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EXPLANATORY MANUAL OF THE PRECAUTIONARY MEASURES TO ADOPT IN THE CASE OF ACCIDENTAL RECOVERY OF WAR SURPLUS IN TRAWLING NETS

With particular reference to surplus containing "chemical warfare agents" dumped in the Southern Adriatic Sea

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Outline of war surplus material recoverable from seabed of the Southern Adriatic Sea

During and after the Second World War, thousands of tonnes of ordnance were dumped in the waters of the Southern Adriatic Sea. This underwater arsenal includes aerial bombs, artillery shells, grenades, mines etc., which include both those containing only explosives and those with "chemical warfare agents". These surplus materials are a source of danger to the environment and to fishermen, particularly chemical war surplus. Once in the sea, the chemical devices, devised for spreading poison, are the first to corrode. This is due to the thickness of their casing, which is usually much thinner (between 2 and 6 mm) than the casing of conventional charge device bombs (Fig. 1 and Fig. 2). The compounds that make up the chemical agent can therefore pollute the sediments and the water. They can also harm marine organisms and represent a serious danger to fishermen who could catch surplus materials in their nets or come into contact with chemical agents while using fishing equipment.

Warning: due to the presence of chemical warfare agents leaking from corroded surplus materials, it is essential to pay careful attention while bringing in the nets that fishing equipment which has come into contact with the seabed has not been contaminated.

In the following section we aim to examine some of the general characteristics of the surplus materials most commonly recoverable from the seafloor of the Southern Adriatic. We also aim to illustrate the chemical agents which they may contain and indications regarding the procedures to adopt in the case of accidental recovery of war surplus.

Warning: Some of the effects caused by chemical agents can appear even after several years following the exposition. Therefore, if contaminated by a chemical warfare agent you must always contact immediately the appropriate health services, however slight or serious the symptoms may appear to be.

Aerial bombs

Both conventional and chemical aerial bombs are identifiable by their tapered body shape and by their tail (vane), which maintains the stability of the bomb during the fall. Along the body of the bomb there are often rings and hooks used to transport the device (Fig. 1).

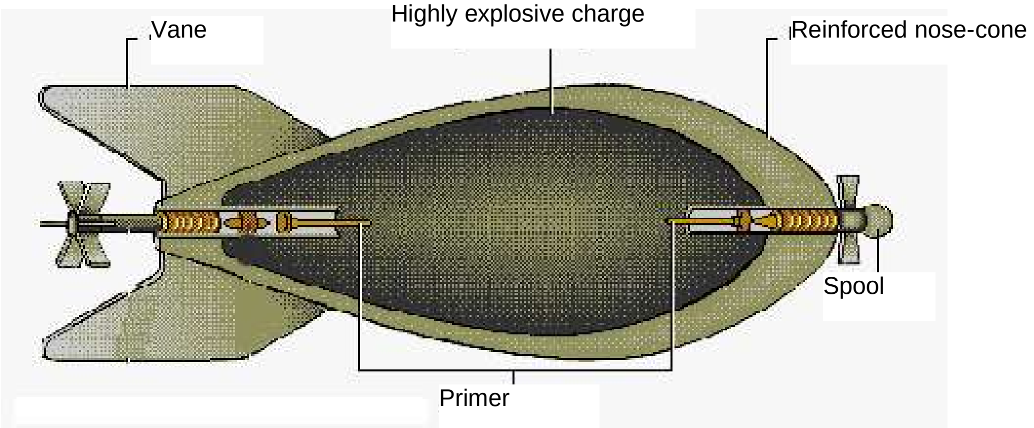

Fig. 1 Structure of an aerial bomb

The vane is often missing from the aerial bombs recovered from the seabed of the Southern Adriatic. This is either because it was removed before it was embarked onto the vessel used to dump it, in order to reduce the load volume being transported, or due to storage methods used in the deposits on land and in the hold.

In chemical aerial bombs the explosive is contained in a cylindrical compartment surrounded by the chemical agent (Fig. 2). In order to optimise the effect of the device the shell is particularly thin (usually between 2 and 6 mm). Therefore, chemical war surplus is particularly fragile and its contents may easily leak as a result of the combined action of marine corrosion and the corrosive action of some of the chemical warfare agents themselves.

Warning: it is for this reason that it is absolutely essential that war surplus materials must only be approached and handled with the utmost care.

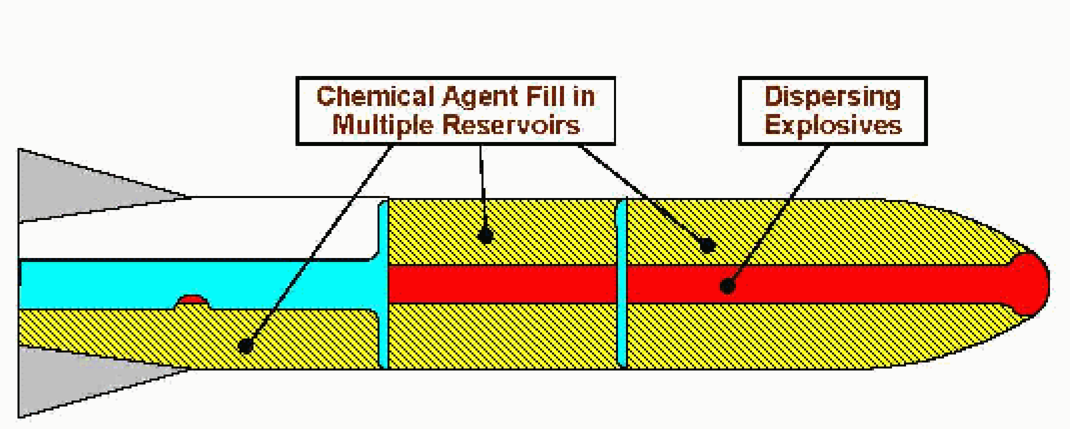

Fig. 2 Structure of a "chemical warfare agent" aerial bomb

ARTILLERY SHELLS

Artillery shells are tapered at one end and the widest diameter point represents the calibre. It is made up of three distinct parts, the bottom (base plate), the central body and the nose-cone (ogive) (Fig. 3). It is possible to identify rings and hooks for transport purposes around the nose-cone, similar to those found on aerial bombs.

