

ANNEX 36D

CBRNDC LECTURE PLANS

LECTURE PLAN	SUBJECT
<u>1</u>	Harbour Firefighting Organisation
<u>2</u>	Fire Prevention
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<u>4</u>	Firefighting Elementary 2
<u>5</u>	Firefighting Clothing and Communications
<u>6</u>	Practical Team Training
<u>7</u>	Containment
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<u>10</u>	Search and Rescue
<u>11</u>	Leakstopping and Shoring
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<u>24</u>	DC Equipment Checks

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
1. Harbour Firefighting Organisation		
State the personnel involved in the Harbour Firefighting Organisation (HFO) and their duties (including reduced organisation).	1. Discuss the duties and responsibilities of the following individuals and groups comprising the HFO: OOD, I/C Main Group, Attack Party, Support Party, BA Party (emphasise importance of BA Coordinator), Containment Group, Control Party, ME & WE Specialist Party, Gangway Staff, Communications Rating, Keys Rating and DPO Roving as required. 2. Discuss the high risk compartment check off card. 3. Discuss the reduced HFO and its applicability of your ship.	BRd 2170(1) Chapter 20 and Chapter 21 BR 4007 Chapter 4
2. Fire Prevention		
State possible causes of fires in RN ships and methods of fire prevention	1. Emphasise importance of Departmental rounds. 2. Understand whose responsibility fire prevention is. 3. Action to be taken by persons finding the fire. 4. Discuss the main causes of fires and their prevention.	BRd 2170(1) Chapter 14 BR 4007 Chapters 1 and 2 Departmental Orders BRd 2170(1) Chapter 21
Define the duties of Hot Work Sentry	1. Discuss the duties and responsibilities of the Hot Work Sentry including the requirement for hot work permission to work permit prior to carrying out the task. 2. Discuss the first aid firefighting equipment required. 3. Understand the requirements of the Hot Work Log.	BRd 2170(1) Chapter 24 BR 2000(20) Hot Work Log, goggles and fire retardant material

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
3. Firefighting Elementary 1		
Fire Triangle: Describe components	Air/Oxygen - smother it/Heat - cool it/Fuel - remove source of combustion.	BRd 2170(1) Chapter 21 BR 4007 Chapter 1
Firefighting Media: Uses	When to use: Water, 9 ltr AFFF, Dry powder, CO ₂ , Fry Fighter and Fixed firefighting systems.	BRd 2170(1) Chapter 23
Firefighting Equipment: Describe its use	2 kg CO ₂ extinguisher, 9 ltr dry powder SPE, 9 ltr AFFF SPE, Fry Fighter, Size 2 and 3 hoses, Firefighter nozzle, Waterwall nozzle, Centre feed hose reel (CFHR), FB 10/10 branchpipe and FB5X Mk 2 branchpipe (set to 6%), AFFF and Thermal Imaging Camera (TIC).	BRd 2170(1) Chapter 22 and Chapter 23
Describe the Basic Firefighting Techniques	1. Value of the waterwall. 2. Problems with fighting fires between decks. 3. Smoke and associated problems. 4. Door technique. 5. Hatch technique. 6. 3 hose technique. 7. Oil fire from above. 8. Importance of getting to the seat of the fire. 9. Sentry with charged hose complete with F/F nozzle or centre feed hose reel. 10. Importance of breaking up carbonaceous fires to prevent re-ignition. 11. Fixed hatch waterwall (FHWW) - use and testing.	BRd 2170(1) Chapter 21 BR 4007 Chapter 6

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
4. Firefighting Elementary 2		
Define initial action on discovering a fire	1. Raise the alarm. 2. If behind closed doors leave closed. 3. If door open fight fire/rescue casualties (depends on circumstances and size of fire). 4. Contain spread. 5. Do not get trapped. 6. If beaten back close door or seal with waterwall. 7. Stay in vicinity to brief Attack Team and I/C Main Group, then escorted to HQ1 to brief OOD.	BRd 2170(1) Chapter 21 BR 4007 Chapter 3
Define boundary cooling procedures	1. Aim to remove conducted heat. Priorities are hazardous compartments above, then others. 2. Minimum of water to keep decks and bulkheads wet. 3. Pump/bale out excess water. Drain water using fitted ships drains. 4. Protect electrical equipment. 5. Boundary starving and remove combustible material. 6. Searching boundaries. 7. I/C to visit boundary coolers regularly and inform HQ1 of water level in compartments cooled.	BRd 2170(1) Chapter 21 BR 4007 Chapter 4
Define actions for dealing with electrical fires	1. Switch off power if possible. 2. CO₂ effective, clean but does not support life (no cooling effect). 3. Water at voltages up to 440V AC or 800V DC in the form of a spray and not nearer than 1.8m.	BRd 2170(1) Chapter 21

