SECTION 3. ACTIONS OF THE SHIP'S COMPANY, THEIR TRAINING AND COMPETENCE

3.1 All members of the ship's company contributed in some way or other in successfully overcoming fire in the MMS. The fire, which was initially intense, was extinguished without further loss of life or loss of the ship; both events which could quite easily have occurred. This was a good effort on the part of HMAS WESTRALIA's company, due in no small part to the determination of the ship's firefighting teams to press home their attack on the fire in extremely difficult and hazardous circumstances.

3.2 The purpose of this section is to examine standard RAN procedures for firefighting and determine whether they were adequate to deal with the fire, whether they were followed and if not why not, and finally, if they require amendment or reinforcement. The Australian Book of Reference (ABR) 5476 Vol.1 entitled, 'RAN Ship Damage Control Manual', sets out the RAN's DC policy and recommends standard operating procedures for dealing with, amongst other things, fire and flood at sea. WESTRALIA also has a Ship's Emergency File which highlights any changes to the RAN's standard operating procedures (SOP) due to the specific design or equipment matters peculiar to the ship.[E112]

3.3 Set out below is the Board's analysis of the actions of the ship's company on 5 May 1998 and comments on training issues. Firefighting equipment and other safety equipment issues are dealt with separately in Section 7 of this Report.

INCIDENT COMMAND

Incident management strategy

3.4 Any ship firefighting strategy requires that the incident commander choose between an offensive or defensive strategy. The strategy adopted must consider the dangers to firefighting personnel and exposures must be weighed against the dangers to the vessel and cargo. Command responsibility lies with the Commanding Officer (CO), CMDR Dietrich, who generally remains on the bridge or where he deems that he can best monitor the incident in order to maintain an overall perspective.[E111,T1544] The Marine Engineering Officer (Engineer), LCDR Crouch, is WESTRALIA's Action Damage Control Officer (DCO). When the ship goes to emergency stations, LCDR Crouch is responsible for the overall co-ordination of the firefighting and damage control from HQ1. He is also responsible for advising command of the situation and making recommendations. On 5 May 98 there appears to have been some confusion as to the strategy being adopted as the actions being taken included direct attack or search and rescue (hose team entry 1051), indirect attack (1101 CO_2 drench) and direct attack again (hose team entry 1126).[E129]

3.5 The length of the communication chain may have compounded the problem of determining the firefighting strategy. For example, the CO requested a hose team enter the MMS to search for people missing prior to the CO_2 dump. Yet when hose team 1 entered the MMS the first time, they were intending to fight the fire not to conduct a search.

3.6 The message to conduct a search came from the CO and was directed to LCDR Crouch, then probably took the following route: the Engineer to LEUT Gishubl, to PO Edmonds, both in HQ1, to Aft DC message receiver to CPO Jenkins, to LS Bromage, and finally to LS Daly who was the hose team leader. Clearly, this lengthy communication process could result in the context of a message being altered slightly each time the message was passed on. In addition, each individual was under considerable pressure and some messages were delivered by sound powered phones which were not operating well.[T2291, T1691] The position of the Executive Officer (XO) as Rover is designed to reduce these communication difficulties.

3.7 At no time during the incident did the command team, namely the CO and his senior officers, assemble to discuss a firefighting strategy, the problems being encountered, determine objectives, and tactics.[T3206, T2982] There was also no evidence that a review process was undertaken to check if the plan was effective and that targets were being achieved.

3.8 Immediately after the CO_2 drench, the command team had time to discuss all of these factors and determine the way ahead. Such an approach may have pooled the group's knowledge of CO_2 on how the gas extinguishes fire and the hazards of an early re-entry. This type of discussion may have also uncovered that CO_2 had a limited cooling capacity and 15 minutes was insufficient time to notice a significant temperature drop. The hose team may not have been committed to re-enter if an analysis of the temperature readings had been undertaken and identified deficiencies in the recording process.

3.9 What is clear is that a number of personnel had very limited knowledge of CO_2 and how it extinguishes fire. As the gas is used as the fixed fire extinguishing agent in WESTRALIA and is relied on to combat major fires in either the ship MMS or after pumproom, the crew should know more about its properties. In addition, there was limited discussion between members of the command team as to the best strategy to employ to combat the fire.

Conclusions

3.10 The command team should have consulted to determine the objectives, strategies and tactics to combat the fire.

3.11 The command team did not meet on a frequent basis during the incident to pool information, evaluate strategies and set appropriate objectives.

3.12 The command communication chain was very long.

Decision not to anchor

3.13 Following the start of the fire in the MMS and the loss of the main engines, HMAS WESTRALIA was 'not under command', disabled and drifting. Anchoring the vessel under such circumstances would have removed any risk of grounding; released experienced bridge personnel and those on the forecastle to combat the fire; and removed any immediate requirement to tow the ship. It would also have allowed the ship to lie to the wind so fumes and smoke were directed over the stern. This may have affected helicopter operations but in the event there was little smoke evident after the CO_2 drench.

3.14 The decision not to anchor was based on concerns raised by the CO, CMDR Dietrich, in consultation with the Navigation Officer, LCDR Triffitt.[T137-138, T3154] Their concerns were namely that:

a. in the absence of electrical power, the cable could not be recovered;

b. it could be hazardous to cut the cable;

c. it would be difficult to stop a joining shackle between the winch gypsy and the hawse pipe;

d. breaking a joining shackle could also be hazardous; and

e. it would hamper the ship being towed clear of the coast if the fire situation deteriorated.

3.15 At 1025 the vessel was approaching the number 1 buoy in Deepwater Channel, on a course of 005.[E91] Just before 1030, WESTRALIA reached the wheel over position and started to alter course to port. When the vessel reached a heading of 335 degrees, 10 degrees of starboard rudder was applied to check the swing. A few seconds later, just before 1031, the bridge received the request to shut down the port main engine (PME).

3.16 With the loss of the PME, the ship continued to swing to port until the swing was eventually checked and the ship started to turn to starboard. When power was lost on the starboard main engine (SME) at 1035, WESTRALIA lost way and lay on an easterly heading.

3.17 The drift under the influence of the wind was to the north towards an 8.2m shoal (Australian Tidal Data). The wind was from the south at 15 knots, the predicted high tide at Fremantle was at 1045, with the tide remaining at virtually 0.9 m above the datum until about 1730. There was a one metre swell recorded at South Passage Beacons, about 5 miles south of WESTRALIA.[E165]

3.18 Between 1108 and 1220, the ship drifted at a rate of about 0.5 of a knot over a distance of 1220 metres. The tug TAMMAR established the tow at 1219 when the ship's bridge was less than 200 metres from the shoal patch.

3.19 The nearest approach to the shoal, based on radar distances from Rous Head, (6.4 miles - Mudrup Rock, 4.63 miles - fairway racon buoy, 1.65 miles respectively) was at 1226 when the vessel was within 130 metres of the shoal.[E17A] At a maximum draught of 9.15 metres and given the existing environmental conditions there was a very real risk of grounding, breaching the hull and the consequent oil pollution.