The chemical artillery shells also generally consist of a cylindrical compartment containing the explosive charge. The compartment is surrounded by a chamber filled with the chemical warfare agent, which atomises at the time of explosion. When the shell is not armed, in the place of the spool at the nose-cone, a ring is screwed on for transporting purposes.

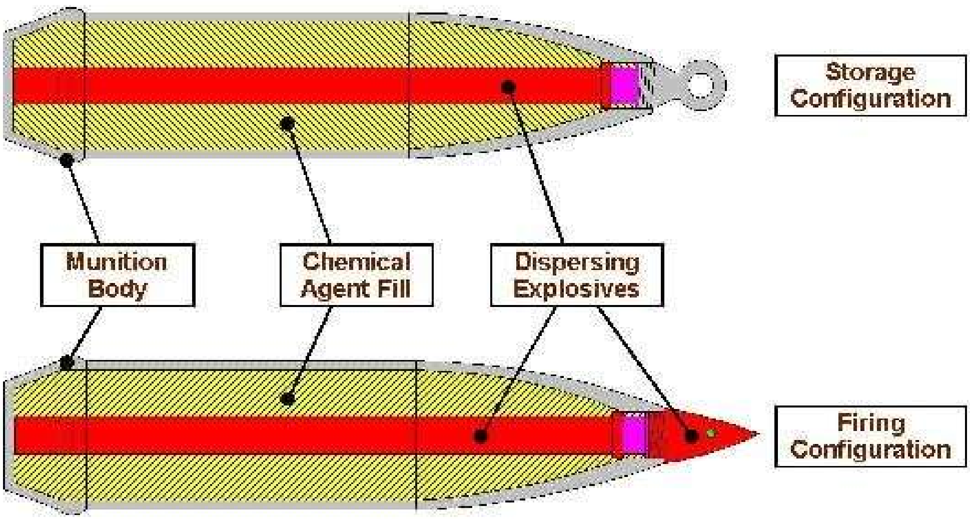

Fig. 3 Structure of a chemical artillery shell

DRUM AND BARREL BOMBS

These were either proper bombs (Fig. 4) or containers designed to conserve and load the munitions, or were to be used with jets containing the chemical warfare agents. Drums were recovered that were also used to transport damaged chemical war surplus to the dumping grounds. They are generally distinguishable from common metal drums by the presence of two metal support rings used to facilitate rolling, that are found along the body and by the presence of a loader, which in some cases is situated on the side of the bomb.

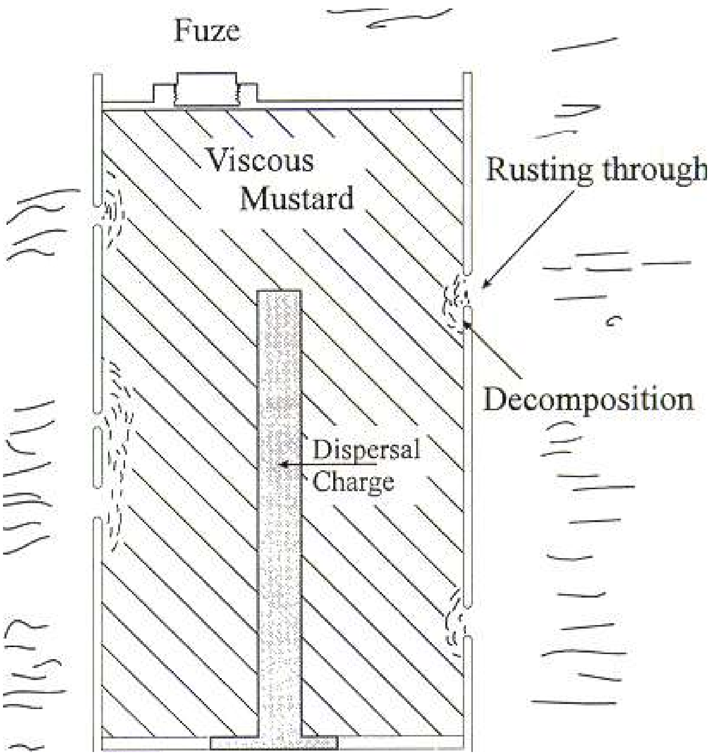

Fig.4 Corrosion of a chemical barrel bomb

Outline of the chemical warfare Agents

Chemical warfare agents used in wars or in the suppression of uprisings are designed to disable or kill whoever comes into contact with the substance and to temporarily render extensive areas uninhabitable.

On the basis of the type of damage caused to the organism, military manuals have classified chemical warfare agents into the following categories:

Blistering agents: provoke the destruction of the cells. The parts of the body which are most affected are - skin, eyes and mucous membranes in the respiratory tract. Yperite and lewisite belong to this category.

Asphyxiating agents: mainly affect the respiratory tract, causing damage around the alveoli of the lung resulting in the production and retention of liquid and suffocation. Phosgene and diphosgene are typical asphyxiants.

Irritants: provoke acute lacrymation, coughing, sneezing and vomiting. They can be divided into: vomiting and sneezing stimulating agents such as diphenyl arsine chloride (Clark I), diphenyl arsine cyanide (Clark II), adamsite (DN) and tear gas such as chloroacetophenone (CN) and chlorobenzalmalonitrile (CS).

Blood Toxic agents: block endo-cellular oxidation processes. Carbon oxide and hydrogen cyanide belong to this group.