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
4. Firefighting Elementary 2 (Cont'd)		
Duties of a Fire Sentry	1. Muster correct equipment. 2. Use correct equipment - FF nozzle and charged hose or CFHR if fitted. 3. Hose length sufficient to reach all compartments. 4. One sentry for each deck level (minimum). 5. BA may be required. 6. Action in event of re-ignition.	BRd 2170(1) Chapter 21 BR 4007 Chapter 5
5. Firefighting Clothing and Communications		
State the varying resistance of materials to fire	1. Man-made fibres - minimal. 2. Cotton - some. 3. Wool - better than cotton. 4. PBI Gold. 5. Action Coveralls. 6. Firefighters gloves (Nomex).	BRd 2170(1) Chapter 25 BR 4007 Chapter 6
State Tier 1 and Tier 1 Enhanced Action Clothing	Outline various elements in the rigs/Outline when and how to be worn/Mention surcoats.	BRd 2170(1) Chapter 25 BR 4007 Chapter 6
State Tier 2 Action Clothing	Basic firefighting rig, FF hood, BA and anti-flash gloves/Hood and gloves in BA locker. Worn by Attack BA Team.	BRd 2170(1) Chapter 25 BR 4007 Chapter 6

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
5. Firefighting Clothing and Communications (Cont'd)		
State Tier 3 Action Clothing	Outline elements of the full firefighting rig. 1. Basic Firefighting rig, plus: a. Firefighting suit, gloves, leather firefighting boots and woollen socks. b. Firefighters hood and anti-flash gloves. c. Firefighters' Helmet with Built-in Communications (FFHBC). d. Thermal Imaging Camera (TIC) (Team Leader only). 2. Additional Points: a. Dressing time 8 mins. b. Ensure flesh and hair covered. c. Avoid radiated heat through visor. d. Heat can penetrate elbows, knees and BA straps. Keep body moving to allow air circulation and stay on feet not knees.	BRd 2170(1) Chapter 25 BR 4007 Chapter 6
Demonstrate how to use FFHBC	1. Radio operating procedures (channels and voice procedure). 2. Radio limitations (not intrinsically safe, not used in magazines). 3. Capabilities of helmet. 4. Pre-wear checks.	BRd 2170(1) Chapter 9 BR 4007 Chapter 6

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
6. Practical Team Training		
Demonstrate and practise correct use of the 4 man firefighting team	1. Correct dressing of support team. 2. Deployment of team on running hoses. 3. Re-entering compartments (door and hatch). 4. Practise relieving support teams. 5. Practise extending hose runs.	BRd 2170(1) Chapter 21 and Chapter 25 BR 4007 Chapter 6 4 BA (Damage Control) 4 PBI Gold 2 x 12 m hoses (No 2) 1 FF and 1 WW nozzle
Demonstrate and practise correct use of the 3 hose technique firefighting team	1. Correct dressing of support team. 2. Deployment of team on running hoses. 3. Re-entering compartment to fight oil fire from above. 4. Practise relieving 3 hose team. 5. Practise extending hose runs. 6. Team numbers will depend on where fire is.	BRd 2170(1) Chapter 21 and Chapter 25 BR 4007 Chapter 5 BA (Damage Control) Firefighting Suit/3 x 12 m hoses (No 2)/2 x waterwall nozzles/1 x FB5X Mk2/1 x inline inductor/4 x 20 ltr AFFF drums

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7. Containment		
To: Search, Starve Cool The Fire Boundary	1. Priorities - dangerous, above and other compartments. 2. Apply minimum water to maintain wet plates. 3. Boundary cooling area become untenable, BA required. It may be possible to re-start selective fans to assist in the removal of smoke, only with the permission of HQ1. 4. Remove false deckheads and bulkheads as necessary to enable cooling and/or monitoring of actual deckheads and bulkheads. 5. Electrical cabinets and components to be covered where practicable with waterproof material. 6. Temperature Monitoring System (TMS). 7. Use of Deck Managers.	BRd 2170(1) Chapter 21 FF Nozzle No 2 hoses BA Magnetic thermometer Thermal Imaging Camera (TIC)
8. 4 Man Team (Revision)		
Define the duties of: 4 man Support Team and 3 Hose Technique Firefighting Team	4 Man Support Team State: The composition of the team, the individual duties of the team members and demonstrate the operation of the team for door/hatch entry procedures. 3 Hose Technique Support Team State: The composition of the team, the individual duties of the team, demonstrate the operation of the team for door/hatch entry procedures and when the 3 hose technique is to be used.	BRd 2170(1) Chapter 21 BR 4007 Chapter 4
9. Ventilation, Smoke Control and Smoke Clearance		
Define the need for Ventilation Control	1. To reduce flow of air to a compartment in which a fire is situated. 2. To limit the spread of smoke.	BRd 2170(1) Chapter 21

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
9. Ventilation, Smoke Control and Smoke Clearance (Cont'd)		
Ventilation Control Procedure(s)	1. Crash Stopping Ventilation. Ships CBRNDC Orders should define set procedures for stopping ventilation and remaking breaker(s) immediately a fire is detected. Describe procedures as defined. <i>Note. Some fans not controlled from ventilation breakers will need to be stopped at their local control positions.</i> 2. Ventilation Systems. Restart selected ventilation systems only as directed by the OOD in HQ1/SCC. <i>Note. This will involve systems essential to the ships function and which do not interfere with firefighting operations or the establishment of a smoke boundary. Particular ventilation systems may be used for smoke clearance operations but only as directed by OOD.</i> 3. Machinery Space Firefighting. Prior to use of either steam, CO₂ or BCF fixed firefighting systems, machinery space to be fully closed down. This will include shutting all ventilation supply and exhaust flaps. Ensure all personnel are aware of position of flaps and that flaps are unimpeded and free to move. 4. BTM Systems. Before operating the first shot of BTM, the vent is to be crash stopped. Before operating the second shot of BTM, the compartment vent is to be fully closed down. All vent flaps shut. <i>Note. When using steam or CO₂ drench 1 in number pre-designated exhaust flap is to be closed but not clipped until the system has been discharged. T45 has dedicated bleed valves therefore ALL hatches are to be fully clipped.</i>	