3.20 The Navigation Officer, when asked about the proximity of the 8.2 metre shoal stated:

> I can't remember how far away from it we were at the time but we were being set towards the shoal by the - - or drifting towards the shoal under the influence of the wind. We discussed the use of an anchor to keep us off the shoal. We went into a fair bit of discussion about it and basically decided that the use of the anchor was to be a last resort because we had no power to get the anchor back and even breaking the cable without power to veer or heave so that we could put slips on to take weight off it and things like that, would have been particularly dangerous…[T137]

3.21 Later the Navigation Officer was asked about the correlation between TAMMAR's estimate time of arrival (ETA) and the projected time of grounding on the 8.2 metre shoal:

> Did you have any, or did you think about any correlation between 'Tammar' ETA and I will say the ETA on the 8.2-metre shoal?---I was constantly working on that. I had my offsider on the chart fixing, calculating sets and rates and giving us estimated times to the shoal. When we had radar, when we had emergency power, I was getting ranges to 'Tammar' and working out from that her ETA to us and correlating the two to work out who would get there first and fairly soon it became apparent that 4 to 5 minutes before impact on the shoal 'Tammar' would be with us.[T141.1]

3.22 SBLT Davey who was in charge of the forecastle head when asked about preparations to anchor the ship and preparing for the tow stated:

> Well, it's only from hearsay what I heard but I'd heard anything from 150 yards to 300 yards and from 1 minute to 3 minutes, but that was only afterwards.[T1605]

3.23 LEUT Read, blind safety officer, was asked about monitoring the ship's position. She was also asked if she could remember how close they came to the shoal:

> I didn't physically. I called out the fix to my assistant. I didn't actually plot it on the chart, but he did tell me later that we went inside the clearing bearing.[E204,T3341]

3.24 LEUT Humphrey, assistant officer of the watch (AOOW), was plotting WESTRALIA's position based on the radar distances taken by LEUT Read. He was asked how close the ship was plotted to the shoal and replied:

> We got within about 150 yards, sir.[E171, T2490]

3.25 Later LEUT Humphrey was asked whether he was asked to alert the Navigation Officer if the ship came within a certain distance.

> No, sir. I don't think so. The Navigator was quite specific in saying, yeah, 'I need continual updates from the distances to the shoal.' And he also asked me to provide set and rate, tidal set and rates, figures, and I think I made two or three of them, two or three reports to that degree, telling him we had about, like, 1 knot of tidal stream pushing us in whichever direction.[E171, T2490]

3.26 He was also asked about any discussion on anchoring:

> Yes, I do, sir. I only picked up snippets of it, but there was some discussion between the command, you know, the Navigator and the Captain regarding the legalities involved with having the pick go down. Now, I can't recall whether the Navigator wanted to or didn't want to, but my impression was, and it really only is an impression, sir, was that they didn't - - they wanted to leave it unless it was absolutely necessary, otherwise there were legalities to do with salvaging. I am not sure.[E171, T2490]

3.27 The CO stated that he thought the nearest approach to the shoal was about 200 yards.[T3174] When later shown the radar ranges taken from the OOW notebooks he

conceded that WESTRALIA was within the limiting lines drawn on the chart and closer to the shoals than he thought, but:

> . . . at the time I was willing to back my judgement that we were going to get connected up and get clear.[T3194]

3.28 The CO when asked about the danger of grounding, stated:

> Just getting back to the proximity of the navigational danger and so on. It was always in the back of my mind that the ship was only doing half a knot, quarter of a knot, towards it, and that it - - I guess, you know, even if we had touched, I don't think it was going to incur a lot of damage to the ship, compared to the danger that was from the fire. The fire was a much greater danger than a touch on the bottom at that stage. However, being a professional Naval officer, I didn't want to run aground as well, and would have used the anchor if I thought I was going to.[T3174]

3.29 Although the Navigation Officer carefully calculated the rate of drift against the ETA of the tug TAMMAR, WESTRALIA drifted within the predetermined limiting lines. Whatever the estimated time interval may have been before the ship would have grounded, the reality is that the ship's radar scanner was 130 metres from the shoal when the tug was secured and started to tow WESTRALIA. Had the tug experienced any difficulty in passing the tow rope or had the rope parted, as later occurred, it would have been too late to anchor. The length of the ship, the scope of cable and the prevailing wind would have made grounding almost certain.

3.30 Given the swell condition at the time, even a low velocity impact would probably have involved some damage to the hull and release of oil. A pollution incident in close proximity to the coast and a major population centre would have compounded the serious problems already being faced by WESTRALIA.

3.31 There was a real risk of the ship grounding and causing a pollution incident. In assessing the risk, more weight should have been given to the consequences of grounding. The fact that the ship did not ground and was towed clear of danger does not mitigate the failure to give insufficient weight to the very real risk that existed.

3.32 Submissions were received from the CO and Navigator in relation to the decision not to anchor. The CO took full responsibility for the decision stating that it was based on his best judgement at the time as previously stated to the Inquiry.

Conclusion

3.33 The Board is not convinced by the reasons offered for the decision not to anchor. If an emergency cable run was rigged between the emergency switchboard and the hydraulics room, the anchor might have been able to be raised. Whilst breaking the cable and slipping an anchor is not an everyday occurrence, such an evolution could have been undertaken with tug assistance if the CO considered it necessary. The Board considers that the decision not to anchor was an error of judgement. Anchoring would have reduced areas of concern to the command team, particularly that of a possible grounding.

3.34 Had the ship gone to anchor this would have released a number of experienced personnel for firefighting, as well as allowing the command to

concentrate totally on the emergency at hand without the nagging worry of running aground.

Decision to CO2 drench

The Engineer's first recommendation to CO_2 drench (1039)

3.35 At 1039 LCDR Crouch telephoned the bridge and spoke with the CO recommending an immediate CO_2 drench. The Engineer gave evidence that he based his recommendation on his own observations in the MMS and his belief that a carbon dioxide (CO_2) fixed system drench would be more benign than the carbon monoxide from the smoke. The Engineer was of the view that, at this time, there was still the possibility of a trapped person locating an emergency life support respiratory device (ELSRD) or being in a relatively smoke free area such as the bilges.[E188 and T2836] The CO declined to activate the CO_2 drench at this point and directed that a hose team be sent into the MMS to search for missing personnel.[E199, T3150] The Engineer explained:

> Now, I…said to the commanding officer, recommended the CO_2 drench, I knew what his answer was going to be because that's the answer that I would have given me if I was the CO and someone had rung me up and that to (me), 'No, go in and search for them,' but that's the advice I had to offer him because that's what I felt at the time. I didn't believe I had the time or that the commanding officer would be prepared to spare the time to listen to me explain…the reasoning behind my wanting to CO_2 drench and I can't reiterate enough that I honestly believed the commanding officer's decision was correct in saying, 'Do not CO_2 drench. Search' [T2947-48]

The Engineer's second recommendation to CO_2 drench (1057)

3.36 The CO left the bridge and went to HQ1 to discuss the status of the fire with LCDR Crouch. There was still a major concern over the missing personnel, but there was a realisation that the personnel in the MMS were unlikely to be alive. Command priority shifted to saving the ship.[E91, T1527] The CO was also aware that hose team 1 was having difficulty making progress past the upper landing adjacent to the fridge flat due to heat and heavy smoke.[E199, T3151] The Engineer strongly recommended to the CO that the MMS be drenched in 5 minutes time. The CO approved the recommendation and directed LCDR Crouch to continue searching the MMS for a further 5 minutes and then to activate the CO_2 drench.[E188, T3151] The CO then returned to the bridge.[E199, T3151]

Command approval to activate the CO_2 drench (1101)

3.37 The Engineer sought further command approval from the CO immediately prior to ordering the CO_2 drench at 1101. In giving evidence, the CO explained that he had concluded that it would have been impossible for anyone to have survived given the heat and smoke and the fact that 25 minutes had elapsed from the start of the fire. He approved LCDR Crouch's request to CO_2 drench.[E199, T3151] The CO_2 drench was activated at 1101.[E155, E91]

Conclusion

3.38 The Board supports the CO's command decision to CO_2 drench and is of the view that the reasoning behind the decision to activate the system at 1101 was appropriate.