At room temperature chemical warfare agents are generally in a liquid state and have a distinct tendency to evaporate. Mustard gas (Yperite), after being in the sea for some time can be found in a solid state and can develop very harmful vapours. The danger to humans is represented by contact with the compound and inhalation of the gases emitted. The chemical warfare agents can be harmful to humans even in low concentrations, which can even only be barely detected by their odour. The odour, as with the colour of the liquid, is often an identifying feature of the type of chemical agent.

In the following pages a general outline of some of the chemical warfare agents will be illustrated, along with the main symptoms that may appear in the short-term and the protective procedures to adopt.

YPRITE (MUSTARD GAS)

COLOUR	Brownish
ODOUR	Garlic
PHYSICAL STATE	Liquid at room temperature, often solid when recovered from the seabed.
AFFECTS	Blistering agent
SYMPTOMS	The first symptoms may appear only after more than two hours following the explosion. Disorders of varying degrees of seriousness are presented, which affect eyes, respiratory tract and skin. These include a burning sensation, intense itching and consequently the formation of blisters. The blisters may be particularly abundant in less exposed areas of the body such as axilla (armpits), pubis and between fingers and toes. The following symptoms may also be presented: a burning sensation in the eyes and conjunctivitis accompanied by intense lacrymation, the formation of boils and temporary blindness. The nose, throat, trachea and bronchus may also be irritated and congested.
PRINCIPLE PROTECTIVE MEASURES	Protection of the whole body (see page 25)
NOTE	Due to the persistence of mustard gas in water, leaks from the device can contaminate fishing equipment used on the seabed.

Lewisite

Colour	Brownish
Odour	Geranium
Physical state	Liquid
Affects	Blistering agent
Symptoms	It penetrates skin and respiratory apparatus easily, damaging, above all, skin, mucous membranes in the respiratory tract and eyes. The first symptoms appear about 20 seconds after the explosion and blistering appears after a few minutes. The sores which are formed are very painful and the burning sensation in the eyes can be extremely intense. In addition to blistering, damage may be caused by the poisoning effect of arsenic in the chemcial warfare agent.
Principle protective measures	Protection of the whole body (see page 25)
Note	It is often mixed with mustard gas. Due to the persistence of lewisite in water, leaked from the device, it can contaminate fishing equipment used on the seabed.

Phosgene

Colour	Colourless
Odour	Light odour of cut hay
Physical State	Gas
Affect	Asphyxiating agent
Symptoms	It has immediate effect, mainly on the respiratory apparatus, damaging the alveoli of the lung and causing suffocation.
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Principle protective measures	Give priority to the protection of nose, mouth and eyes (see page 25)

DIPHOSGENE

COLOUR	Colourless
ODOUR	Light odour of mouldy hay
PHYSICAL STATE	Gas
AFFECT	Asphyxiating agent
SYMPTOM	It has immediate effect, mainly on the respiratory apparatus, damaging the alveoli of the lung and causing suffocation.
PRINCIPLE PROTECTIVE MEASURES	Give priority to the protection of nose, mouth and eyes (see page 25)

CHLOROSOLPHONIC ACID

COLOUR	Brown
ODOUR	Acrid
PHYSICAL STATE	Liquid
AFFECT	Burning agent and irritant
SYMPTOMS	The burning effect of the acid, which can burn through clothing, is immediate and the sours that it causes are very painful and do not heal easily. In a gaseous form it is an irritant to the eyes.
PRINCIPLE PROTECTIVE MEASURES	Protect the whole body (see page 25)
NOTE	It reacts violently, exploding when in contact with water.

CHLOROPICRINE

Colour	Faded yellow
Odour	Acrid and pungent
physical state	Oily liquid
Affect	Suffocating agent and irritant
symptoms	It takes immediate effect, particularly on the respiratory apparatus causing suffocation. The vapours act as an irritant to the eyes.
principle protective measures	Give priority to the protection of nose, mouth and eyes (see page 25)

HYDROGEN CYANYDE AND CYANOGEN CHLORIDE

Colour	Colourless
Odour	Bitter almond
Physical state	Gas or liquid (depending on room temperature)
Affect	Blood toxic agent
symptoms	If inhaled it acts immediately.
Principle protective measures	Give priority to the protection of nose, mouth and eyes (see page 25)

Procedures to adopt in the case of accidental recovery of a device

Many people working in the fishing industry have discovered a large quantity of war surplus materials are lying on the part of the seabed that trawling nets come into contact with. A map of the areas at risk is needed, but it has proved difficult to provide. This is due particularly to the imprecision of the detection instruments on ships used to trace surplus after the war (the period in which large quantities of war surplus materials were dumped in the Southern Adriatic). In addition, the fishing practices themselves over the years have led to the dispersal of war surplus. In some cases, devices have been recovered accidentally in areas where trawling is not permitted and have therefore been thrown back into the sea without informing the maritime authorities of the incident. This practice, although widely carried out, is to be strictly discouraged. This is because it causes the accumulation of pollutants and contaminating substances in very wide areas and also because this practice makes areas of the seabed dangerous for activities other than fishing with trawling nets.

Although chemical weapons are more dangerous in terms of personal safety than conventional armaments, the procedures to adopt in the case of accidental recovery of all types of war surplus materials are similar. However, apart from inhalation of fumes or particular odours, it is often only possible to distinguish "chemical warfare agent" surplus from simple explosive charge devices by their coloured symbols, which are erased after a short time in the sea.

In the case of recovery of surplus materials the procedures to adopt will be different depending on when the device is discovered in the nets. Three different cases will be considered schematically:

A. The device is detected before the net is brought on board

A. The device is detected once the net is on board but has not yet been opened

B. The device is detected only after the net sack has been opened

In any of these circumstances it is advisable to act having clear the two aims to pursue:

- Reduce, as much as it is possible, the risk of explosion of the chemical agent
- Dispose of the device following the established procedures

**Important**: the activities outlined below must be carried out using protective equipment (page 25) and personal and material decontamination equipment (page 28), which must be prepared beforehand.

