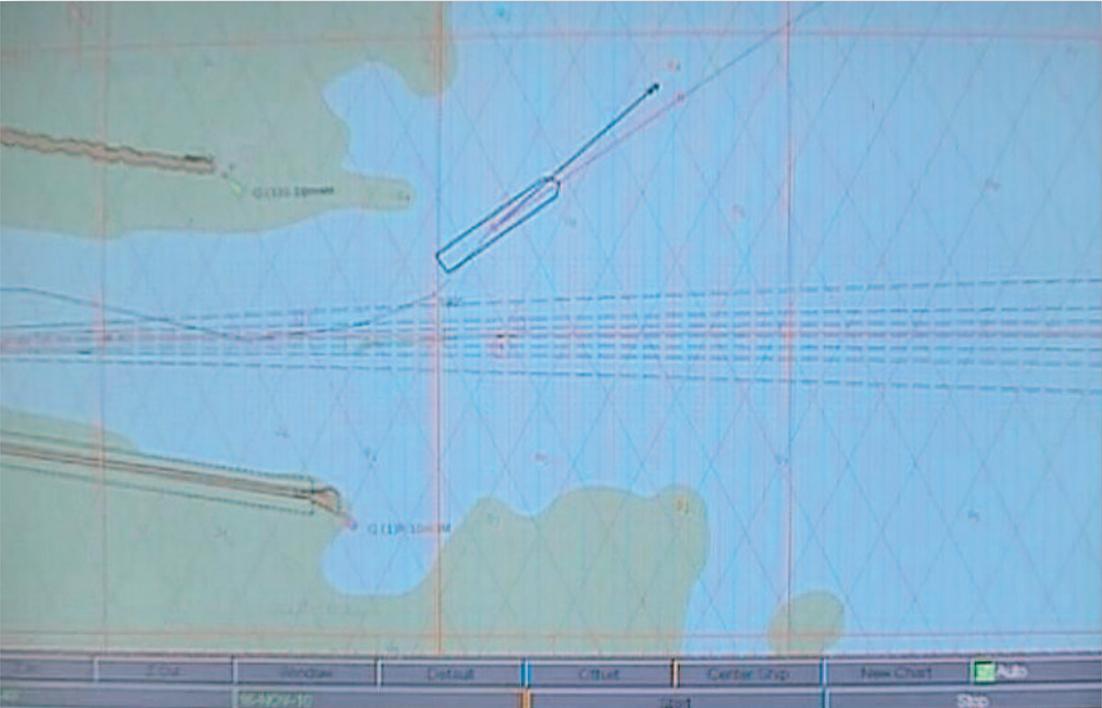


Photo 1



Photo 2

Appendix 8.4 Met Éireann Weather Report.



MET ÉIREANN
The Irish Meteorological Service

Glasnevin Hill,
Dublin 9, Ireland

Cnoc Ghlas Naíon
Baile Átha Cliath 9, Éire
www.met.ie

Tel: +353-1-806 4200
Fax: +353-1-806 4247
E-mail: met.eireann@r

25/11/2010

Our Ref. WS3018/2C_13898
Your Ref. MCIB/195

Estimate of weather conditions in the Drogheda Port, at the mouth of the river Boyne sea area, between 14 hours on the 16th November 2010 and 20 hours on the 17th November 2010

16/11/2010

14-18 hours

Winds: south to south-easterly, fresh to near gale, Force 5 to 7, (20 to 30 knots gusting 35 knots)

Weather: cloudy and dry

Visibility: good, greater than 30 km

Temperatures: air temperature, 10°C, and sea temperature, 13°C

Waves: Moderate to Rough off-shore

16/11/2010

18-24 hours

Winds: south-easterly, Force 6 to Gale Force 8, (25 to 35 knots gusting 40 knots)

Weather: cloudy with outbreaks of rain

Visibility: moderate in rain, 5 km, otherwise good, greater than 10 km

Temperatures: air temperatures 10°C, sea temperatures 13°C

Waves: Moderate to Rough off-shore

17/11/2010

0 – 6 hours

Winds: south-easterly, Force 7 to Gale Force 8, (30 to 35 knots gusting 50 knots)

Weather: outbreaks of rain, heavy at times

Visibility: moderate to poor, 4 to 6 km

Temperatures: air temperatures 10°C, sea temperatures 13°C

Waves: Rough off-shore

...continued

Appendix 8.4 Met Eireann Weather Report.