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9. Ventilation, Smoke Control and Smoke Clearance (Cont'd)		
Smoke Control and Clearance	1. Effects of Smoke a. Spread of smoke is a major factor in preventing clear appreciation of the source and extent of a fire and in preventing the adoption of effective firefighting measures. b. Toxic nature of smoke is highly debilitating to personnel and just a small concentration may be lethal. 2. Smoke Control a. Effective immediate ventilation crash stop procedures will help to limit the spread of smoke. b. Control of all ventilation systems by the OOD in HQ1/SCC will ensure good smoke control discipline. c. Early use of smoke curtains and/or door/hatches will help to isolate smoke into the smallest area consistent with the need to gain access to the fire.	BRd 2170(1) Chapter 21 BR 4007 Chapter 4 Forms S3021 - High Risk Compartment Check Off Cards (Kill Cards).
10. Search and Rescue		
Assess situation and organise search parties	Obtain permission from I/C in HQ1, number of persons missing, last known location, what BA sets are available?, decide search routes and detail personnel in pairs.	BRd 2170(1) Chapter 21
Carry out correct search procedure	Contact is to be maintained at all times, lay guidelines correctly and indicate compartment has been searched on completion.	BRd 2170(1) Chapter 21
Carry out correct procedure on discovering a casualty	Let casualty know who you are, what you are doing and going to do, give casualty a fresh source of air, never leave casualty alone and SITREP to I/C. Request assistance if necessary.	BRd 2170(1) Chapter 21 and Chapter 27 . BR 8223(1)
Select best transportation and remove casualty safely	1. If mobile on 2 m extension. 2. If stretcher required, BA is to be removed. 15 m extension to be used. 3. 15 m extension to have separate supplying set and controller outside point of entry.	BRd 2170(1) Chapter 21 and Chapter 27 . BR 8223(1)

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
11. Leakstopping and Shoring		
Principal of First Aid Leakstopping	1. First Aid Leakstopping. a. Explain effect of wedging. b. Define softwood wedges. c. Explain when and where softwood wedges are used. d. Describe 'petalling' effect and importance to Command and Control (inboard or outboard 'petalling' indicating direction of attack). e. Assess the number of wedges required for area of damage (1 wedge per 25 mm of damage). f. Describe arrangement of wedges when attacking damage (arrow head formation). g. Aggressive attack on damage required to minimise ingress of water 70% effective). h. Describe the splitting of whole wedges, using ships framework for maximum leakstopping effect around whole wedges (90% effective). i. Describe that on attacking multi splinter damage, wedging to commence at lowest level. j. State that DC bags stowed in machinery spaces have bungs in 3 sizes to aid leakstopping teams.	BRd 2170(1) Chapter 15 and Chapter 16 BR 4008

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
11. Leakstopping and Shoring (Cont'd)		
Principal of First Aid Leakstopping (Cont'd)	2. Preparation to Continue to Second Stage. a. If required, wedges and/or bungs to be cut back in order for domes to fit over damaged area. b. Ensure second stage equipment is at hand before removing wedges. 3. GRP Domes. a. Describe different sizes of GRP Domes; identify the rubber seal and stowages. b. Explain the use of strongbacks, wooden washer and securing wing nut. c. Pass strongback through damage, then position GRP dome over threaded spindle. Secure in position using wooden washer and securing the wing nut.	-
Explain the types of shoring available	4. Types of Shoring Available. a. Timber. Pine or Fir (100 x 100 mm and 150 x 150 mm). b. Acroprop. Main advantages of steel shores are speed and ease of use. Cannot be used as a proud shore. Large Acroprop 1.75 m - 3 m. Small Acroprop 1 m - 1.6 m. Major parts - locking pin, rotating collar, fixed feet. Course and fine adjustments (130 mm). No problem with weak points.	BRd 2170(1) Chapter 16 and BR 4008 Timber Shore Steel Shore Note. <i>Acroprops should always be carried with threaded end uppermost. Pin through cut out below rotating collar, thumb on chain end, two fingers around prop and pin.</i>

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
11. Leakstopping and Shoring (Cont'd)		
Explain different methods of shoring	1. Vertical Shoring. a. Used for decks, hatches and GRP domes. b. Pad piece required for deck, pad piece OR opposing wedges required for deckhead. c. Stapled on completion. d. Sentry. 2. Proud and Breast Shoring. a. Used for watertight doors, bulkheads and GRP domes. b. Proud measured from pad piece, shore is cut 25 mm (one thumb width) longer than required. c. No wedges. d. Pad pieces as required. e. Breast cut ½ width of proud shore longer. f. If on a bulkhead, breast ⅓ way up compartment. g. Stapled on completion. h. Sentry posted.	BRd 2170(1) Chapter 15 and Chapter 16 BR 4008
State the principle rules of shoring	Shoring: Shores must have a strong rigid anchorage and complete network of reinforcement essential.	BRd 2170(1) Chapter 15 and Chapter 16 . BR 4008