In **case A** it is essential to suspend operations immediately, lower the nets and tow them, if possible, towards the nearest port. In the meanwhile, the nearest port authorities must be notified immediately, giving the co-ordinates of the vessel, a brief description of the device and requesting indications in order to identify a safe area to place the net on the seabed. The dumping point must be identified by a buoy, its colour should be agreed upon with the port authorities, as this will facilitate the recovery of materials by those responsible for the clean up operation.

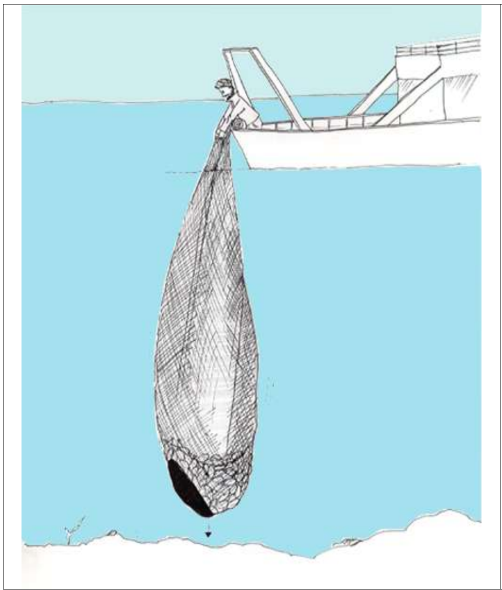
Important: all communications by radio must only be carried out while the device is still under water, in order to avoid setting off radio sensitive detonators.

In **case B**, the net must be put back into the water as soon as possible and the procedures laid out in case A must be followed. The operation must be carried out taking care to bring the boat in with the stern downwind, in this way the crew will be less exposed to chemical inhalations from the ordnance. At the same time, it is a good idea to close all the doors and portholes. If fumes are emitted from the surplus material (this is particularly typical of devices loaded with phosphorus) it is necessary to keep it wet by spraying it continuously with a low pressure jet of water.

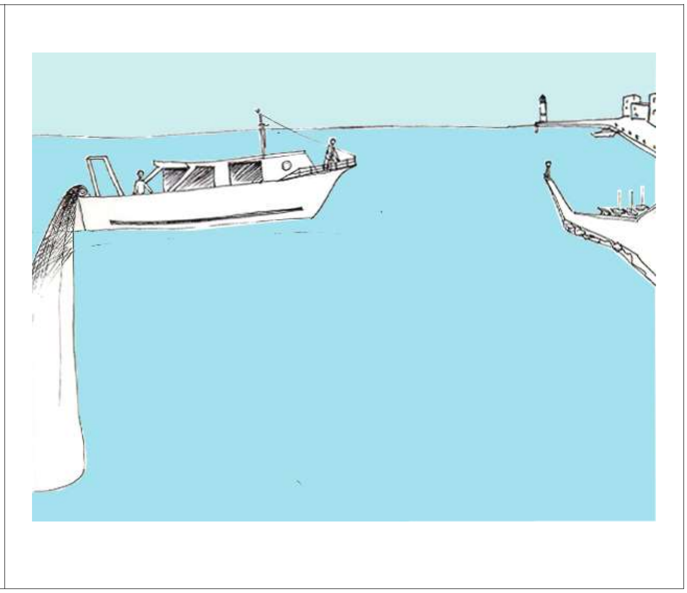
It is always a good idea to have the waterproof sheet normally used to protect the nets laid out on the deck where the net is emptied, so that if the situation presented in **case C** does occur the time that the device is on board will be kept to a minimum. With the help of a rope the device can be put back into the water and towed towards the coast, as indicated in case A. While the device is on board the precautions indicated in case B must be taken.

Important: handle the device only for the time strictly necessary to bring it on board and to put it back into the water (see page 23).