MET ÉIREANN
The Irish Meteorological Service

Glasnevin Hill, Cnoc Ghlas Naíon Tel: +353-1-806 4200
Dublin 9, Ireland. Baile Átha Cliath 9, ire. Fax: +353-1-806 4247
www.met.ie E-mail: met.eireann@me

WS3018/2C_13898 continued

17/11/2010
6 to 12 hours
Winds: south-east, Force 7 at first decreased to Force 4 to 5 later
(30 knots, later 15 to 20 knots)
Weather: rain cleared to sunny spells
Visibility: good, greater than 10 km
Temperatures: air temperatures 9°C to 10°C, sea temperatures 10°C
Waves: Very Rough off-shore

17/11/2010
12 – 20 hours
Winds: south-east Force 5 to 6, (20 to 25 knots)
Weather: clear or sunny spells and isolated showers
Visibility: good, greater than 20km
Temperatures: air temperatures 10°C, sea temperatures 13°C
Waves: Rough off-shore

A handwritten signature in black ink, appearing to read 'Evelyn Murphy'.

Evelyn Murphy B.Sc. M.Sc. Meteorologist
Research & Applications Division
Met Éireann

APPENDIX 8.5

Appendix 8.5 Damage to port bilge keel.



9. CORRESPONDENCE RECEIVED

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Note: The address and contact details of the individual respondents have been obscured for privacy reasons.

Arklow Shipping

NORTH QUAY, ARKLOW, CO. WICKLOW, IRELAND
TELEPHONE: +353 (0) 402 39901. TELEFAX: +353 (0) 402 39902, EMAIL: chartering@asi.ie

Marine Casualty Investigation Board
Leeson Lane
Dublin 2

Date: 2 December 2011

You Ref: MCIB/195

Re: Draft report of the Investigation into the grounding of "Arklow Raider" at River Boyne entrance 16th November 2010

Dear Mr. O'Donnell,

Thank you for the copy of the above mentioned draft report. We at Arklow Shipping have a few observations and comments we wish to submit for consideration by the board.

In your cover letter you describe this event as a **fatal incident**, this is incorrect, it was a grounding of a vessel.

With regard to the draft report itself we have the following observations and comments.

Section 2. Factual Information

- 2.1 Description of the vessel: Although container fitted, the hold is **not** of cellular construction.
- 2.2 Principal Particulars (Crew Carried): There were seven crew on board at the time of the incident and **not** six as stated. Please amend.
- 2.2 Equipment
Last sentence: Quote "It is important to note that there is no keyway in the rudder stock and the system is completely reliant on the effectiveness of the clamp"
What is the relevance of this sentence? The Clampax coupling is type approved and is only one of many approved clamping systems in use today. It should be noted that many rudders and propellers are fitted to their shafts without keyways. We believe this sentence should be deleted.



DIRECTORS: Sheila M. Tyrrell, James S. Tyrrell, Patrick Corcoran,
James Kavanagh, Adrian Tegglin, Martin Dekker (Dutch), Peter Schalk (Dutch)

Registered in the Republic of Ireland, No. 23605 Registered Office - North Quay, Arklow

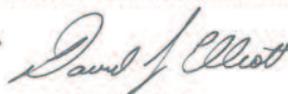
Section 4 The Incident

- 4.1 Second last sentence: Quote "At 1934hrs the vessel would not respond to rudder commands, engine or bow thruster commands." We believe this sentence should be re-written to reflect that the vessel would not respond to rudder commands and as a result engine and bow thruster commands without effective rudder control were insufficient to rescue the situation.