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
11. Leakstopping and Shoring (Cont'd)		
State the principle rules of shoring (Cont'd)	2. General Rules. a. Maximum length of timber shores is 30 x min width (eg 100 x 100 mm = 3 m and 150 x 150 mm = 4.5 m). b. The top and bottom of the shores are mounted on pad pieces or opposing wedges if required. c. Never cut timbers in anticipation. d. Do not erect shoring before damage occurs. e. When wedges are used in pairs they should be in opposing pairs - driven in simultaneously, one person, two hammers. f. A system of shores should be tied together with staples. g. Sentry posted on completion, with hammers.	
Demonstrate the method of measuring timber for shoring	1. Measuring Length of Vertical Shore using Gunter Batten. a. Place the required number of pad pieces on deck (sheet of rubber/metal plate or GRP dome if required). b. Place the booted foot on top of pad piece (s). c. Use the Gunter Batten to measure the distance between the top of toecap and deckhead/beam. d. Lock Gunter Batten using locking cord.	Gunter Batten BRd 2170(1) Chapter 16 and BR 4008

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
11. Leakstopping and Shoring (Cont'd)		
Demonstrate the method of measuring timber for shoring (Cont'd)	e. The person measuring the shore cuts the timber REMEMBER: MEASURE TWICE - CUT ONCE. f. Lay the Gutter Batten on length of timber and cut to size. 2. Measure the Length of Proud Shore. a. Place pad piece on deck. b. Use Gunter Batten, measure vertical distance between pad piece and deckhead/beam. c. Lock Gunter Batten using locking cord. d. Lay the Gutter Batten on length of timber to be cut, add one thumb width, mark and cut. The cut should be angled back approximately 10°.	Pad Piece example
State the uses of Pad Pieces	Pad Pieces. a. Explain the use of a pad piece. b. Not required where shore butts up to beam. c. Pad pieces must be used with metal shores to prevent slipping.	
Explain types and uses of Emms Clamps	Emms Clamps. 2 sizes of standard clamp: a. 180 x 140 mm (for use with 100 mm² shoring). b. 230 x 190 mm (for use with 150 mm or double 100 mm shoring should additional support be necessary).	

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
11. Leakstopping and Shoring (Cont'd)		
Explain types and uses of Emms Clamps (Cont'd)	Supplied to HM ships as follows: a. Main machinery spaces - 4 large and 2 small. b. FRPP - 2 small. Note. 2 clamps can be used in tandem to extend the distance of the 'strongback' from the damaged area. Universal clamp is for use in ships with offset bulb frames and can be extended by using additional standard Emms clamps.	BRd 2170(1) Chapter 16 and BR 4008 Demonstration Emms clamps (1 standard and 1 large) Demonstration Universal Emms clamp in ships with offset bulb frames
12. Second Stage Damage Repair		
Practical demonstration of shoring techniques	1. Second Stage Repair on splinter holes in decks or bulkheads. Using an Acroprop, 2 pad pieces and medium size GRP dome. a. Leave first aid leak stopping wedges in situ. b. Site GRP dome box over wedges and damage. c. Place 2 pad pieces on GRP dome. Explain use of pad pieces in all shoring. d. Place Acroprop on top of GRP dome and one pad piece. One person remove safety pin from below rotating collar and raise up inner section of Acroprop until approx. 2 ins away from deckhead, reposition safety pin above rotating collar. Second person place remaining pad piece in position between deckhead and Acroprop. Lock Acroprop in position using operating handle on rotating collar. Ensure Acroprop is vertical. 2. Second stage repair splinter hole in deck (passing through compartment) using 100 x 100 mm timber shore, Gunter batten, pad pieces, wedges, patch pack and rubber sheet.	BRd 2170(1) Chapter 16 and BR 4008 Demonstration Observe all safety precautions when handling and transferring Acroprops. BRd 2170(1) Chapter 16 and BR 4008 Demonstration

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
	12. Second Stage Damage Repair (Cont'd)	
Practical demonstration of shoring techniques (Cont'd)	a. Explain where to use pad pieces with vertical timber shores (deckhead and support beam). b. Place rubber sheet and steel plate over damaged area on sound frames. Explain that wedges must be removed. Place pad piece on top. c. Describe the construction of the Gunter batten and explain how to operate. d. Place boot on pad piece and measure from toecap of the boot the length of shore required. e. Cut timber to length and take to incident. f. Lock shore into position by inserting opposing wedges (top or bottom) ensuring shore is vertical. (A further pad piece may be required if shore butts up to deckhead). g. Vertical timber shore length is not to exceed 30 times its width. 3. Second stage repair on multi-split EMMS clamps, compressible material, pad piece, timber infills, timber shore and wedges. a. Position EMMS clamps either side of damaged area on sound frames. Clamps to be central to damage and level with each other. Wing nuts facing away from damaged area. b. Explain that, if required the protruding length of wedges/bungs to be cut off. c. Place compressible material over damage. d. Position pad piece over compressible material. Place timber infills over pad piece. Locate timber shore between EMMS clamps. Lock/build into position using opposing wedges (Infills and EMMS clamps).	BRd 2170(1) Chapter 16 and BR 4008 Demonstration