Emergency organisation with Special Sea Dutymen on watch

3.39 When a ship is sailing in confined waters with increased risk of navigational dangers, additional and more skilled members of the ship's crew are required to be closed up to assist with the safe navigation of the ship. These personnel are termed Special Sea Dutymen (SSD). In the event of an emergency when personnel are not at 'action stations', personnel not already on watch will be sent to 'emergency stations' to provide the best organisation under the prevailing circumstances, to deal with the emergency.

3.40 At the outbreak of the fire in WESTRALIA, many of the ship's company were at their special sea duty station. When hands were sent to emergency stations, some personnel who would normally be available for firefighting duties, at one of the two Section Bases, were not available. This will always be the case when special sea dutymen are closed up, and as happened on the day, the I/Cs of the section bases will have to improvise and detail other personnel to fill positions required until other personnel can be released from their special sea duty station.

Use of the Standing Sea Fire Brigade

3.41 The SSFB is a five person emergency response firefighting party. If the SSFB is unable to quickly extinguish a fire with the firefighting appliances, then the ship will go to emergency stations.

3.42 The SSFB was piped to the MCR and assembled in the main switchboard room at 1032 [E91] to await further direction.[T275] The EOOW, POMT Herridge, told the I/C SSFB that he wanted the SSFB in the MMS as a precautionary measure. The Engineer countermanded the order as he wanted to keep as many people out of the MMS as possible.[E31, T275] The Engineer gave evidence that he was worried about 'slip hazards' due to the fuel that could be on the decks and ladders; further, the two members in OCCABA would have an additional difficulty descending the ladders into the MMS.[E188, T2835]

3.43 Following the commencement of the fire and as 2 members of the SSFB were dressed in breathing apparatus (BA) the team leader, PO Manderson, asked 'the engineer' if he wanted them to enter the engine space. The engineer replied, 'No'.[T276] PO Manderson reported to HQ1 that the MCR was filling up with smoke.[T276] Again PO Manderson told 'the engineer' that he had people on air and asked whether he wanted them to go into the MMS to search for the missing personnel. He was told no by the engineer. PO Manderson stated that LCDR Crouch said, 'Just wait mate'.[E31, T276]

3.44 Both LCDR Crouch and WO Bottomley had opened the starboard MCR door and the port workshop door and looked into the MMS after the fire had started.[T2835, T26] There were two sailors dressed in intermediate rig in the MCR at the time. Evidence was given that the MMS staff routinely accessed the MCR from the lower and middle plates by the port ladder and the MMS workshop. Given that there were four OCCABA stowed in the MCR, it would have been possible to equip two backup personnel and allow

the two SSFB sailors to make a controlled entry to the MCR. Strict conditions could have been imposed to make a quick assessment of the situation as to the feasibility of remaining in the MMS to search close to the port access door for any MMS staff. The Engineer made the difficult decision not to risk further personnel and the SSFB were not used.

Conclusion

3.45 The SSFB should have been properly trained to make a controlled entry into the MMS to:

a. evaluate the situation;

b. conduct a snatch rescue; and

c. guide personnel to safety.

Recommendation

3.46 DC training should emphasise the importance of conducting search and rescue procedures.

Personnel in Tiller Flat

3.47 AB Noles was alone in the aft steering compartment, which is his special sea duty position. The compartment is just aft of the MMS.[E187] He heard the pipe that the ship was going to emergency stations. AB Noles unsuccessfully tried to contact the bridge on his sound-powered headset, then depressed the button to the bridge but got no response. He went into the passageway leading to the MMS where he saw a huge column of flames going straight to the top of the MMS. AB Noles tried to get firefighting equipment from the passageway to the MMS but was beaten back by the heat and smoke. He was unable to close the door between the MMS and the tiller flat as it was held open by rope lashing. Therefore the MMS and tiller flat can be considered to be one space for the purpose of fighting the fire.[E187] AB Noles evacuated through the emergency escape hatch.

3.48 AB Noles stated that he did not contact the bridge straight away to report that he had evacuated the tiller flat as he was intercepted by LS Bromage and CPO Jenkins who directed him to move firefighting gear to the hose flats. He telephoned the bridge immediately afterwards to report that he was out of the tiller flat.[E187]

Conclusion

3.49 AB Noles should not have been on watch alone in the tiller flat.

3.50 AB Noles should have advised CPO Jenkins that he had to report to the bridge before assisting to shift the firefighting gear.

Effective utilisation of female sailors

3.51 LS Page gave evidence that she took offence when she heard on the Maxon radio, 'We need a hose team to aft DC. WESTRALIA personnel only and no girls'.

> I don't know who made the comment. This comment annoyed me. I could not understand why it was made, when LS Durnan had done such a good job as a member of a hose team. She went in three or four times, and always gave accurate reports [T2424, T2425]

3.52 When questioned on this matter, LCDR Crouch gave evidence that he made statement to that effect in relation to the extrication of casualties. He was questioned in the following terms:

> Is there a reason why you stipulated men, not women?---- 'Yes, sir. It's - - I've got two children in the Navy: one's a son, and a daughter. And I wouldn't like my daughter to go down and have to do that'.
>
> So, you are thinking perhaps that a male would have been more capable? ---- No, not - - well, that the male would be physically stronger, and I - - you know, to be able to manipulate the people; and I believe the psychological make-up of the female would, you know, pretty - - be more scarring to them.[T2938, T2955]

3.53 In today's times of equality and with female sailors comprising approximately 25 percent of the crew this would appear not to have been an appropriate call to make. There is no evidence to suggest that the women on board suffered from a greater stress reaction than any of the men. There is also no evidence to indicate that female sailors were not capable of performing any duty as competently as their male counterparts.

Conclusion

3.54 The comment made about 'no girls' was well intentioned but inappropriate. Female members of the crew performed their duties as competently as their male counterparts.

