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See Distribution

18 Sep 08

RECOMMENDATIONS FROM THE BOARD OF INQUIRY INTO THE GROUNDING OF HMS SUPERB

Reference:

A. QRRN Article 5701.

1. The Board of Inquiry into the grounding of HMS SUPERB on 25 May 08 during a submerged transit of the Red Sea reported to me in July and the Board's report has now been staffed. The Board concluded that HMS SUPERB grounded on a charted feature, in position XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX principally because a XXXXXX shoal, on the chart in use, was missed. Significantly, a number of factors contributed, including: the late decision to transit at XXXXXX a failure to consult all available multi source data in order to assess potential hazards, and a failure to check the chart when laying off a new track.

2. I have accepted the Board's conclusions and recommendations. The recommendations, which cover equipment, training and support issues, are forwarded at the Annex for the attention of addressees.

3. The BOI report, without supporting evidence, is forwarded at Enclosure 1. The report is still subject to the redaction process pending formal publication. While I am content to enclose the report in full (in order to give you the context necessary to take forward the required actions in an informed manner) I would ask you to treat the report as being sensitive, paying attention to its protective marking and disclosing no more detail than is necessary to fulfil your responsibilities, particularly to subordinates. Should you wish to access witness statements or other supporting evidence referred to at the Enclosure, you should contact Fleet Legal Operations.¹

4. You will appreciate that my primary concern is to ensure that remedial action is completed as a matter of priority. This incident could have had far more serious consequences, mitigated significantly by the exemplary post incident response by SUPERB's Ship's Company. I look to all of you to ensure that effective measures are put

¹ Point of Contact: XXXXXXXXXXXXXXXXXXXXXXXX

RECOMMENDATIONS AND ACTIONS

1. The principle recommendations of the Board are that:
 - a. COM(OPS) should signal all submarines highlighting the generic lessons identified from this incident. This signal has now been sent².
 - b. **Equipment:**
 - (1) **Fleet WEO SM** to investigate the formal transfer of the WECDIS RPT Laptop from a minor trial to acceptance into service as either a class modification (S, T and V) or alteration and addition (A&A) (paragraph 43).
 - (2) **Fleet WEO SM** to actively pursue connectivity of the WECDIS RPT to NSINS (paragraph 43).
 - (3) **Fleet WEO SM** to investigate feasibility of adding a depth alarm facility to all in service submarine echo sounders (paragraph 53).
 - (4) **Fleet Nav** to alert all submarine COs of the nascent capability of the WECDIS RPT laptop and develop the necessary standard operating procedures (SOPs) for its use in support of navigational safety, both surfaced and dived (paragraph 43).
 - (5) **Fleet Nav** should investigate the provision of a commercial off the shelf Voyage Data Recorder would represent a sensible investment for post event reconstruction, particularly for a serious incident (SUBSUNK) (paragraph 48).
 - c. **Training:**
 - (1) **Fleet Nav and FOST (Shore)** to conduct a thorough review of all relevant SM courses to ensure that all aspects of dived navigation, planning preparation and execution, highlighted by this incident are adequately taught in FNO and the Basic and Intermediate Warfare Course (paragraph 33).
 - (2) **FOST (DN)** to develop an Emergency Operating Procedure for a collision at depth (paragraph 55).
 - (3) **FOST (DN)** to ensure that their training guarantees commonality in the execution of all navigational operations, in particular management of the plot and its associated records (paragraphs 44 & 47).
 - d. **Support**
 - (1) **Fleet Nav** to ensure that BR 45 is updated to reflect operating below MSD and to review and enhance the guidance contained therein. In particular, the

² Enclosure 19-CTF311 ADA/LGQ 231701Z JUN (Superb BOI).

proposal to include a further limiting danger line, in addition to those prescribed in BR45(4), for the submarine's max depth + BVSS be considered (paragraphs 34, 38 & 40).

(2) **Fleet Nav** to thoroughly review mechanism by which specialist products, compiled by UKHO SoS for dived navigation, are automatically supplied to all submarines. (paragraph 37).

(3) **Fleet Nav** and UKHO SoS to investigate the provision of 1:250,000 scale BC charts for this region (Red Sea) capable of being used for navigation (paragraph 39).

(4) **Fleet Nav & Flotillas** to ensure that submarine class standing orders are amended to include clear watch hand over routines. In addition, these orders are to include a robust routine for the hand over of the navigation plot (paragraph 50).

(5) **FLEET Nav** to issue guidance to the submarines to ensure that the Sea Order Book receives the attention that it deserves (paragraph 49).