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
12. Second Stage Damage Repair (Cont'd)		
Practical demonstration of shoring techniques (Cont'd)	4. Second stage repair on multi-split proud and double breast shore using pad piece, Gunter batten, small Acropop, 100 x 100 mm timber proud and breast shores. a. Position pad piece on the deck central to damaged area. b. Use Gunter batten to measure from pad piece to deckhead. c. Add 25 mm (one thumbs width) to the measurement. d. Cut and position timber central to damage. e. Measure from compressible material and pad piece over damaged area on lower breast shore to the front face of proud shore using Gunter batten. f. Extend length of Gunter batten by half of the width of proud shore. g. Cut and position breast shore. h. Place footplate of small Acropop against compressible material and pad piece. i. Extend Acropop until top plate touches proud shore, insert wedge between Acropop top plate and proud shore to counteract proud shore angle. j. Tighten and lock into position using operating handle.	BRd 2170(1) Chapter 16 and BR 4008

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
12. Second Stage Damage Repair (Cont'd)		
Practical demonstration of shoring techniques (Cont'd)	5. Second stage repair on buckled hatch using Acroprop and pad pieces. a. Apply pressure to top of hatch (stand on it). b. Apply hatch retaining clips and tighten using hatch clip spanner/lever. c. Shore hatch using Acroprop and 2 pad pieces on affected area. Replace with 100 x 100 mm vertical timber shoring when action/sea state allows. <i>Note. During peacetime conditions, Acroprops are considered to be a semi-permanent arrangement. However, in a wartime condition they are only for temporary use and must be replaced with timber shores as soon as conditions allow.</i>	BRd 2170(1) Chapter 16 and BR 4008 Demonstration
13. Portable Pumps		
Define the types of pumps available in your ship and where they are located.	Each FRPP has 3 Weda pumps and 1 portable eductor plus one ARO (Sanseal) per ship with a low pressure ringmain. Describe, rig each pump and demonstrate its operation.	BRd 2170(1) Chapter 27 and BR 4008
14. WEDA Pump Series Coupling Kit		
Define WEDA pump capability to produce firefighting water pressure	1. 1 pump does not produce sufficient pressure for firefighting. 2. When 2 pumps are run in tandem they will produce sufficient pressure to supply up to 4 hoses for emergency firefighting.	BRd 2170(1) Chapter 27 and BR 4008
Explain tandem connection of 2 pumps	1. The first pump (which is taking suction) is fitted with a 4 in discharge adaptor (as supplied) and a 4 in discharge hose. 2. The second pump is connected to the first pump discharge hose using the coupling kit connection. This is fitted to the bottom of the second pump strainer.	2 pumps and connections rigged for demonstration

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14. WEDA Pump Series Coupling Kit (Cont'd)		
Explain rigging of firefighting hoses and nozzles	Two in number 'Y' pieces are connected to the discharge side of the second pump; size 2 hoses are then rigged to the required length from the pump to the firefighting nozzles. If only 2 hoses are used for firefighting, the other 2 should be run to separate discharge overboard valves to provide maximum flow rate.	'Y' pieces, hoses and nozzles rigged for demonstration
Carry out practical demonstration	If the situation allows the demonstration should be rigged on the upper deck and the first pump lowered overboard until its suction is covered by water. The pumps can then be started to prove the system.	At least 6 personnel are required to man the hoses and suction pump
15. Incident Board Marking		
Interpret an Incident Board	The requirement for whole ship Incident boards is to record all Damage Control incidents in a pictorial manner that can be understood at a glance. Explain the following: Layout of Decks, Half Decks, Watertight and non-watertight bulkheads, Doors, Hatches, Manholes, Hoists and trunks, Compartment water capacities, Fire and Repair posts, CBRN markings, Dispersal stations numbers, Tank Layout and Colour wash for machinery spaces.	Large incident board. Individual incident boards marker pens. BRd 2170(1) Chapter 8
Define the notations for marking an Incident board	Explain the following symbols: Fire, Free Flood, Slow Flood, Free Surface Flood, Boundary cooling, Smoke boundaries, Flooding boundaries, Shoring, Contamination from within, External contamination, Additional information, Splinter holes, Distorted bulkheads, Adjacent incidents and Duel incidents. Notes: - Where a significant error has been made, eg fire in wrong compartment, this may be erased and corrected, having first obtained OOD permission to do so. - Emphasise importance of IBO. - The symbology for marking Ship Protection incidents in harbour is detailed in BRd 8988 - Royal Navy Manual of Military Training, Operations and Tactics.	Large incident board. Individual incident boards marker pens. BRd 2170(1) Chapter 8 Using individual Incident board get Duty Watch to mark boards up using correct symbology.