EMERGENCY PROCEDURES AND FIREFIGHTING TECHNIQUES USED

Reactions to the fuel leak

3.55 Reactions to the major fuel leak on the port engine could have been improved. The Board heard evidence that the size of the leak was such, that it compared in volume to a garden hose in use.[T1850] WO Bottomley acknowledged that the situation which presented itself in the MMS was very dangerous with a risk of fire and explosion.[T255] Fire hoses laid out in the MMS as a precaution against fire were not charged, nor was foam laid in the bilges as a precaution against fire.[T1487, T1888] Consideration might have been given to evacuating non-essential personnel from the MMS at the time.[T255]

3.56 On finding the leak on the port main engine (PME) located on the bottom plates, PO Hollis had to return to the machinery control room (MCR) to make his report as there was no other method of communicating with the MCR. On entering the MCR, he yelled to the PO Herridge, the Engineering Officer of the Watch (EOOW), that there was a major fuel leak on the PME.[T1821] PO Hollis described the leak as big by normal standards and stated, 'That's the largest fuel leak I have ever seen'[T1856, T1857] When questioned on how long the fuel could have been leaking he stated, 'I don't know when the last set of rounds had been done. It could have been 5 minutes before; it could have been 10, 15 minutes before. I don't know'.[T1888]

3.57 WO Bottomley stated, 'When I got near the port engine, I could see that there was a major high pressure fuel leak. There was a vapour cloud above the port engine. It was misty. The vapour cloud was above the port main engine, and going up'.[T23-24] In the course of his evidence, WO Bottomley was asked if the situation was very dangerous he replied, 'I regarded the fuel mist that was above the port main engine dangerous'.[T3453]

3.58 LCDR Crouch, stated, 'Someone entered the MCR from the MMS. I do not recall who. I asked him what it was like down there. They asked me what I meant and I asked if there was dieso dripping from the upper reaches, or is there a mist or what. Whoever it was told me that there was a mist'.[T2834] In relation to the Standing Sea Fire Brigade (SSFB), he went on to state, 'The PO in charge started to lead his people out of the MCR and into the MMS. I pulled him up because I was worried about slip hazards due to the fuel that could be on decks and the mist report had alarmed me'.[T2835]

3.59 Clearly, the senior MMS personnel were concerned about the fuel leak and the mist that had been reported. In addition, it was uncertain how long the fuel had been leaking before being noticed.[T1888] The perceived level of risk can be gauged by the urgency with which personnel were dealing with the problem. A number of people were running around setting up equipment, which suggests the situation was dangerous. However, while the crew may have perceived the risk to be high they did not evaluate the information before them and respond with appropriate tactics.

Charging of hoses laid out in the MMS

3.60 Whether or not the fire hoses that were laid out in the MMS should have been charged is a contentious point. The case against charging the lines is the number of electrical hazards. The other point of view is; why bother to run out lines of hose if they are not going to be charged?

3.61 When asked if the hoses were charged, WO Bottomley stated, 'we don't charge fire hoses in the MMS because of the amount of electricity we have there'.[T56] While WO Bottomley was concerned about the electrical hazards, he nevertheless assisted AB Carroll position an AFFF extinguisher for use in the event of fire.[T25] If directed onto electrical equipment, the firefighting stream from a foam extinguisher would also conduct electricity.

3.62 The danger of not charging the lines is that once a fire has started, there is a delay in turning on hydrants, charging the lines, preparing foam supplies and directing the nozzles. This does not mean that fires hoses are charged every time there is an event in the MMS. Whether or not fire hoses are charged should depend on the perceived level of risk the incident poses to personnel and the ship. Accordingly, an appropriate evaluation of the situation is required in order to respondent with a safe and effective course of action.

3.63 As most emergencies are invariably different they each require an evaluation to determine the procedures to be implemented. While standard operating procedures are needed, flexibility to adapt to changing circumstances is required.

3.64 In the case of this incident, the safest procedure would have been to evacuate unnecessary people from the MMS, isolate the electrical equipment, ventilate the MMS, charge the fire hoses and apply foam to the fuel spill and the bilge to prevent the escape of flammable vapours. The implementation of such a strategy would have ensured the

minimum number of people were within the MMS. It would have allowed the immediate use of the hoses in the event of the outbreak of fire.

Conclusion

3.65 There was a major fuel leak on the PME.

a. A thorough evaluation of the situation was not undertaken.

b. Unnecessary personnel should have been withdrawn from the MMS.

c. The situation was hazardous enough to warrant the isolation of electrical equipment and the application of foam onto the fuel and into the bilge.

d. If fire hoses laid out for use are not charged and ready, it is highly likely that they will not be used as there will be no time to charge the hoses once a fire has started.

Recommendation

3.66 DC training should emphasise the requirement for personnel to evaluate and assess the risk associated with any type of emergency scenario so that measured departures from the SOP can be initiated to match the risk.

Escape drills

3.67 Initial firefighting operations were conducted under extremely hazardous conditions.[T1488, T1853] Isolations of the machinery were timely, correct and did much to limit the extent of the fire. Regrettably four members of the ship's company failed to escape from the compartment as smoke quickly engulfed all within the space; escape drills, particularly using Emergency Life Support Respiratory Devices (ELSRD) had not been regularly practiced. Annual continuation training (ACT) outlined in AFTP 4(F) requires this type of training to be conducted two times a year. WESTRALIA conducted escape training (DC Exercise 18) once in 1996, once in 1997, with no serials being conducted up to 5 May 1998. WO Bottomley stated that the ME Department had not conducted escape training recently and he could not recall when it had last been completed.[T253]

Recommendation

3.68 The importance of conducting escape training using ELSRDs should be re-promulgated to the Fleet. (The Board understands that this recommendation has already been implemented.)

AFFF hand-held extinguishers

3.69 Shortly after the commencement of the fire, PO Hollis and PO Francis started fighting the fire with AFFF extinguishers. Not long after, there appears to have been a secondary fireball within the MMS.

3.70 As a result of the heat generated by the secondary eruption and an increase in the quantity of smoke that was beginning to envelop him, PO Hollis realised the fire was more than he could handle.[T1807] Due to the size of the fire and the deteriorating conditions, PO Francis also assessed the situation could not be controlled with the equipment on hand.[T1461]

3.71 While quick decisive action is required when a fire is detected, the use of extinguishers to attempt to contain a fire of the size described was courageous but likely to fail. Fighting the fire also delayed the departure of people from the MMS and ultimately put their lives at risk.

Conclusion

3.72 The fire was too large to be contained with extinguishers.

Recommendation

3.73 DC training should emphasise the limitations of portable fire extinguishers as well as their use.

Containment

3.74 With any fire onboard a ship, it is vital to keep the fire within the smallest perimeter possible. Where a fire is within any compartment on a ship, containment is primarily achieved by cooling the outside boundaries of the compartment with water or other cooling medium. Effective boundary cooling will limit the spread of the fire by preventing radiant heat igniting combustibles in compartments above, adjacent and below the compartment containing the fire. On 5 May 1998, HQ1 directed after DC repair base to set up smoke boundaries and conduct boundary cooling.[T497] Containment of the fire and major firefighting efforts to combat it were ultimately successful. The requirement for boundary cooling was well understood although containment of the forward boundary of the fire (bulkhead between MMS and after pump space) was slow to be set up.

Ventilation

3.75 Ventilation control was not well understood. The ship had developed a standing operational procedure (SOP) which involved closing both supply and exhaust ventilation to the MMS in the event of an MMS fire. The result of this was to prevent heat and hot gases from escaping from the affected space, increasing the difficulties faced by personnel directed to re-enter from a high entry point to conduct firefighting.