(6) **Fleet Nav** are to mandate all submarine Navigation Officers to visit UKHO as part of the preparations for any deployment in accordance with FPN 60 (paragraph 27).

in place to reduce the risk of a recurrence. Accordingly, I ask that you provide my office with reports on the initial progress towards achieving these recommendations by 3 Oct 08, and confirmation once they have been completed. If addressees feel that the recommendations are for whatever reason not achievable, I am to be informed immediately, along with full reasons.

Signed on Dii

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RAdm
COMOPS
Convening Authority

Annex:

A. Recommendations and action.

Enclosure:

1. Board of Inquiry Report.

Distribution:

Action:

FOST
Navy Cmd HQ for Fleet Nav and FLEET WEO SM

Information (without Enclosure):

CINC
DCINC
Command Secretary

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Discussion

25. In coming to its conclusions and recommendations and in order to answer the questions posed at Reference A, the Board has chosen to analyse the incident in 4 sections; preparations, planning, execution and actions after grounding.

Preparations

26. **Pre-deployment Briefings.** Prior to deployment, SUPERB's Command Team received a series of pre-deployment briefings. The first of these was the Intermediate Deployment Planning Meeting, chaired by Fleet 'Generate and Employ' at Northwood, on 21 Nov 07, which not only reviewed SUPERB's forthcoming deployment, but also included a 'wash up' of the lessons learnt during XXX. Thereafter, the Main Deployment Brief took place on 22 Jan 08 at the Old War Office Building in London.

27. Using this information and the Submarine Deployment Manual (FPN 60) as a guide, SUPERB's Command Team produced an Action Grid²⁵ and Deployment Risk Register²⁶ for the deployment; standard practice for submarine deployments. Focused at the operational level, this comprehensive pre-deployment briefing package did not concentrate on either navigational or charting issues. However, the Board note that the Action Grid did task the NO to call on the Fleet Submarine Navigator and visit 'HYDROUK Taunton (MS6 Folio)²⁷'; neither visit took place²⁸. In the case of the latter the CO reports that post a phone call, the NO was advised that, as he had visited the UKHO within the year, a further visit was not required. The UKHO have no recollection of such a call. Nevertheless, had the NO conducted such a visit to the UKHO, in the Board's opinion, it is likely that he would have been aware of the full range of dived navigational products available for this area.

28. **Individual Training.** A summary of SUPERB's Warfare Officers qualifications and experience is at Annex A. In sum, all Warfare Officers involved in this incident were found to be STCW compliant. In addition, the LO, who was acting as Plot Officer in the lead up to the incident, had completed the required courses. Thus, in the opinion of the Board, the on watch team were sufficiently experienced to fulfil the roles and duties with which they had been tasked.

29. **Team/Unit Training.** The unit/team training process had begun last year with Submarine Safety Training Continuation (SSTC) 4-7 Jul 07 and Directed Continuation Training (DCT) that followed 11-23 Jul 07, were both completed to a satisfactory standard.²⁹ This was followed by summer leave and a varied programme of operations and trials in UK waters, prior to a short deployment to the Mediterranean 27 Sep-8 Nov 07.

30. Post a pre-deployment maintenance period, Support Period (SP) 2, the submarine completed a further phase of Directed Capability Training (DCT) 21-23 Mar 08 achieving a 'satisfactory standard'.³⁰ This was followed by a final Fleet Operational Assurance visit conducted by XXXXXXXXX (Fleet DACOS UWB), 5-6 May, which concluded that the submarine was 'ready for deployment ...'.³¹ **In the opinion of the Board SUPERB's preparations package was a**

²⁵ Enclosure 8 - HMS SUPERB Temporary Memorandum 84/07 dated 10 Dec 07 (Deployment Planning).

²⁶ Enclosure 9 - HMS SUPERB Deployment Risk Register.

²⁷ 'Marine Science Branch 6' became 'Submarine Operational Support' some time ago.

²⁸ Annex C- CO-91 Co reports that NO did phone Taunton, but as he had been there within the last year agreed that a specific pre-deployment visit was not required.

²⁹ FOST LGH/LGQ 240910Z JUL 07 (DCT Completion signal).

³⁰ Enclosure 10 - HMS SUPERB LGB/LGQ 290909Z APR 08 (HMS SUPERB DCT).

³¹ Enclosure 11 - HMS SUPERB ADA/LGQ 060943Z MAY 08 (HMS SUPERB Operational Assurance Visit).

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approximately xxxxx, who retained this responsibility until the grounding⁴⁷. That said, whilst the NO and CBO were fully Bridge Warfare Qualified Warfare Officers the LO was not and had only received a limited amount of basic navigational training prior to taking up his appointment. Thus in the same manner as a second OOW on the surface, the LO should have warranted greater supervision by both the watch navigator (NO) and the Watch Leader (TASO), to ensure his chart work was correct.