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16. Ramfan		
Describe the Ramfan and its uses To identify the equipment and know how it is set up Describe the operation of the Ramfan	1 man portable fan. HPSW driven turbine. 2.75 to 12.4 bar (40 to 180 psi). Used for smoke clearance or double bottom tank venting. Set comprises of 1 fan and 4 lengths of 300 mm ducting. - Connect size 3 hose from discharge side of pump to a discharge overboard. - Connect size 2 hose from HPSW to inlet of Ramfan. - Fan must be earthed using earthing lead. - Attach required length of ducting on suction and discharge. - To operate open supply for Ramfan (obtain permission from HQ1 before operating). - On completion flush with fresh water.	BRd 2170(1) Chapter 22 Ramfan and hoses
17. Ramset Tool		
Describe the Ramset tool. To identify the equipment and know how it is set up. Understand the operation and uses of the Ramset tool	The Ramset tool is an explosive powered fastening tool, which is primarily used to effect emergency repairs to breaches of ships citadel and structure. The equipment description to include: Fastening system (nail), Fastening system (charge), Penetration, Fixing the patch plate, Safety precautions (Personal), Safety precautions (Tool), Safety precautions (General), Pre-firing, Failure during firing, Post firing and Stowage.	BRd 2170(1) Chapter 15 and BR 4008

**WARNING**

THE RAMSET TOOL IS ONLY TO BE OPERATED BY PERSONNEL TRAINED ON COURSE AT THE MWS PHOENIX TRAINING GROUP. THIS LECTURE DOES NOT QUALIFY OPERATORS.

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
18. Kill Cards		
Explain what a Kill Card is and where it is found Define what information is found on the Kill card	Firefighting Kill Cards (Form S3021) are used for High Fire Risk, Explosive Risk and High Value compartments. Kill Cards may be raised for other compartments at the discretion of ships officers. Front side: Ventilation, Danger hazards within and external to compartment, Firefighting installations within fixed/portable and external fixed/portable, Smoke clearance action, Pumping out arrangements, Electrical supplies to be isolated and Fuel supplies to be isolated. Reverse side: Compartment layout and Adjacent compartments. Locations to find Kill Cards: At entrance to compartments, HQ1/HQ2/SCC, FRPPs and WSB.	BRd 2170(1) Annex 21J Photocopied examples of ships Kill Cards
19. Radioactive Valve Breakage/Beryllium Hazards		
Explain the correct procedure for the disposal of a broken radioactive valve Define what Beryllium is and where it can be found	Disposal: Hazards of valve, Disposal kit to be used, Contents of kit, Initial reactions and reporting procedures, Correct method to clean up area and Methods of disposal. 3 main forms: Metal, Oxide and as a addition to metals. Beryllium: Grey colour, lightweight and strong. Used in aerospace/nuclear, scanning mirrors, computer disc systems, X-Ray generators and detectors. Copper beryllium: 98% Copper and 2% Beryllium. Good electrical conductor. Used in high reliability 'L' connectors, household appliances, cars, computers, aircraft and telecommunications.	BR 2000(20) - Ship Engineering Practices (Safety) JSP 392 - Instructions for Radiological Protection

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
20. Thermal Lance Cutting Equipment		
Explain what the Thermal Lance Cutting Equipment is and its uses	It is oxygen cutting equipment: Portable, Uses ultrathermic cutting rods, How it uses oxygen, How the rod is ignited, Cuts 380 mm of 20 mm steel, Up to 1 m in water and Personnel rescue and battle damage.	BRd 2170(1) Chapter 15 and BR 4008 Thermal Lance
Describe each component	Aluminium box, Body harness, Oxygen cylinder, Batteries and cable assembly, Cutting torch and striker late and Ultrathermic rods.	Thermal Lance disassembled. Show each individual part
Procedure: Explain safety aspects and demonstrate how the Thermal Lance Cutting Equipment is used.	Correct clothing: Overalls over No 4s and cotton underwear, anti-flash hood and welder's goggles, leather gauntlets. Basic firefighting rig, FF hood, BA and anti-flash gloves. Be aware of what you are cutting: What is behind it?, minimum distance for other personnel (3 m), never point the torch at anyone, keep clear of flammable materials, positive and negative side of the batteries SHOULD NEVER TOUCH.	Show objects
Preparation for work.	Inspect all components, check batteries and oxygen cylinder for charge, set regulator 90 - 120 psi, connect batteries to harness, cutting tool and striker, check area, check ventilation and ensure correct safety clothing is worn.	-
Commencing work.	Open bottle/open collet nut, insert rod and tighten/point rod away from body/bring rod into contact with striker/when sparking commences add oxygen/move to the top of work and move striker away from work area.	-
Cutting.	Angle rods towards cut and drag along line.	-

**WARNINGS**

- 1. THE TEMPERATURE OF THE ROD IS 5000°C.**
- 2. TEMPERATURE MIXTURE OF OXYGEN AND ELECTRICITY IS POTENTIALLY LETHAL.**
- 3. THERMAL LANCE CUTTING EQUIPMENT IS ONLY TO BE OPERATED BY PERSONNEL TRAINED ON COURSE AT THE MWS PHOENIX TRAINING GROUP. THIS LECTURE DOES NOT QUALIFY OPERATORS.**