3.76 As outlined in Ships Standing Orders and in the Ship's Emergency File, WESTRALIA had developed the practice of closing both supply and exhaust ventilation in the event of a MMS fire.[E68, E112] This is contrary to ABR 5476 - RAN Ship Damage Control Manual which directs that in the event of fire, ventilation should be 'crashed stopped', supply intakes should be closed whilst exhaust outlets should be left open with selected exhaust fans restarted (WESTRALIA does not have exhaust fans). The Engineer told the Board that he had agreed with the Navigator that if the ship went to emergency stations due to fire in the MMS, the closing of the funnel flaps and ventilation supply flaps would be an SOP.[T2923] The Engineer did not seem aware of the direction in ABR 5476

and agreed that the SOP the ship had developed would restrict the escape of smoke and gases to atmosphere.[T2924, T2925]

3.77 It is probable that even had a conscious decision been made to close the ventilation supply flaps and leave the funnel flaps open, this would have been unsuccessful because the operating levers for closing each of the flaps were not marked or identified in any way.

Conclusion

3.78 The funnel ventilation exhaust flaps should have remained open until Hose Team 1 had exited the MMS.

Recommendation

3.79 The guidance and directions provided in ABR 5476 should be re-emphasised to command teams.

3.80 DC training should emphasise the importance of ventilation for effective firefighting operations.

3.81 The operating levers for ventilation supply flaps and funnel exhaust flaps should be colour coded and marked for ease of identification

Re-entry

3.82 Re-entry procedures to the MMS after the use of the ship's CO_2 system were incorrect. The ship believed that an entry could be made after 15 minutes had elapsed since the space was drenched with CO_2. This belief is incorrect and probably arose out of instructions laid down for umpiring DC exercises in AFTP 4(F). Unless there is an overriding priority, a fire scene should not be re-entered after drenching for as long as possible, thus allowing the scene to cool as much as possible in order to prevent a re-flash.

Recommendation

3.83 Fleet units should be made aware of the correct procedures for re-entry to a fire scene after drenching (The Board is aware that this recommendation has already been actioned)

Hose teams

3.84 Two hose teams were formed, one at Aft DC Section Base and one at Forward DC Section Base. HQ1 directed a third hose team be established and this was done at Forward DC Section Base. Firefighting teams from both forward and after repair bases conducted major firefighting competently and with vigour. With only one exception, all members of the ship's company who gave evidence, commented most favourably on the DC training that they had received both ashore and afloat. LS Daly, who was a hose team leader, when asked if there was anything which he had been tasked to do on the day for which he had not been adequately trained, responded by saying, 'No, the training that the

Navy gives us, and the confidence it gives us is very good. They do a good job'.[T645] CPO Jenkins, the OIC of the Aft DC Section Base, when asked if the RAN might improve its firefighting and damage control training replied, 'No, I think our training was pretty good. On the day it proved that it works'.[T555]

Conclusion

3.85 RAN hose team training is excellent.

Sustenance of Hose Teams

3.86 During the firefighting effort, hose teams replenished their OCCABA and rested at RASCO. In the early stages, limited water was available from a Jerry can provided by the SMET members, and this was provided to Hose Team 1 after their first entry.[E152, T398, T656-7] However, members of Hose Team 2 were limited to frozen fruit juices on their first exit.[E45, E386] Not surprisingly, they reported that the frozen fruit juices were inadequate for rapid rehydration. Later, fluids and ice were available for all the hose teams at RASCO, with drinking water being made widely available.[T485-6, T774, T778] LS Nix noted that all the available water and cordial in the messes had been used up early in the day.[E383]

3.87 PO Mercer started distributing snack food (chocolate bars etc) at about midday, and these were also provided to hose teams after their later MMS entries.[E378] Supplementation of snack food and drinks was requested from the OSC at 1328, and these were provided shortly after by SYDNEY and ADELAIDE.[E52] LS Nixon delivered this to the Repair Bases. The Supply Officer, LCDR Opie, gave evidence that he was involved in organising action snacks, but only after distribution had started.[T2294] LS Nixon observed that no one had time to organise rations, and he had been involved in a variety of firefighting support activities.[E152]

Conclusion

3.88 There was a delay in providing fluids for the refreshment of hose teams after firefighting. Each of the key catering staff had ancillary duties that diverted them from this task.

Breathing Apparatus Control Procedures

3.89 On the day of the fire there were occasions when breathing apparatus (BA) control procedures should have been more closely followed.[T1347] BA control procedures require that an individual will always enter a hazardous area accompanied by at least one other person. BA wearers work as a team to enable one person to come to the assistance of another should someone get into difficulties.

3.90 Shortly after the outbreak of the fire WO Bottomley went to the MCR on his own to check the fire main pressure and while there he entered the MMS to have a quick look around the area.[T26, T57, T260, T261] His location was some distance from any other personnel.

3.91 He also had no partner when he entered the CO_2 room to manually discharge some cylinders that had not been activated [T61]. While PO Herridge was outside the door

to the CO_2 room he was not dressed in OCCABA and therefore could not have come to his assistance if needed [T29, T60, T1630, T1631].

3.92 A person dressed in OCCABA operating on their own in areas where there are known to be toxic gases is dangerous practice. An additional concern with WO Bottomley going to the MCR on his own was that there is no evidence to suggest his name was recorded on an entry control board. Although it is not clear from the evidence, it is probable that LCDR Crouch was the only person who knew that WO Bottomley had reentered the MCR. As LCDR Crouch was extremely busy in HQ1 at the time he may not have noticed WO Bottomley was missing if he had failed to return from the MCR. If WO Bottomley had become trapped or overcome in some way, no rescue would then have been mounted because nobody would have known he was missing.

One out all out procedure

3.93 The Board has heard evidence that other control procedures could have been more closely followed. Evidence indicates that in some instances personnel were not dressed in OCCABA when they should have been and that members of the hose teams did not always leave the MMS together.[T3375, T1336] In another case, the after DC thought someone was missing when in fact the person had either bypassed the board marker or the board marker had not cleared the name. The procedure of 'one out all out' limits the opportunity for mistakes to occur.[T1336, T2539]

Conclusions

3.94 Breathing apparatus control procedures were not always followed. Of particular concern was the failure, on some occasions, for personnel in OCCABA to work in pairs.

Recommendations

3.95 DC training should reinforce breathing apparatus procedures concerning working in pairs and correct entry control.

Monitoring of time 'on air'

3.96 The evidence demonstrates that the hose teams did not spend excessive periods of time within the MMS. Evidence suggests that the air supplies were more rapidly consumed than the accepted norm of 40 litres per minute. This could have been due to the conditions and anxiety of personnel or the cylinders were not appropriately charged for an initial entry. There is no evidence of the latter.

3.97 At the height of the emergency a number of individuals ran low on air, had to pull the D ring and exit the MMS.[T670, T227] At different times, two hose teams exiting the MMS had a hose team member run out of air.[T671] In one case, the team member pulled his D-ring but the air supply failed within about 30 seconds.[T467-468] This would indicate the set had malfunctioned in some manner, as after the D-ring is operated approximately 8-10 minutes of air should remain.[ABR 5476]

BA Control Boards

3.98 Evidence suggests the board markers followed the correct procedures. They appear to have calculated the BA set durations from the endurance table on the control board. The BA control board operators dispatched relief crews as required but in cases where the OCCABA air was used more quickly than anticipated the teams in some cases left the space before another team had entered.[T670]

3.99 The RAN Damage Control Manual (ABR 5476 Vol 1) states 'personnel wearing beards experience up to 10 percent reduction in the wear time' and yet when witnesses were questioned they did not seem aware of this fact.[T326, T562] While this matter was not raised with any board markers, it is unlikely that they would have made any calculations to reduce the wearing time of those people who had beards.