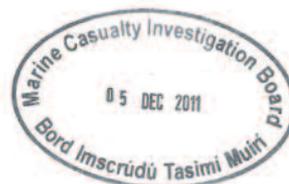
Section 5 Events after the Incident

- 5.4 This is incorrect. Please note Tug "Huskie" arrived off Drogheda Bar during the afternoon of the 17th November and Tug "Mourne Shore" arrived before high tide that evening.
- 5.6 This is incorrect. When checks were made the Forepeak ballast tank was found to be taking water. This was reported, by VHF, to Dublin Coastguard prior to proceeding under tow to Dublin.
- 5.7 This is incorrect. The vessel arrived in Dublin on the morning of Saturday, 20th November.
6. Conclusions and Findings
- 6.2 This is incorrect. Copies of crewmembers certificates are kept by the Personnel Department of Arklow Shipping, as required under our Safety Management System, the investigator never requested to sight such copies.
- 6.5 We fail to see the relevance of this paragraph. The predicted high water was 4.2m above datum when the vessel arrived at Drogheda on the 10th November. When the vessel sailed from Drogheda on the 16th November the predicted high water was only 3.9m above high water. This paragraph should be removed.
- 6.13 "The Vessel Track Mandatory System" please correct this error, should read Vessel Traffic Management System.
- 6.16 The 50mm clearance between the base of the rudder and the aftermost part of the keel is incorrect; it is in fact 65mm. Please correct

Yours sincerely,



David J Elliott
Marine Superintendent
Arklow Shipping



MCIB RESPONSE

The Board notes the comments and has made amendments as appropriate.



24 November 2011

mc18/195
Our Ref. 22/52/2

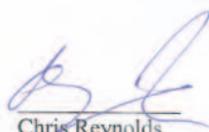
Ms. Eve Reddin
Secretariat
Marine Casualty Investigation Board
Leeson Lane
Dublin 2

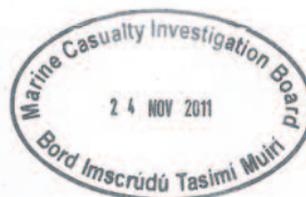
Draft Report of the Investigation into the grounding of "Ark low Raider" at River Boyne entrance 16th November 2010

Dear Ms Reddin,

I wish to advise that the draft report in relation to this incident has been reviewed and the Coast Guard has no observations to make on the matter.

Yours sincerely,


Chris Reynolds
Director



Administration Office, Irish Coast Guard, Department of Transport, Leeson Lane, Dublin 2, Ireland.
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MCIB RESPONSE

The Board notes the contents of this correspondence.



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Mr. John O'Donnell B.L.
Chairman
Marine Casualty Investigation Board
Lesson Lane
Dublin 2

12.12.11

Yr ref: MCIB/195

Re: Grounding on the M.V. Arklow Raider off Drogheda on the 16th November 2010 – MCIB Draft Report

Dear Mr. O'Donnell,

I refer to above and the Draft Report of the MCIB received into this office on the 18th November 2011.

Drogheda Port Company has a number of observations to the Draft Report as set out below.

We note that the incident took place on the 16th November 2010, the MCIB Warrant Appointment to Mr. Eugene Curry was issued on the 20th November 2009. The MCIB notified the Drogheda Port Company of its decision to institute an investigation was dated the 10th January 2011 and the investigator attended the casualty on the 12th January 2011.

We also note in your cover letter the wording "fatal accident". This we consider a poor choice of words given that from the time of the grounding and over the following period until the vessel re-floated, that at no time did the ships Master consider his vessel or crew in imminent danger or request any external assistance other than towage. The Harbourmaster as the local competent authority did not implement the Drogheda Port Company Emergency Plan, but kept it under review.

Equipment:

The draft report draws attention to the fact that there is no keyway in the vessels rudder stock and that the system is completely reliant on the effectiveness of the clamp.

Conclusions and Findings:

6.1 The ships Master was interviewed on the 12th of January 2011. The Arklow Raider was examined also on the 12th of January 2011 as it prepared to leave the dry-dock.

We note that this was 54 days since the incident. All the repairs have been affected. No other interviews with ships serving crew at the time of the incident are recorded. More importantly, given that attention was drawn to the vessels keyless rudder stock and clamping arrangement, no consideration appears to have been given to mechanical failure, inspection of the damaged steering gear, last mandatory or Classification Society inspection, ships records, similar incidents or manufacture recommendations and repairs.

6.2 Only the Master was available for interview.

While the draft report has concluded that the vessel took the ground in the navigation channel considering the weather, squat, increased in draft due to heel etc, this assumption has not been verified either by the Master or Pilot. No other member of the vessels bridge team, engineering staff or crew were interviewed to verify what appears to be the corner stone of the draft reports conclusion to the incident. It should be noted that the vessel become fast outside of the navigation channel.

