ANNEX 21N

SMOKE CLEARANCE IN SURFACE VESSELS

1. The aim of this Annex is to highlight the inherent dangers associated with smoke and smoke clearance, offer guidance on smoke management that will assist ship's staff in the production and validation of smoke clearance plans and reinforce the requirement to use synthetic smoke in ship's organic firefighting training.

2. It has long been recognised that most fire deaths and/or injuries are due not to burns but to exposure to toxic smoke products, oxygen depravation and other effects loosely termed smoke inhalation. Smoke kills by a combination of thermal damage, poisoning and pulmonary irritation caused by carbon monoxide, hydrogen cyanide and other combustion products.

3. When considering smoke clearance, ship's staff should be aware that as well as being toxic, smoke is unburnt gas and is therefore flammable. The flammability of this unburnt gas should not be underestimated and this means that sensible precautions should be taken to ensure that the process of smoke clearance does not provide any ignition sources. Also in most ships, the ventilation system will allow smoke to pass to other compartments that may be remote from the scene of the incident and therefore personnel need to be informed of the potential hazards with any smoke emanating from ventilation system, however remote from the incident. Therefore the following precautions should be observed, as far as reasonably practicable:

a. When using an exhaust fan to smoke clear, all reasonable precautions should be taken to ensure its electrical integrity before it is utilised to smoke clear.

b. If smoke is to be exhausted through a compartment, or passageway, the electrical integrity of all equipment within that compartment should be confirmed before smoke is exhausted through it.

c. If the compartment to be smoke cleared does not have a fresh air inlet, then a Ramfan may be used to feed fresh air in while an exhaust fan is used to exhaust the smoke.

d. Supply fans may be used to move smoke, but the possibility of the smoke (toxic and unburnt gas) being forced into compartments remote from the scene should be carefully considered and precautions taken to minimise this.

e. The OOD or IBC should carefully consider what equipment/fans will be used to smoke clear, the route the smoke will take (as well as the route it may take) and therefore which areas need to be clear of personnel or have personnel in breathing apparatus. They should also be aware where the smoke will go once it has left the ship, eg if alongside the shore authorities/other ships need to be informed.

4. Training with Smoke

a. Feedback from the Surface Flotilla and FOST continues to highlight a poor understanding of the dangers of smoke, the principles of smoke clearance and a reluctance to practice smoke clearance outside of OST training. Recent experience of ship's arriving for training at OST has highlighted a lack of familiarity with both the dangers of smoke and smoke clearance techniques. In particular, ship's staff have consistently been seen to walk through smoke filled compartments apparently oblivious to the dangers.

b. The use of synthetic smoke during harbour and sea fire exercises is mandated during the follow serials detailed (with frequency) in BRd 9274 - Maintenance of Operational Capability (Surface Ships, Submarines and RFA):

(1) Serial 806011 - Smoke Control and Clearance (90 days).

(2) Serial 806018 - Practical Escape Drill with EEBD (182 days).

(3) Serial 806025 - Main Machinery Space Fire (Harbour) (182 days).