Case A: the net has not yet been pulled in

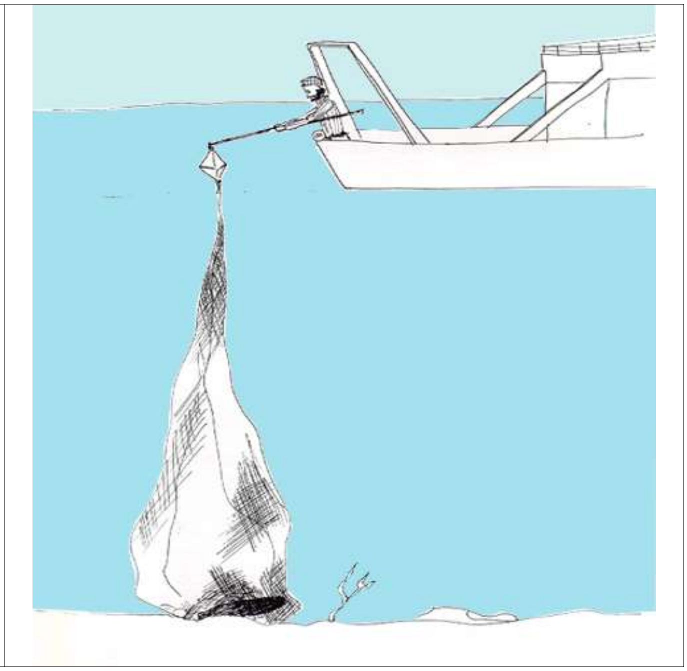


1. Lower the net



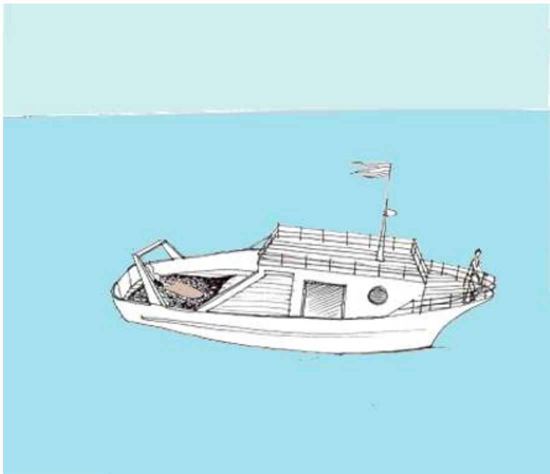
2. Tow it to the nearest port

3. Notify the port authorities



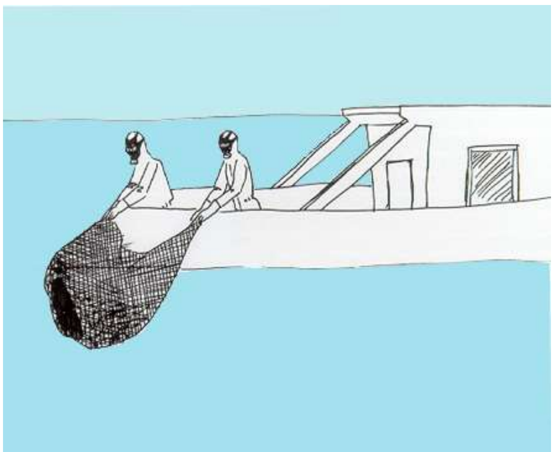
4. Place the net on the seabed at the agreed point and mark it with a buoy

Case B: the net has been taken on board but has not yet been opened

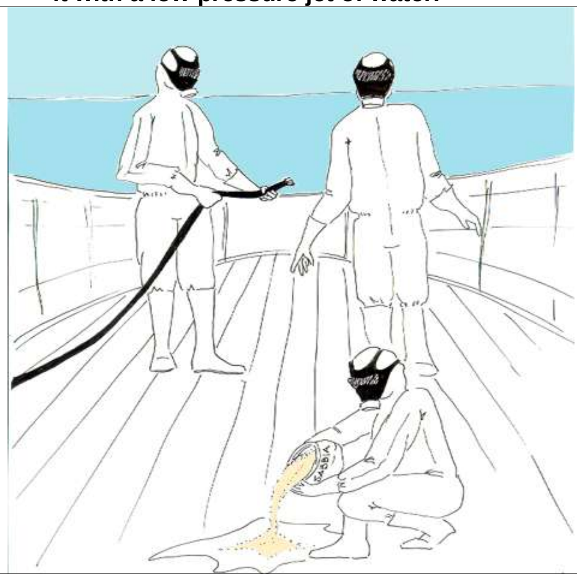


1. manoeuvre the stern downwind and close doors and portholes

2. If fumes are emitted wear the protective clothing and keep the device wet by spraying it with a low pressure jet of water.



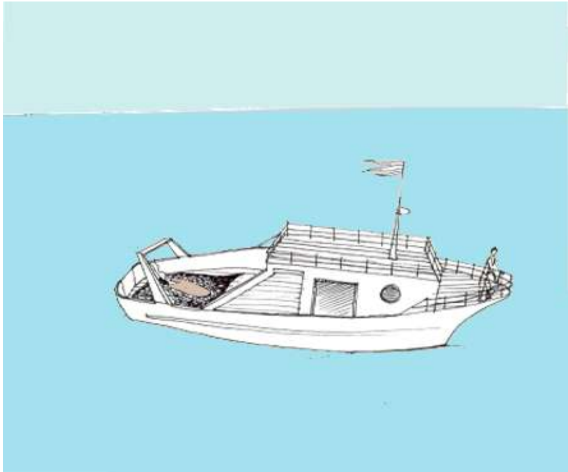
3. Put the net back into the water



4. Decontaminate people and equipment

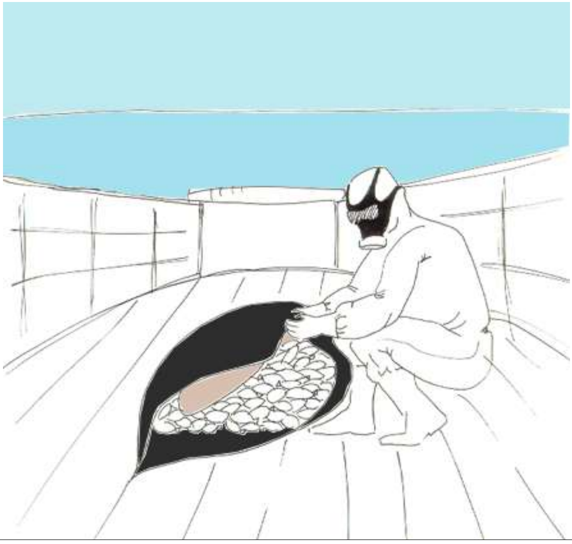
5. Follow the procedures indicated in case "A"