6.2.3 The Master was on the bridge conning the vessel

6.2.4 The Master acknowledged the vessels position passing the Green light, the northerly set and the corrective action taken to bring the vessel back on the directional light.

6.2.5 The Master acknowledges the sudden sheer to port and taking the ground a minute after the vessels failure to respond to the helm.

The draft report concludes that as the vessel emerged from the sheltered waters of the training walls that the wind and waves would cause the vessel to roll and pitch. While the Master has not recorded any roll or pitch motion of the vessel the Pilot in his report notes that the vessel was pitching moderately. As no other serving crew members were interviewed the extent of the ships motion cannot be verified. The incoming Pilot advised of a 1 -2 mtr swell.

6.14 The draft report refer to the design of the channel and states that up to recently the port attracted ships of smaller tonnage.

The Pilot controlled the vessel with the Master taking over as the vessel approached the bar. Thus, the Master was not free to observe what was happening and take avoiding action sooner.

The conclusion draw and the evaluation used is unclear. We draw to the MCIB attention that prior to April 2000, Drogheda Port was handling vessels up to 100mtrs LOA with a depth of -0.6mtrs at Chart Datum and a 42degree course change on passing the breakwaters. Post April 2000, Drogheda Port has handled vessels up the 128mtrs LOA with a depth of -2.2mtrs at Chart Datum with the direction line running true to the channel.

The draft report wrongly concludes that the Master was not free to take avoiding action. What avoiding action. The Master noted the set to the north, the corrective action, repositioning the vessel on the direction light and immediate loss of helm control. The fact that the Pilot was conning the vessel did not inhibit the Master taking action.

6.15 Consideration of the effects of roll.

6.16 Consideration of pitch and its effects.

6.16 Consideration of bilge keels making contact with the seabed.

Neither the Master nor Pilot recorded that the vessel touched the bottom other than the actual grounding off the channel. Both Master and Pilot are experienced seafarers in short sea shipping and ship manoeuvring. If a vessel were to touch the bottom in the manner concluded in the draft report this impact would have been felt on the bridge and the re-actions of both Master and Pilot would have been appropriate. As no other members of the serving crew were interviewed this bottom contact cannot be verified.

6.17 Consideration of the vessels bilge keels making contact, support by photographic evidence in appendix 8.3, induced veering.

Most likely, the damage to the bilge keels would be as a result of the heave and pitch motion of the vessel immediately after the grounding north of the navigation channel caused in the immediate deterioration of the weather. This motion of the vessel is referred to in the Pilots and Harbourmasters reports. The vessel would have remained in motion until settling fully on the bottom with the ebb tide. This vessel motion would have been repeated on the following flood tide until the weather moderated.

6.18 Consideration of initial contact, pressure on the rudder stock and stock movement within the upper retaining clamp.

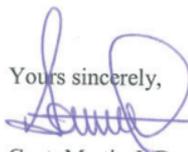
The investigation makes no reference to any inspection of the damaged steering gear, findings on dismantling the gear, repairs, recommendations, manufacture input. The draft report other than highlighting the absence of a keyway gives no further consideration to a failure of the retaining clamp other than by touching the bottom at the moment of passing the entrance.

6.19 The indications were that neither the Master, the Harbourmaster nor Pilot considered the increased in draft causing by the vessel rolling in a seaway at the entrance.

We don't accept the premise of this paragraph. The Harbourmaster attended on board prior to the loading and discussed with the Master the departure draft taking into account of the prevailing and predicted conditions which did not raise any undue concern.

Recommendations:

Drogheda Port Company notes and supports the recommendation of para 7.1. Indeed, this is the practice adopted by the Harbourmaster.

Yours sincerely,


Capt. Martin J. Donnelly *Master Mariner, MNI*
Harbourmaster & Pilotage Superintendent



MCIB RESPONSE

The Board notes the comments and has made amendments as appropriate.

Marine Casualty Investigation Board

Aidan McMahon
Drogheda Pilots

12-12-11

Response to MCIB Draft report into the grounding of the Arklow Raider

Having read your report these are my observations:

The Incident

Your conclusion that the vessel touched bottom, veered to port and ran aground is not correct. There is no evidence whatsoever that the vessel touched bottom before veering to port. The ship was not rolling prior to the grounding. As I wrote in my report the vessel was pitching moderately. The wind direction recorded at the M2 data buoy was 1900 hrs 141.7°T, 2000 hrs 149.8°T. The ships course was 100°T between the breakwaters therefore the wind would be on the starboard bow.