45. **Decision to 'Cut the Corner'**. Post the close quarters drill, conscious of the need to maintain the xxxxx SOA, TASO then ordered the Plot Officer, the LO, to chart a course to cut the corner whilst remaining within the MHN. Once the submarine had altered course the LO laid off the new navtrack which passed directly over the xxxxxshoal⁴⁸. TASO stated that he cursorily⁴⁹ inspected the new track, but again he and the LO failed to note the hazard.

46. **Informing the CO**. Despite being required by SCSSOs⁵⁰ to inform the Captain 'if more than one mile off track'; it was common practice in SUPERB that the submarine could be manoeuvred as required within the MHN by the Watch Leader without recourse to the Command. Furthermore, the CO stated that he 'glanced at the chart'⁵¹ enroute to lunch in the Wardroom at xxxxxx and noted that the DR and EP placed the submarine within the MHN and must therefore have been aware that the alteration to xxx had taken place.

47. **Records**. So far as practicable all available records were examined by the Board and whilst it is assessed that an accurate reconstruction of the incident was possible, there were nevertheless a number of shortcomings. In particular, without NSINS fix data recorded in the Control Room Fixing Log it has proved impossible to use NSINS data as part of the reconstruction of the navigational track. In the Board's opinion the instructions in the front of the Control Room Fixing Log require revision to ensure, when dived, that the SINS position is recorded whenever it is plotted on the chart as an EP to enable reconstruction. It is also proposed that positions from NSINS A&B are recorded for comparison at least hourly⁵².

48. xxx of limited value; the quality of data held was marginal, impossible to copy and could only be listened to onboard SUPERB⁵³. In the opinion of the Board provision of a commercial off the shelf Voyage Data Recorder would represent a sensible investment for post event re-construction, particularly for a more serious incident such as SUBSUNK.

49. **Sea Orders**. CO's sea orders, in the standard submarine fashion, were loose leaf and produced on computer⁵⁴. The original copy for the 26 May was lost during the grounding as the NO went forward to make a minor amendment in the ship's office. That said, apocryphally the CO's intentions note that '[shallow water patches of the Red Sea]...will provide us with no warning of danger and will require the highest accuracy and concentration from the right hand side'. The Board also noted that the Sea Order File did not contain an extract from SCSSOs of the occasions for calling the CO and NO and some pages from historic copies of the Sea Orders were missing although unsigned soft copies exist.

⁴⁷ Enclosure 2 - None of the handovers between Plot Officers were recorded in the Fixing Log.
⁴⁸ Annex C, LO-5: '...As we came around I plotted theXXXtrack...' and later in response to 'Did you spot the XXX patch?', LO-6 'No, Sir'. Then 'Did TASO inspect the chart?' LO-8: ' Yes sir, at the time of the alteration, after I had laid on the new track.'
⁴⁹ Annex C, TASO-2.
⁵⁰ SCSSO (Issue 2) -0107.8.b.(1).e- Informing the Captain.
⁵¹ Annex C, CO- 47 'I looked at the chart whilst going for lunch...' CO-48 ' prior to luch, about xxxxxx.
⁵² Having compared SUPERB's Fixing Log to that of another submarine it was clearly below par.
⁵³ Having examined the recording in some detail only certain microphones were audible and it was only possible to listen to the various channels in SUPERB.
⁵⁴ Enclosure 15 - HMS SUPERB's Sea Orders dated 25/26 May 08.

56. The Board concluded that HMS SUPERB grounded on a charted feature, in position ~~xy~~
~~XXXXXXXXXXXXXXXXXXXXXXXXXXXX~~ principally because a ~~xxxx~~ shoal, on the chart in use, was missed. Significantly, a number of factors contributed: the late decision to transit at ~~xxxxx~~, the failure to consult all available multi source data⁵⁶ to assess potential hazards within the MHN, and to check the chart when laying off the new track (paragraph 45). Furthermore:

a. There were 6 individuals who were involved in either the production of the dived chart for the ~~xxxx~~ transit, or the subsequent conduct of the dived navigation thereon, all of whom could have spotted the ~~xxxx~~ shoal. Of those 6, three were required by regulation to keep the submarine safe from navigational hazard. (paragraph 44).

(1) The NO, also Watch Navigator, until just prior to the grounding, had denied himself the use of the ~~xxx~~ Bottom Contour chart by focusing exclusively on the better scale of British Admiralty chart with no regard for the clarity of data displayed on the former. This led to the ~~xxxx~~ shoal being difficult to identify and thus it was missed and wasn't hatched as a 'No Go' area within the moving haven, as it should have been (paragraphs 6 & 36).