Case C: the net has been taken on board and opened

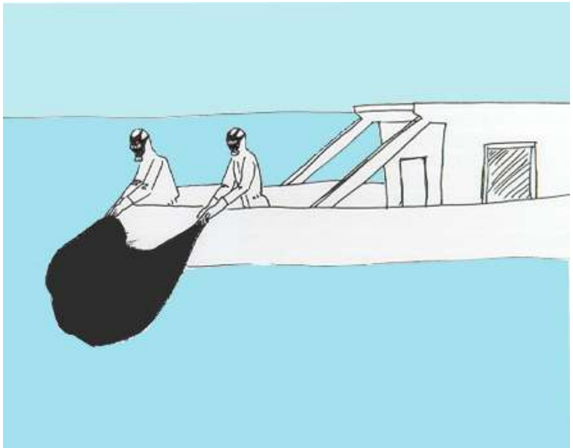


1. manoeuvre the stern downwind and close doors and portholes

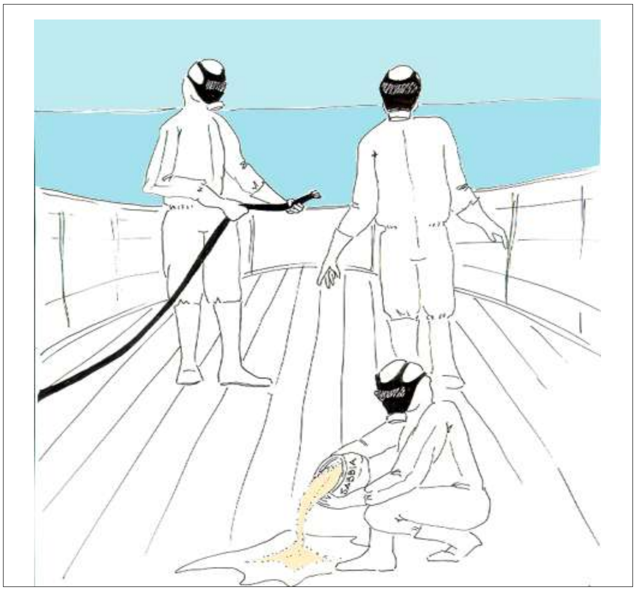
2. if fumes are emitted wear the protective clothing and keep the device wet by spraying it with a low pressure jet of water.



3. Wrap the device in a waterproof sheet



4. lower the sheet into the water



5. Decontaminate crew and equipment

6. Follow the procedures indicated in case "A"

An example summary form for the information to be reported in the case of recovery of a device is included on the following page. Obviously, the form should be completed only after the procedures indicated above have been carried out.

Information to be recorded in the case of recovery of war surplus materials

Point where nets were dropped (co-ordinates and depth)	Lat. (φ) Long. (λ) Depth (metres)	vessel	
Point where nets were taken in (co-ordinates and depth)	Lat. (φ) Long. (λ) Depth (metres)	Date	
Ordnance dumping point (co-ordinates and depth)	Lat. (φ) Long. (λ) Depth (metres)	Time	

If one of the crew felt unwell, when did he/she present symptoms ?	Immediately	After a few minutes	After an hour	After a few hours
Symptoms presented				
Odour of the chemcial agent				
Colour of the chemcial agent				
A brief description of the ordnance				
Notes				

Photograph or drawing of the ordnance

WHEN THE SURPLUS MATERIALS ARE ON BOARD

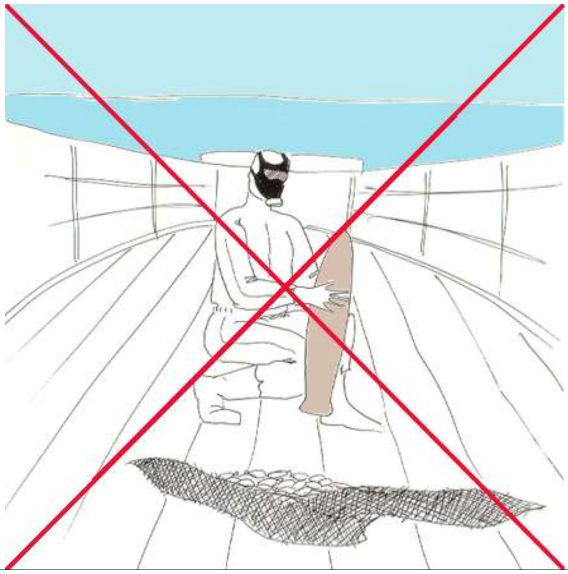
Although particular care must be taken when handling chemical weapons, conventional devices should also, however, be handled as little as possible and always with great care. Following a prolonged period under water, TNT can become unstable and explode even after a minor bump or if exposed to even a small amount of heat. The recovered ordnance should therefore be kept well away from sources of heat (e.g. a lighted cigarette) and from vibrations.

The ordnance has often been defused, however the detonator (the device to prime the explosive reaction) is occasionally armed. In addition, due to the possibility of explosion it is always essential to be extremely careful if bringing the ordnance in the nets, avoiding, in particular, bumping the device. Under no circumstances must the cleaning of the device be attempted.

Although the ordnance may seem watertight, the surplus material must not be touched without protection.

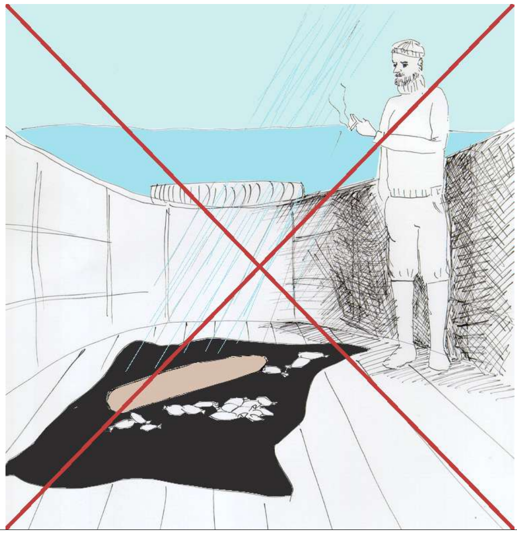
<u>Warning</u>: due to the different pressure levels between the seabed and the deck of the vessel, the chemical agent contained in the chemical surplus material, may leak violently from any opening in the casing, risking to spray people and objects.

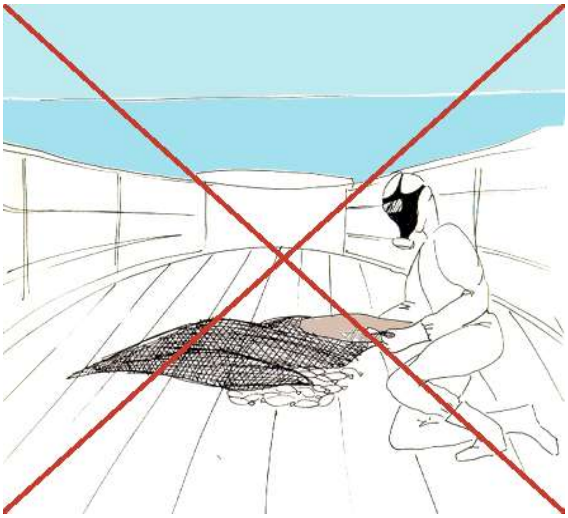
Summary of the principle actions to be taken in the case of war surplus materials on board



1. Handle any surplus material with extreme care.

2. The device must not be handled without protective clothing or equipment.





3. The device must be kept away from sources of heat and vibrations.

4. Do not attempt to scrape or clean the device.

PROTECTIVE MEASURES FOR THE CREW AND EQUIPMENT

In order to prevent, or at least limit, the damage that any war surplus material could cause to the crew of a fishing vessel, the procedures indicated must be followed and adequate protective measures must be employed.