Furthermore, with south easterly wind the sea and swell is funnelled into an east to west direction between the breakwaters. I know this from experience. Therefore the ship would be meeting the sea more or less head on.

If the ships bilge keel made contact with the seabed as you suggest, the impact would have been obvious to everyone on board, yet nobody felt anything. Any damage to the bilge keel would surely be caused after the grounding as the vessel was subjected to a severe pounding for a 24 hour period in a force 9 gale.

Under keel clearance

Height of tide prediction	6.10 mts
Actual height of tide	6.66 mts
Ships draft	<u>5.68 mts</u>
Under keel clearance	0.98 mts

Allowing for ships sag, clearance would be 0.95 mts. Therefore the actual under keel clearance was 0.95 mts.

Preconception

There was a preconceived idea that the ship struck the bar.

During my interview with Mr Eugene Curry, while watching a video of the port company's VTS he remarked, "that's where the contact took place". When I asked him what contact he was referring to, he stated that the ship struck the bar. I stated that neither my report or the Captain's report stated that the ship struck the bar and I asked Mr Curry who said the ship struck the bar. He said "Arklow".

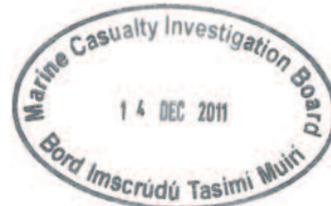
On the day prior to my interview with Mr Curry, he and the harbour master had a telephone conversation during which Mr Curry said the ship had obviously struck the bar.

In my opinion nobody can say for certain why the ship suddenly veered to port.

These are my observations.



Aidan McMahan
Drogheda Pilots



MCIB RESPONSE

The Board notes the comments and has made amendments as appropriate.

29th November 2011

M.C.I.B.
Leeson Lane
Dublin 2
Ireland

Your Ref. MCIB/195

Dear Sir,

Thank you for the copy of the Draft Report of the investigation into the grounding of the "Arklow Raider" off the River Boyne on 16th November 2010, later described in the covering letter as a "fatal incident". May I please advise that no injuries or fatalities occurred and that the vessel was not lost.

I request the Board consider the following comments and observations on the Draft Report:

1. Page 4, 2.1, Factual Information. The vessel does not have a cellular hold, and would rely on stacking cones and twist locks for container carriage.

Page 4, 2.2, Crew carried. The vessel is manned by 7 crew.

Not mentioned in the description is that the hull and its equipment is designed to lie aground and work cargo in ports that dry out at low water, for chartering purposes described as "not always afloat but safely aground". (N.A.A.B.S.A.)

Page 5, 2.3, Equipment. Last paragraph. For readers of the full report to learn from the incident, a fuller technical description of the rudder and steering equipment, its design and operation in N.A.A.B.S.A. ports in particular, would be advantageous in explaining why, rather than just noting, there is no keyway and /or is completely reliant on a clamp.

2. Page 6, 3.2, The Harbour Master was contacted *prior* to any cargo loading operations to establish the maximum permissible draft. During the subsequent two low waters occurring after completion of loading, whilst waiting for cargo settlement, the vessel took the ground at Tom Roes berth in a "down by the head" condition, suggesting the bottom was not level. On refloating on both flood tides, the vessel assumed her required sailing drafts.

Page 6, 3.3 (i) For readers of the full report to learn from the incident, and with reference to above re NAABSA ports, in full compliance with the Company S.M.S. procedures, and good seamanship practise, all pre-departure checks of steering gear, machinery and equipment etc., were made and found in good order.

(ii) The bridge V.H.F. radio was also switched on at the time of equipment testing pre-departure, and as I recall, the incoming vessel boarding its pilot near the pilot boarding / anchorage area outside the bar was having a little difficulty establishing sufficient lee for the pilot boat. The swell height being noted over the radio was not at

the bar, but at the aforementioned area. The exact position of the incoming vessel at that time should be available from the ECDIS "history" hard drive playback on the "Arklow Raider". I recall looking at its position during pre-sea checks.