(2) The evidence suggests that the Watch Leader's total reliance on the Plot Officer's control of navigating the submarine dived, without recourse to anything more than cursory oversight, was contrary to QRRN 2323.5 (paragraph 45).

(3) By his acceptance of a late brief, the Command unduly constrained its ability to scrutinise a vast amount of data on the dived chart; additionally, the relatively late decision to conduct the transit at a depth of ~~xxxxx~~ meant that any additional limiting danger lines were left to the on-watch team to construct. With the ultimate responsibility for submarine safety, the evidence is compelling that sufficient checks and balances were not present in the Command's onboard processes to prevent an incident of this nature occurring (paragraph 35).

b. Whilst it is assessed that an accurate reconstruction of the incident was possible, there were nevertheless a number of shortcomings with the compilation of the submarine's routine records (paragraphs 47 & 48).

c. The concurrent watch handovers restricted close scrutiny of the chart, just prior to the grounding, by members of the on coming watch which might, with a fresh set of eyes, have identified the hazard posed by the ~~xxxxx~~ shoal. (paragraph 50).

57. It was further concluded that:

a. All officers involved in this incident were found to be STCW compliant. In addition, the on watch team were sufficiently experienced to fulfil the roles and duties with which they had been tasked (paragraph 28).

b. The submarine had successfully completed all mandated training and inspections prior to deployment and the navigational equipment in use was accurate, functioning correctly and in date for calibration and maintenance, at the time of the incident (paragraph 30).

c. The Board had no concerns with actions taken after the grounding (paragraph 54).

⁵⁶ This includes both paper and electronic charting.

Recommendations

58. The principle recommendations of the Board are that:

a. COM(OPS) should signal all submarines highlighting the generic lessons identified from this incident. This signal has now been sent⁵⁹.

b. **Equipment:**

(1) Fleet WEO SM to investigate the formal transfer of the WECDIS RPT Laptop from a minor trial to acceptance into service as either a class modification (S, T and V) or alteration and addition (A&A) (paragraph 43).

(2) Fleet WEO SM to actively pursue connectivity of the WECDIS RPT to NSINS (paragraph 43).

(3) Fleet WEO SM to investigate feasibility of adding a depth alarm facility to all in service submarine echo sounders (paragraph 53).

(4) Fleet Nav to alert all submarine COs of the nascent capability of the WECDIS RPT laptop and develop the necessary standard operating procedures (SOPs) for its use in support of navigational safety, both surfaced and dived (paragraph 43).

(5) Fleet Nav should investigate the provision of a commercial off the shelf Voyage Data Recorder would represent a sensible investment for post event reconstruction, particularly for a serious incident (SUBSUNK) (paragraph 48).

c. **Training:**

(1) Fleet Nav and FOST (Shore) to conduct a thorough review of all relevant SM courses to ensure that all aspects of dived navigation, planning preparation and execution, highlighted by this incident are adequately taught in FNO and the Basic and Intermediate Warfare Course (paragraph 33).

(2) FOST (DN) to develop an Emergency Operating Procedure for a collision at depth (paragraph 55).

(3) FOST (DN) to ensure that their training guarantees commonality in the execution of all navigational operations, in particular management of the plot and its associated records (paragraphs 44 & 47).

d. **Support**

(1) Fleet Nav to ensure that BR 45 is updated to reflect operating below MSD and to review and enhance the guidance contained therein. In particular, the proposal to include a further limiting danger line, in addition to those prescribed in

⁵⁹ Enclosure 19-CTF311 ADA/LGQ 231701Z JUN (Superb BOI).

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BR45(4), for the submarine's max depth + BVSS be considered (paragraphs 34, 38 & 40).

(2) Fleet Nav to thoroughly review mechanism by which specialist products, compiled by UKHO SoS for dived navigation, are automatically supplied to all submarines. (paragraph 37).

(3) Fleet Nav and UKHO SoS to investigate the provision of 1:250,000 scale BC charts for this region (Red Sea) capable of being used for navigation (paragraph 39).

(4) Fleet Nav & Flotillas to ensure that submarine class standing orders are amended to include clear watch hand over routines. In addition, these orders are to include a robust routine for the hand over of the navigation plot (paragraph 50).

(5) FLEET Nav/FOST DN to issue guidance to the submarines to ensure that the Sea Order Book receives the attention that it deserves (paragraph 49).

(6) Fleet Nav are to mandate all submarine Navigation Officers to visit UKHO as part of the preparations for any deployment in accordance with FPN 60 (paragraph 27).

Annexes:

- A. Summary of HMS SUPERB's Warfare Officers Qualifications and Experience.
- B. Summary of Navigational Equipment Accuracy and Serviceability.
- C. List of Witnesses and Interview Transcripts.

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