Minimum breathing apparatus cylinder pressure

3.100 During questioning, a number of people giving evidence stated that during firefighting operations they did not monitor the OCCABA cylinder air pressure.[T484, T697, T699, T778-779] This is not good practice because consumption can vary depending on the conditions being encountered and the anxiety level of the individuals wearing OCCABA.

3.101 The RAN BA control procedures contained in ABR5476 volume 1 chapter 43 clearly indicate the minimum cylinder pressure of 100 bar cylinder pressure must be in an OCCABA for a re-entry. Evidence suggests that at least one re-entry occurred where the pressure was less than 100 bar. An entry into a large compartment like WESTRALIA's MMS with the minimal cylinder pressure was poor practice.[T2050]

Conclusions

3.102 Not all personnel wearing OCCABA monitored their pressure gauges.

Recommendation

3.103 DC training should emphasise the issue of varying air consumption rates and the need for personnel in OCCABA to frequently to monitor air pressure.

Breathing Apparatus and Beards

3.104 Breathing apparatus (BA) procedures are instituted to ensure the safety and effective control of personnel at emergencies. However, for procedures to work during emergencies it requires people to willingly comply. The evidence presented to the Board suggests the hose teams were correctly dressed in OCCABA however there were a number of areas where improvement could be made.

3.105 Some sailors with beards used OCCABA on the 5 May 1998. This is despite the warning given in ABR 5476, volume 1, chapter 43 as to the dangers. Chapter 23 of ABR 5476 also makes this comment.

NOTE

> Personnel wearing beards experience up to 10 percent reduction in the wear time because of the reduced efficiency of the face seal. Personnel with beards should not, wherever practicable in peacetime, be allocated to duties, which require them to wear breathing apparatus. In wartime all beards would have to be removed as part of the preparations for war.

3.106 The issue of sailors having beards and wearing OCCABA is relevant here as the Board received evidence the testing of an OCCABA set revealed that its facemask did not maintain a positive pressure.[E429] If the OCCABA is operating correctly and maintaining a positive pressure within the facemask air can leak out around the beard breaking the seal and cause a reduction in the duration of the set. However the failure to achieve a seal can lead to other more serious problems.

3.107 AS/NZS 1715:1994 states, 'The sealing problem is especially critical when close fitting face pieces are used. The reduction in pressure developed in the breathing zone of these respirators during inhalation may lead to leakage of contaminant into the face piece where there is a poor seal. Therefore, individuals who have stubble (even a few days' growth will cause excessive leakage of contaminant), a moustache, sideburns, or beard which passes between the skin and the sealing surface must not wear a respirator which requires a facial seal'.

3.108 Australian Standard 1715-1994 – Appendix E deals with the subject of facial hair and respirators in more detail. Part E2 of the standard states; 'Bearded persons cannot expect to achieve adequate respiratory protection when wearing a full face piece respirator or a half face piece respirator. Accordingly, no one who requires respiratory protection shall attempt to wear either a full or a half face piece respirator over a beard'. Part E5 makes the following comment, 'Stubble growth depending on its length and stiffness, interferes to some degree with the proper sealing of a face piece and it is necessary that male wearers of respirators shave daily'.

Conclusions

3.109 On the day of the fire bearded members of the ship's company wore breathing apparatus. Personnel did not have a thorough understanding of how beards could reduce the wearing time of an OCCABA. Accordingly, no allowance was made for personnel with beards when calculating OCCABA duration.

3.110 The practice of allowing bearded personnel to use breathing apparatus does not comply with AS/NZS1715-1994.

Recommendations

3.111 DC training should include instruction on the effect of beards on OCCABA duration and on what adjustments are to made by board markers to compensate for air loss.

3.112 Navy should review its policy regarding personnel with beards wearing OCCABA in light of AS/NZS1715-1994 and occupational health and safety requirements.

Stage 2 Breathing Apparatus Entry Control Procedures

3.113 During major emergencies such as the fire in WESTRALIA, there can be confusion and the failure of best practice especially in relation to breathing apparatus procedures. With many issues arising simultaneously, those controlling the response to the incident can be overwhelmed with the quantity of information and fail to recognize the dangers. To limit the opportunity of this occurring it is imperative that the span of control is never too great. In relation to breathing apparatus control procedures, this involves the implementation of 'Stage 2 Entry Control Procedures' as practiced by civilian fire brigades.

3.114 Stage 2 is an extension of the normal breathing apparatus control procedures and should be implemented when:

a. there is more than entry point to a fire or other emergency;

b. where more than two teams are working simultaneously; and

c. the circumstances require the undivided attention of at least one person whose sole task is to arrange relief crews and cylinders.

3.115 To coordinate these activities and ensure the resources were in place at the right time required the attention of someone to specifically take control of the BA situation.

3.116 A person with the skills and authority must be designated the task of establishing and maintaining an effective stage 2 procedure. This person by undertaking a variety of tasks in relation to organising BA allows the scene leader to concentrate on the operational matters. The stage 2 controller establishes a BA main control point at the most convenient site for easy access and communications with all board markers, scene leaders and the incident commander. His/her responsibilities include:

a. Establishing and recording the availability of OCCABA, associated equipment and personnel resources at the incident.

b. Establishing effective communication with each entry control point (board marker location).

c. Having available adequate numbers of personnel dressed in OCCABA to act as reliefs.

d. Assembling reliefs at each entry control point in sufficient time to enable the entry control officer (board marker) to carry out their responsibilities.

e. Having at least two additional personnel standing by for emergency purposes.

f. Arranging for sufficient fully charged cylinders, or any other requirements necessary to prepare OCCABA for use. This could include operation of Bauer compressors and the repair of faulty OCCABA.

g. Having OCCABA sets ready for personnel to use.

h. Assembling the ship resources.

3.117 To record this information many fire brigades around the world use a stage 2 Breathing Apparatus Control Board. These boards are more extensive than the normal entry control board and provide capacity to summarise such facts as the number of sets in use at each control point, the reliefs required or sent and details of emergency standby personnel and OCCABA sets.

Conclusion

3.118 Stage 2 BA control procedures would assist with the management and coordination of activities in an emergency.

Recommendation

3.119 Stage 2 BA control procedures should be considered for introduction into the Navy.

International Shore Connection

3.120 As the fire in the MMS had rendered the other fire pumps unserviceable the emergency fire pump was the only source providing the water to the fire main. At different times there were concerns that the pump had insufficient capacity or that it could fail.[T29, T145]

3.121 When the tug WAMBIRI came along side there was discussion between the vessels as to whether the tug's fire pump could connect into WESTRALIA's fire main. The idea was rejected by Navy personnel who thought the fire hoses and couplings were different and that WAMBIRI could not connect to WESTRALIA.[T3154]

3.122 When personnel were questioned as to WESTRALIA's international shore connection there was an obvious lack of knowledge on the subject. As the connection is a fundamental piece of equipment that is required of all ships under Safety of Life at Sea (SOLAS) regulations, this lack of knowledge was a surprise. The ability to use WAMBIRI's pump would have been vital if the ships emergency pump had failed. That a number of officers and the crew were unaware of the existence of the connection or how it works, suggests that very little training was carried out in this area.[T3154,T2954]

Conclusion

3.123 Ship's personnel knew little, if anything, about the international shore connection.

Recommendations

3.124 Naval personnel should be trained in the use of the international shore connection.

3.125 DC training should re-emphasise the importance of conducting firefighting training serials which involve civilian fire brigades.