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
21. Keys Organisation		
Explain keys organisation onboard your ship Explain duty of Keys rating	Point out importance of key tanks. Correct keys are stowed in key tanks for ALL compartments. If locks or padlocks are changed then keys must be replaced in key tanks. Must be mustered periodically. Point out location of key tanks. When the alarm is raised the Key rating is to provide keys from key tank to I/C of Main Group and I/C of Containment Party to allow access to all compartments in the vicinity of the fire. Then rating must return to containment control point.	BRd 2170(1) Chapter 20 BR 4007 Chapter 4 Ships CBRNDC Orders
22. OOD, DMESR, DWESR and DPO Stability Training		
Understanding basic aspects of ship stability considerations	1. Explain the principles of flotation: Archimedes Principle, Weight acts vertically down through CG and buoyancy acts vertically up through CB. For equilibrium, buoyancy is equal and opposite of weight. 2. Explain the effects of changes of weight: Addition of weight causes sinkage (ie an increase in buoyancy) to regain equilibrium, CG moves towards added weight and away from a removed weight and CG moves marginally for an addition of weight. 3. Explain intact ship stability at small angles: CG is independent of angles of heel (heel is an inclination away from the upright caused by external forces such as wind and/or waves), CB moves as the ship heels, movement of CB causes a righting lever GZ and a righting moment, position of metacentre and use of GM as a measure of stability. 4. Explain that the main concern is transverse stability. Longitudinally the same theory but GM very large, therefore not of concern except effects on OC or incidents involving docking or grounding. These would fall outside the remit of the HFEP. 5. Explain the effects of free surface liquids on ships stability: Causes a virtual rise in CG/ Dependent on cube of breadth of compartment and length/Liquid will cause a movement of CG towards the flood as it is also an added weight/In the case of asymmetric flooding, CG will rise and move off the centreline; this will cause list and could also cause loll.	BRd 2170(1) Chapter 30 and BR 4008

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
22. OOD, DMESR, DWESR and DPO Stability Training (Cont'd)		
Know specific considerations for the individual vessel	1. Inform the group of the vessels typical GM for conditions they are likely to experience (Deep, Light Seagoing and Light Harbour). 2. Inform the group of compartments likely to give cause for concern due to their free surface effect and give typical values for the free surface effect of various compartments around the vessel. 3. Inform the group of any other limitations that are likely to affect them, imposed by the Stability Statement.	BRd 2170(1) Chapter 30 CB 4538 - CBRNDC Class Book
Know the correct actions to take in the event of an incident with respect to stability	1. Explain list and loll: List caused by off-centre weight/Loll caused by a rise in CG to make GM negative at small angles (eg free surface, large vertical movement of weight or addition of a large weight well above CG)/Loll is an unstable state, which, if not recognised, can lead to a worsening of the situation. For most ships in the light harbour condition they will move more quickly into a state of loll than they would in the light seagoing condition. 2. State the correct reactions to list and loll: a. List. Remove off-centre weight or counterbalance it. b. Loll. Remove high weight, remove/reduce free surface or ballast low down. 3. Discuss the implications and practicalities of various methods of improving ship stability, relating to the specific vessel: Loss of compartment when counterflooded; identify those that might be used/ Loss of equipment by jettisoning; where is the Jettison Bill; what are the easy items to remove?/Lack of space to ballast when fully fuelled/Loss of use of fuel tank if flooded with seawater (non-compensated tank)/Difficult to move large weights vertically; what could be moved, that would make a difference?	BRd 2170(1) Chapter 30 and BR 4008 HQ1 documentation Jettison Bill

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
22. OOD, DMESR, DWESR and DPO Stability Training (Cont'd)		
Know the correct actions to take in the event of an incident with respect to stability (Cont'd) Consolidation	4. Explain how to deal with free surface: a. Break up surfaces longitudinally, (dwarf bulkheads do not have to be watertight). b. Remove water from the ship (best solution normally) or stop it forming, hence reason for keeping boundary cooling water to a minimum. c. Drain down (but be aware of risk of two free surfaces or bigger free surface if the lower compartment is larger). d. Completely fill the compartment. 5. Show sources of information in HQ1 or that can be quickly obtained. Explain how each may help to provide solutions to problems. 6. Ensure that the location and use of inclinometers is understood. 7. Explain the location and use of cross-flooding systems, if fitted. Repeat the Key Points sequentially, ensuring that they have been understood. Invite any questions from the group.	-

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
22. OOD, DMESR, DWESR and DPO Stability Training (Cont'd)		
Examples of areas to cover	Explain simply why a ship floats and how your ship could sink. Where is the waterline in relation to the deck where the lecture is being delivered? Where are the centres of flotation? Give examples of compartments flooded and consequent changes in heel/trim. What angles of heel and trim are dangerous and why? Where are the areas susceptible to flood? Which compartments are more hazardous when flooded? What is GM and how can reductions due to flooding be easily calculated? How is a GZ curve read? How is a carpet plot read? What are the various sources of information relating to stability? Explain how to use them. How is each different type of flood combated? What is the Jettison Bill? What are the stability particulars for your ship now? Are they recorded in HQ1?	BRd 2170(1) Chapter 28 and BR 4008