The necessary materials must be stowed on board in a closed room where the crew can easily put on their protective clothing. All crew members on board must know exactly where the equipment is kept.

The recommended equipment ensures a certain degree of protection, however it does not guarantee complete protection from all chemical warfare agents. Therefore it is recommended to consider yourself only relatively protected for the time strictly necessary to remove the war surplus from the vessel.

Anti-acid rubber gloves and butyl gum boots are absolutely essential to protect hands and feet. The use of a polypropylene suit with hood is recommended to protect the entire body. For added protection oilskins normally used for fishing can be put on over the polypropylene suit.

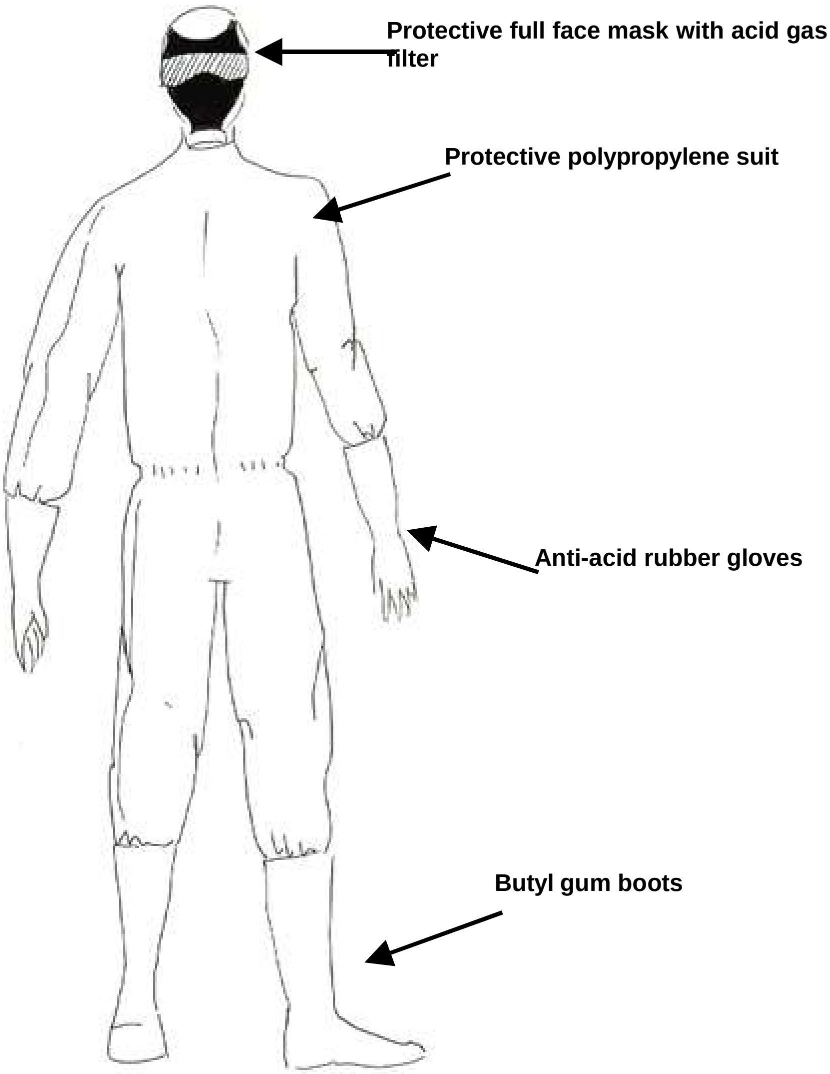
Priority must be given to the protection of airways and eyes. The use of a gas mask with an activated carbon filter against acid gases is recommended.

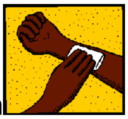
Warning: extreme care must be taken when removing the items of clothing used while carrying out the clean up operation "to make the war surplus safe". Traces of the chemical warfare agent on the equipment could contaminate the environment and the crew, with serious consequences.

The materials used must be placed in a plastic bag (the type used for the disposal of solid, urban refuse), placed at the stern of the boat and handed over to the port authorities.

In addition, it is recommended as a precautionary measure, to always empty the net onto the waterproof sheet normally used to protect the net.

PERSONAL PROTECTIVE EQUIPMENT



Decontamination 

The aim of decontamination is to remove pollutants promptly and rapidly from people and/or objects and from the environment exposed to the chemical warfare agents.

In the following pages indications regarding the materials and the main methods to carry out chemical decontamination will be outlined. It must be underlined that in most cases decontamination does not completely eliminate the chemcial agents involved.

**Important**: decontamination must always be carried out after the device has been put back into the sea.

It is recommended that the decontamination materials, like the protective clothing, be stored in a confined, closed place, and that all crew members on board know where they are kept.

It is advisable to proceed giving priority to human decontamination, which is then to be followed by the cleaning up of materials. A list of decontamination materials has been provided below. These items must be kept on board as a basic precautionary measure, in order to decontaminate, if necessary, humans and materials (see page 32):

- cotton wool pads
- 1 litre of 2% sodium bicarbonate solution (see instructions on page 30)
- 1 litre of permanganate solution 4:1000 (see instructions on page 30)
- 5 Kg of sand or fossil flour
- 5 litres of sodium hypochlorite (bleach)
- 5 Kg of caustic soda
- hot water and liquid soap
- plastic buckets and plastic bags

The decontamination operation must be commenced immediately after any contact with surplus material or after exposure to chemical warfare agents. It must be underlined that most chemical warfare agents are able to penetrate the skin very rapidly, thus a delayed attempt at decontamination may seriously compromise its effectiveness.