Page 6, 3.4. The vessels speed reduction commenced before the bend prior to passing Mornington Pier and took into account the known effects on vessels fitted with pitch propellers. Available on the "Arklow Raider" ECDIS hard drive history playback screen, upper left hand corner, is the speed over the ground, by GPS and the speed through the water by Doppler Log. I am not certain that "4.9 knots just before grounding" is an accurate reflection on the reality of what occurred, and could be misconstrued by readers wishing to learn lessons from the full report.

3. Page 7, 4.1 (i) As noted above re ECDIS history playback information, which is tamper proof by crew members, speed *was* reduced, not just "reportedly reduced". Such wording could lead readers of the full report to form misconceptions. Information from the Port VTS is obtained via AIS, and whilst an aid to confirming speed reductions, is not sufficiently accurate, as supported and documented in other marine accident investigations. (I do not recall the number of the U.K. "M" Notice to this effect concerning a collision in the western approaches of the English Channel between two container vessels in good, clear conditions, relying on AIS as a collision avoidance aid, but the judges comments regarding AIS in the subsequent court case seem valid in this instance.)
 - (ii) At all times "Arklow Raiders" engine and bowthruster responded to all commands prior to, during and after, the grounding. The rudder indicator suggested that desired helm applications were being supplied, but after grounding, subsequent investigations proved that it was not the case, though rudder indicator continued to suggest that desired helm applications were in fact being supplied right up until the vessel was drydocked.
 - (iii) "At 1935 hrs, the vessel touched bottom, veered to port, and ran aground" is not correct. The vessel, when still between the breakwaters, ceased reacting to the helm. When it very rapidly became a foregone conclusion that grounding would occur, full thruster was applied to push bow to starboard, and on clearing Aleria Light, full astern was applied by me (a) to reduce any impact when ground was taken, (b) to keep as far as possible the vessels head outwards (east) in the hope of getting off, and (c) to avoid at all costs going aground across the channel which might have broken the vessel at low water and closed the port. As the effect of transverse thrust increased as way decreased, and the bowthruster effectiveness increased for the same reasons but also coupled with the effect of shoaling depth the vessel grounded gently, having gained an easterly heading. Crew were aware of the vibrations from the full astern. Most crew were unaware the vessel had grounded. The port swing was effectively counteracted as far and as quickly as possible. Had the vessel touched bottom, veered to port and then ran aground as described, she would have gained a northerly heading. All of the above described can be viewed on the vessels ECDIS history playback.
4. Page 8, 5.2. The vessel was ballasted down to retain heading and prevent any movement after it became apparent that refloating was not possible on that tide. On each subsequent attempt at refloating the vessel was deballasted.

Page 8, 5.7 I think the vessel arrived Dublin on the morning of the 20th November 2010.
5. Page 9, 6.1. Some crew members present at the time of the grounding were still aboard the "Arklow Raider" on the 12th January 2011 and could have verified some

details contained above, one of whom was the watchman on duty who was preparing the pilot disembarkation arrangements with the Chief Officer who had left the bridge to assist the watchman, when the grounding occurred.

Page 9, 6.2. See above.

Page 9 /10, 6.2.5. The vessel only failed to respond to the indicated helm orders. The limited directional response to directional heading noted above was obtained from correctly functioning engine and bowthruster.

Page 12, 6.9. Please see remarks above ref. 6.3 section (ii) regarding swell information. Serious consideration to delay sailing would be given in the event of swell heights of the magnitude described in the Draft Report if they had occurred in the area of the bar as defined by the Admiralty Pilot book. *No* swell of between 1 and 2 metres was encountered in that area. Please check the position of the incoming vessel when that report was made. Paragraph 6.8 information from Met buoy 2 would be expected given its position, but not in southerly winds and between two training walls irrespective of such walls covering at high water up to 0.7 metres. Given that all crew were awake at the time of negotiating the bar and none of those available on the 12th January in Dublin were questioned to verify the above, is a disappointment to me.

Page 13, 6.13. There was no "loss", and as read, "... there was sufficient data to indicate the speed of the vessel.....", again, any reader wishing to learn from the report would need to know if that data was from the port AIS or the vessels ECDIS history, and also what was the rate of fresh running behind the vessel in the area of the bar at or near to H.W.