ENABLING OBJECTIVES	KEY POINTS	METHODS AND AIDS
23. Emergency Escape Breathing Apparatus (EEBD)		
Explain what an EEBD is and where they can be found.	1. The Emergency Escape Breathing Device (EEBD) is a one-shot, short duration re-breathing set that provides respiratory protection for personnel escaping from a toxic or smoke filled atmosphere. 2. Normally stowed in racks located in compartments containing personnel, but can also be worn on a belt.	BRd 2170(1) Para 2614 to Para 2620. OCENCO training video.
Identify and Locate the individual components of the EEBD.	1. Mouthpiece. 2. Nose clip. 3. Neck strap. 4. Oxygen cylinder, gauge and regulator. 5. Scrubber to remove carbon dioxide from exhaled air. 6. Breathing bag, which receives oxygen from the regulator and exhaled air from the user. 7. Face shield. 8. Plastic cover.	BRd 2170(1) Para 2615 to Para 2620. OCENCO training video. See Para 24 sub para h .
Demonstrate and practice correct EEBD donning procedure.	1. Don training EEBD iaw case instructions (see Note). 2. Ensure set is fully removed from all packaging and the re-breather is activated. 3. Wear the training EEBD for a minimum of 10 mins. Note. <i>Emphasis should be placed on the importance of inserting the mouthpiece first as essential for a successful escape.</i>	Blue EEBD (see Para 2620). BRd 2170(1) Para 2616 .

24. DC Equipment Checks

a. CO₂ SPE

- (1) Full yellow/red/blue anti-tamper tag in position, pin fitted with collar.
- (2) Local number marked on extinguisher.
- (3) Red triangle on bulkhead with corresponding local number.
- (4) Stowage and securing strap in good condition.
- (5) Horn is not loose in movement and securing nut is immovable.
- (6) Check for dents and corrosion on extinguisher.

b. AFFF SPE

- (1) Correct pressure (15 Bar - in the green sector).
- (2) Check safety pin free to turn and plastic dart is inserted in the pin with anti-tamper tag in position.
- (3) Local number marked on extinguisher.
- (4) Red triangle on bulkhead with corresponding local number.
- (5) Stowage and securing strap in good condition.
- (6) Check nozzle assembly and hose connection joints for condition and ensure that joints are tight.
- (7) Check for dents and corrosion on extinguisher.

c. Dry Powder Extinguisher

- (1) Correct pressure (15 Bar - centre of green sector).
- (2) Check safety pin free to turn and plastic dart is inserted in the end of the pin with anti-tamper tag in position.
- (3) Local number marked on extinguisher.
- (4) Red triangle on bulkhead with corresponding local number.
- (5) Stowage and securing strap in good condition.
- (6) Shake extinguisher to keep powder inside free.
- (7) Check nozzle assembly and hose connection joints for condition and ensure that joints are tight.

- (8) Check for dents and corrosion on extinguisher.
- (9) Check dust cap is in place on charging connection.

d. **Escape Scuttles**

- (1) Test escape scuttles from **BELOW** ensuring ease of operation of the locking mechanism and that the scuttle moves freely.
- (2) Test escape scuttles from **ABOVE** ensuring ease of operation of the locking mechanism and that the scuttle moves freely.
- (3) Are escape arrows and signage appertaining to the escape scuttle in place, legible and correct?

e. **Firefighting Hoses 20 ft and 40 ft (6 m/12 m)**

- (1) Connections clean and lightly greased with XG 274.
- (2) Hoses in good repair and marked with location at ends.
- (3) Stowed correctly (40 ft faked to the inside, 20 ft rolled to outside).
- (4) The hydrant identification number is to be marked on a red painted square adjacent to the hydrant.
- (5) Hose basket clean on inside (under hose and nozzle).

f. **Centre Feed Hose Reels**

- (1) HPSW valve adjacent to inductor panel **SHUT**.
- (2) Position selector valve set to foam and hoses/nozzles and spill pick-ups in good condition.
- (3) Pressure in hose released - as indicated on pressure gauge.
- (4) Ensure non-return valve ball moves freely.
- (5) No saltwater deposits on nozzle.
- (6) Operating instructions posted adjacent.
- (7) Shaded deck plans indicating compartments covered adjacent.

g. **Firefighting Nozzles FF/WW**

- (1) Clean and free of corrosion.
- (2) Lightly grease working parts with XG 274.

- (3) Easy to operate through the full range of movement.
- (4) Stowed in the **CLOSED** position.

h. **Emergency Escape Breathing Device (EEBD)**

- (1) Pressure within green zone. Gauge and casing of unit not cracked.
- (2) Stowage cabinet in good condition with sets numbered.
- (3) ESCAPE BA sign on cabinet.
- (4) Securing strap in good condition with Velcro extension.



Notes:

1. Defects are to be entered into the defect log. This checklist is not exhaustive and units may add other items of DC equipment that must be checked within compartments. The checklist may also be adapted to record items of CBRN equipment, including periodical checks to be carried out and details of the custodian.

2. Any maintenance operations including the monitoring of test and LIFEX dates of SPE are the responsibility of the designated equipment maintainer (see [Para 3304](#)).