Fixed CO2 Fire Protection System – Procedures for use

3.126 The fire control team followed the procedures as detailed in the WESTRALIA emergency file. This initially involved the activation of the MMS fixed CO_2 fire suppression system and then the re-entry of hose teams into the space to extinguish any remaining fire. The procedure states 'A minimum of 15 minutes must elapse after the drench before re-entry can be made'.[E112] Hose team 2 entered 18 minutes after the last of the CO_2 cylinders were activated.[E129]

3.127 Carbon dioxide is effective as an extinguishing agent primarily because it reduces the oxygen content of the atmosphere so that it can no longer support combustion. Because the CO_2 discharges at a low temperature and the gas has a density of one and one-half times that of air it has the ability to replace air above burning surfaces and maintain a smothering atmosphere. The resulting mixture of CO_2 and air will be denser than the ambient atmosphere. However the cooling capacity of CO_2 is minimal compared to an equal weight of water. These factors were not known by the ship's company, and as a result they did not make the appropriate operational decisions on when to use the gas, how long to wait after a drench before re-entry and how to clear the space of the gas after the fire.

3.128 The injection of CO_2 into a sealed space will extinguish a flammable fuel fire almost immediately but has no cooling effect making, the chances of re-ignition high if oxygen is reintroduced. The sealed space will cool quite slowly after the fire is extinguished.

3.129 Any re-entry into a CO_2 saturated atmosphere must be undertaken with caution. Although there are no hard and fast rules concerning re-entry, many factors must be taken into consideration. How hot was the fire? Has the metal cooled sufficiently to prevent re-ignition if oxygen is reintroduced into the space? Are there any over-riding operational reasons to attempt a re-entry – navigational hazard or weather conditions? The decision to re-enter should be a conscious judgment based on the information available and the contingencies of the situation.

3.130 The US Marine Training Advisory Board [E458] recommends that re-entry should not be attempted for at least one hour, to allow the heat to dissipate. Then the re-entry is closely controlled and if excessive heat remains the space should be resealed. Other marine firefighting centres recommend, depending upon the operational situation, a period of at least two hours, or 'overnight' where possible, while carefully monitoring the temperature in the space.

3.131 The US Marine Training Advisory Board recommends that any initial entry should be made from the highest point as this limits the disturbance of the CO_2 gas which as it is heavier than air settles in the lower parts to the MMS. However a high-level entry forces the hose teams to encounter the highest temperatures and negotiate a number of ladders. It also makes the rescue or removal of casualties difficult.

3.132 WESTRALIA's emergency file provided LCDR Crouch with no information on the properties of CO_2 gas and incorrect information as to the time that should elapse following a drench before hose teams are committed.[E112] In addition, ABR 5476 Vol 1 – the RAN Damage Control Manual - does not provide information to incident managers of the properties and extinguishing characteristics of the gas. As a consequence of lack of knowledge and an incorrect standard operating procedure, the command team did not wait a reasonable period of time for the MMS to cool before the hose teams re-entered.

3.133 What is clear from the evidence given and the action of the command team is that nobody had a thorough knowledge of the properties of CO_2. As a consequence the decision to send hose teams into the space was premature. This lack of knowledge endangered the hose teams and could have made the fire worse.

Conclusions

3.134 ABR 5476 provides insufficient information on the properties and extinguishing characteristics of CO_2.

3.135 The command team had limited knowledge of the properties of CO_2 and its hazards. As a result the decision to send in the hose teams after the drench to fight the fire, was premature.

Recommendation

3.136 ABR 5476 should be amended to include a section on the properties of CO_2 and the hazards when it is used as an extinguishing agent.

HMAS WESTRALIA Emergency File

3.137 WESTRALIAs emergency file contains instructions in the event of a fire and shows hose layouts to be adopted for the various spaces.[E112] One of the purposes of the file was to assist the OOD in an emergency.

3.138 As has been discussed in other parts of this report, the emergency file in WESTRALIA did not always provide the appropriate information for the command team. The file details incorrect advice on when hose teams can enter an area after a CO_2 drench and provides the following comment in reference to the emergency fire pump:

> A new diesel emergency fire pump has just been installed but very little is known about it at present.[E112]

3.139 Noone appears to have a clear responsibility to write the material, check that standard operating procedures (SOP) actually work and be accountable to keep the file up to date. The Board is concerned that nobody identified there was a problem with the file until after the fire. Whoever is allocated the task to write the emergency file must have significant damage control and firefighting expertise.

3.140 The nominated MMS standard operating procedures for fighting a fire is very one dimensional and alternative approaches are not identified. If the ship has only the one plan to combat a fire and this fails, what do the incident commanders do?

3.141 The SOP was to enter through the fridge flat and that was always the method practiced. There were other alternatives such as entering through the tiller flat. The over reliance on SOPs and the limiting effect it has on lateral thinking is best illustrated by the problems encountered when trying to remove the bodies from the MMS. The SOP and all the training involved bringing the body to the top plate below the fridge flat landing and using the electric winch to remove the body. As there was no electricity to this area after the fire there was a delay in body extrication while feasible alternatives were devised, tried and implemented [T700].

Sea Training Group

3.142 At regular intervals the RAN Sea Training Group boards the ship to check the performance of the ship's company in a number of areas. As this group are the RAN experts they should check the emergency file, assess the SOPs and identify any problems.

Conclusions

3.143 The ship's emergency file provided incomplete and incorrect advice to any incident commander.

3.144 The SOPs were followed without any lateral thinking.

3.145 The Sea Training Group did not identify that the ship's emergency file was inadequate.

Recommendations

3.146 The WESTRALIA emergency file should be re-written.

3.147 The Sea Training Group should check routinely validity of SOPs in emergency files.

Ship Knowledge

3.148 It became apparent to the Board that many officers and senior sailors did not have an adequate knowledge of their ship and its systems, particularly emergency arrangements.

3.149 The Special Sea Dutymen (SSD) OOW, when asked how much knowledge she had of the CO_2 system replied, 'not a great deal compared to what the engineers would have'.[T1169] When asked if the ship's emergency power arrangements would provide power to the VHF radio, she responded by saying 'I'm not sure of that'.[T1169]

3.150 One of the ship's DC instructors, when presented with a scenario where a SSFB attacking a fire is beaten back by heat and flames, was asked what the SSFB does then replied, 'I'm not sure'.[T2276] Additionally, when questioned on tugs connecting their salt water service to the ship for firemain boosting, the arrangement of the ships ventilation/funnel flaps and the ships CO_2 system, he was unable to demonstrate a competent knowledge of these arrangements.[T2283-2284] Likewise, an engineering officer, when questioned on the ship's emergency fire pump, was unable to convince the Board that he had a sound knowledge of this equipment.[T1923]

3.151 A Senior Sailor, when questioned about the ship's emergency pump, emergency generator and the international shore connection, demonstrated little or no knowledge of these equipments.[T2417-2418]

Conclusion

3.152 In general officers and senior sailors displayed a poor knowledge of the ship, particularly of the emergency systems.