Page 13, 6.14 (i) Section bullet point 1, "The weather, the wind and waves would be close to beam on..... and cause the vessel to roll...." Etc. By this time the problem that led to the grounding had already occurred and has no bearing on the cause, whilst also appearing to contradict paragraphs 3.3 and 6.9 given its defined area.

(ii) Section bullet point 5. Irrespective of whether the master was looking astern over the pilots shoulder, or looking over a helmsmans shoulder at the compass, or as I was doing, observing the continuous ECDIS plot and vessels heading, the awareness of something wrong was detected promptly, reported to the Pilot, and immediate action taken to try and rectify the situation. Also see 5. reference page 9, 6.1 above. I am unaware of what avoiding action caused by an unexpected steering failure could have been taken any sooner without being able to foretell the future.

Page 14, Paragraphs 6.15 through to 6.19 inclusive. Irrespective of calculations, apart from slight rolling as the vessel cleared the training walls, *none* of the speculative events described occurred. Eight witnesses were on board the "Arklow Raider". At *no* time prior to the vessel actually grounding, which was controlled as best as possible given the situation previously noted above, did the vessel touch bottom. Three persons on board were aware of the controlled grounding at the time of occurrence: the pilot, myself, and the Chief Engineer who thought he heard stones against the hull. Five other crew were only aware when the alarm was made. There was no violent impact on contacting the seabed on grounding. Given the experienced crew on board, who had all at one time or another sailed on vessels that "sniffed the bottom" whilst negotiating harbour entrances like the Boyne, who in small restricted river ports experienced the deliberate grounding of vessels of a similar size to "Arklow Raider" in order to turn prior to berthing, (e.g.U.K. River Trent ports of Gunness, Keadby etc, or Tonnay Charente,France), all would have immediately been aware of *any* alleged touching of the bottom

prior to grounding. Similarly, anyone experienced in such small ports of the type as mentioned is well aware of squat, where the vessel touches, changes in engine beat and propeller vibrations etc. None of this occurred. The vessel touched nothing, except at its grounded position.

Irrespective of the height above keel of the rudder, on drydocking no evidence of scrape, impact or other damage associated with grounding or squatting onto the bottom at 4 or 5 knots speed was apparent on hull, forward or aft. Undoubtedly there will be photographic evidence from other sources to back this up.

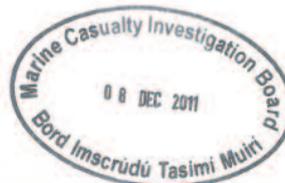
There was evidence of severe upward damage of a type associated with vessels lying aground on uneven hard stony ground, unsupported forward and aft. No tearing of the bilge keels from the hull as a result of bottom contact damage at 4 or 5 knots was apparent. Photographic evidence, including the one attached to the Draft Report, Appendix 8.3, shows upward damage to bilge keels of a type associated with lying on hard, uneven or stony ground. Undoubtedly there will be photographic evidence from other sources to back this up.

On removal of the rudder, no evidence of contact damage to its bottom forward edge of a type associated with bottom contact at 4 or 5 knots was found. There was a round indent on the flat bottom of the rudder, which looked to be old damage of an upward type associated with sitting on a boulder at low water in a NAABSA port. Undoubtedly there will be photographic evidence from other sources to back this up.

The rudder stock was seen to be bent on drydocking, but in the wrong direction to what would be expected if the rudder had made contact with the ground whilst the vessel was making headway at 4 or 5 knots. Undoubtedly there will be photographic evidence from other sources to back this up. The stock was bent over to port of centreline in a direction associated with lying aground on hard uneven bottoms, where successive tides were building sand and stones up on the port side and the vessel was trying to "slide downhill" on the starboard. This was evidenced and logged at approximately 0130 one morning (date currently forgotten) when the strain on the hull parted the hatch securing arrangements with a loud bang. The stock was bent as a result of the grounding, not as a contribution to the grounding. Nobody on board Arklow Raider witnessed any of the events contained in page 14. of the Draft Report.

I request that the Board consider the above observations and comments prior to publishing the full Report into the grounding of "Arklow Raider".


A.T. Jamieson, Master.



MCIB RESPONSE

The Board notes the comments and has made amendments as appropriate.