Recommendation

3.153 OOW's and OOD's should be trained to ensure competence in ships systems and their emergency arrangements. This competence should be fully demonstrated prior to the award of the appropriate certificate. Where qualified personnel join a ship which has different systems from the ship in which their certificate was obtained, these personnel should understudy current ships staff until competent to undertake duty alone.

TRAINING

Firefighting Training

3.154 Prior to joining a sea-going vessel, it is RAN policy that all crew members are required to have completed firefighting training. Firefighting training is a component of the RAN's basic Damage Control (DC) course. Firefighting training prepares naval personnel to take appropriate precautions to prevent fire, to raise the alarm on discovery of a fire and to take the appropriate first aid actions to extinguish the fire or to prevent it spreading. Firefighting training also provides every sailor and officer with the knowledge and experience to be a member of a hose team which will be used to combat a major fire. Firefighting training is constantly updated to reflect latest equipment and techniques. If naval personnel have been ashore for more than 3 years, they are required to update their skills and experience by completing a DC requalification course before joining a ship. Advanced firefighting training is also provided to train those naval personnel who will lead the various firefighting teams.

3.155 Ten percent of the ship's company were not in date for damage control training. Two members had not undertaken the standard DC course whilst others were either out of date for requalification or had not undertaken training commensurate with their rank or billet.[E431]

Pre Joining Training

3.156 Evidence given by WO Bottomley, indicated that not all Marine Engineering (ME) Department personnel had undertaken or completed the appropriate Pre-Joining Training (PJT).[T253] LCDR Triffitt, confirmed that a number of other personnel may also not have completed the appropriate PJT; he further indicated that MHQ was concerned about this matter and had directed all ships to forward a 'return' on the number of personnel who had not completed the PJT required.[T160-161] WESTRALIA Minute 72/23/2 dated March 1998 indicates that approximately 25% of the crew had not completed the required billet pre-requisite training.[E233] Of significance, this minute indicates that several officers including: the Executive Officer, the Marine Engineering Officer (Engineer), and the Liquid Cargo Officer (LCO), had not completed the Tanker Safety Course.

Recommendations

3.157 The requirement for personnel to have received the appropriate PJT prior to joining a ship should be further emphasised.

3.158 Consideration should be given to ship's raising a Priority 1 URDEF (which would prevent the ship from sailing) if key personnel, or a significant number of the ship's company, join without the proper qualifications.

Annual Continuation Training

3.159 The ship had progressed Annual Continuation Training (ACT) satisfactorily. The following paragraphs, however, address some deficiencies that became apparent to the Board.

3.160 Damage control exercise 22 (Command Team DC Training) plays an important part in assisting those who have to make command decisions in times of emergency to have a complete understanding of their ship and its equipment, particularly emergency systems. This had not been conducted since June 1997 and the ship had failed to achieve at least 50% of the training requirement for this type of exercise over the previous two years.[E94, E95] In his evidence to the Board, LCDR Crouch could not recall when the ship had last conducted this exercise.[T2922]

3.161 The ship had not exercised dealing with a MMS fire in harbour (damage control exercise 27) since it undertook its Light Off Examination (LOE) in June 1996.[E95]

3.162 WESTRALIA conducted damage control exercise 100 (MMS fire at sea) during a shakedown period on 30 April 1998. From the evidence given to the Board by the ships senior NBCD instructor, WO Baker, it may be inferred that the planning of this exercise and its execution were not as thorough as it could have been.[T2390-T2398] For example, the planned exercise did not encompass casualty management or the operation of CO_2 drenching. It is probable that there were insufficient umpires on the day to effectively run the exercise and provide a comprehensive de-brief on completion.

Recommendation

3.163 The NBCD Instructor's course should be examined to ensure appropriate modules exist, which encompass ACT requirements and exercise planning /execution.

Fast Cruise

3.164 A 'fast cruise' is an exercise which is designed to allow a ship to check its organisation and emergency procedures after a lengthy period in harbour. It provides the opportunity for new crew members to familiarise themselves with their ship and its routines as well as highlighting any deficiencies in the ship's organisation before it proceeds to sea.

3.165 WESTRALIA considered conducting a fast cruise prior to sailing on 29 April 1998 but it was not undertaken.[T161] Currently AFTP 4(F) (Fleet Exercise Instructions) only requires ships to conduct a staff covered fast cruise on completion of a refit period. This is in contrast to AFTP 29 (Submarine Exercise Instructions) which requires submarines to conduct a fast cruise after refit, IMAV and Assisted Maintenance Period (AMP). Noting that it is probable during periods of IMAV and AMP, that a number of personnel will post in/out and that job rotations may well take place, it would seem

sensible for ships to conduct their own fast cruise at the completion of these periods and prior to sailing for the first time.

Recommendation

3.166 RAN ships should be directed to conduct a fast cruise, prior to sailing, after periods of IMAV or AMPs when there has been a change in key personnel or a significant proportion of the crew .

Major Fire/Engine Room Fire at Sea Exercise [DC 101/100]

3.167 The ship has achieved or exceeded its ACT for these types of exercises, however it had not practiced the scenario of receiving outside assistance to help deal with such emergencies.[T171-172] When receiving outside assistance, a ship must have an organisation for receiving, briefing and deploying those resources to meet the commands priorities. To enable the commanding officer to fully utilise these resources, he must be made aware of what resources have joined his ship and the estimated time of arrival of other resources expected. This aspect needs to be reviewed and appropriate instructions compiled and placed in Ships Standing Orders.

Recommendation

3.168 Fleet units should document and practice, receiving assistance from external agencies.

Sea Training Group Covered Training

3.169 The last Sea Training Group (STG) covered training was conducted prior to the ship's Southern Ocean deployment in October 1997.[T167] Damage control aspects were assessed as standard achieved minus. This training did not appear to include a major fire at sea exercise.

Additional Training Required

Professional Knowledge

3.170 The 'spill pulse' phenomenon (discussed later in this report) which led to metal fatigue in the steel braid of the flexible fuel lines was not known to any of the ship's engineering staff, nor, the Board suspects, was it known to the majority of RAN engineering personnel. This phenomenon was known to other organisations and was described in various literature from time to time.

3.171 Although this is a highly specialised example, the Board believes that the RAN should have the capability to vet professional journals and other literature and where appropriate distribute information contained in such documents to the lowest level deemed warranted. This service should not be confined to engineering but should cover all professional fields.

Recommendation

3.172 The RAN should investigate the distribution of professional articles, from appropriate journals and literature, to the Naval Community.

Requirements of Lloyds Classification

3.173 Current RAN directives require WESTRALIA to be 'kept in class' by Lloyds Register Classification Society. This requirement and what it entails was poorly understood by the ships officers and others associated with the ship. Training in this subject appears to be non-existent. The Board is of the opinion that if some RAN vessels are required to be 'kept in class' then training on this requirement should be given to ships officers and staff from the Class Logistics Office.

Recommendation

3.174 Appropriate training should be provided, to enable selected RAN personnel to understand and implement requirements of 'classification societies'.