Important: the decontamination of personnel must be carried out by crew members who are adequately protected and have not come into contact with the surplus materials.

Firstly, the traces of the chemical agent must be eliminated from the skin. In order to do so, the affected area must be dabbed by cotton wool pads, without rubbing, so as not to spread the substance to areas of unaffected skin. Once the chemical warfare agent has been removed, as much as is possible, pads soaked in permanganate solution 4:1000 (to prepare the solution see page 30) must be applied. It is then necessary to rinse the area very thoroughly with lots of soapy water.

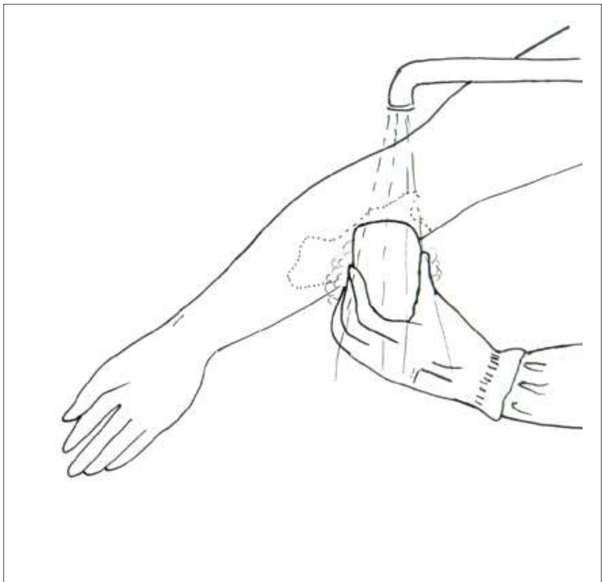
To decontaminate eyes and airways, irrigate and wash out (gargle) with 2% bicarbonate of sodium solution (to prepare the solution see page 30).

It is however essential to immediately contact a doctor to receive the correct care.

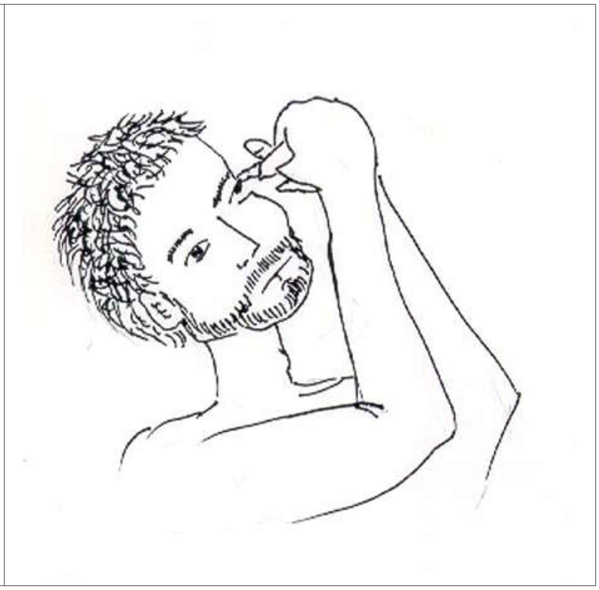
Summary of personal decontamination measures

1. Dab, without rubbing, cotton pads onto the affected area.

2. Apply pads soaked in permanganate of potassium 4:1000.



3. Rinse very thoroughly with lots of soapy water.



4. Irrigate eyes and wash out mouth with 2% bicarbonate of sodium

The areas contaminated by chemical warfare agents must be decontaminated as soon as possible. If the agents remain in contact with the materials, many of them (including wood) may absorb the chemical agents making decontamination particularly problematic.

As in the case of personal decontamination, the majority of the aggressive agent must be removed first, and afterwards the operation must then be completed by cleaning the areas thoroughly. In order to do this dry sand can be applied to the contaminated surfaces. The sand absorbs the contaminating liquids. Alternatively, flour can be used, thanks to its particularly absorbent qualities.

It is then possible to apply sodium hypochlorite or caustic soda solutions to break down the aggressive agent.

Several minutes after the application of the absorbent substance you can rinse the surface thoroughly with jets of hot soapy water (hot water decontaminates much more effectively than cold water). The "dirty" water must go into the sea. In order to avoid spreading the contaminating substance to other areas, it is important that the jet of water is always spayed in the same direction at a 45° angle to the vertical line.

The common, household name for the liquid form of sodium hypochlorite is bleach. Household solutions come in different concentrations, but before the container is opened they usually contain up to 14% of sodium hypochlorite.

Caustic soda is a white, solid substance that dissolves easily in water or alcohol. The chemical name is sodium hydroxide ($NaOH$). The effectiveness of liquid solutions of caustic soda depends on their concentration, but usually, the more concentrated the solution the quicker the clean up operation. The best way to mix and apply the substance is to spread dry caustic soda on the contaminated area and then wet it with hot water, rinsing it immediately. It must be underlined that caustic soda must be handled with care as it is a burning agent.

Any items of clothing which may have been contaminated should be soaked for 24 hours in potassium permanganate solution 4:1000 or 6:1000, and then rinsed with hot soapy water and dried in the open air for a lengthy period.

PREPARATION OF A SOLUTION

The solutions described below must be prepared on the floor and stored in a safe place, in a container clearly indicating its contents and the date of the preparation. The effectiveness of the decontaminating substance is guaranteed for one month.

Due to the difficulty in obtaining a precise set of scales, you should prepare large quantities of the solution (at least 10 litres), in order to use amounts of the solute that can be weighed out on household scales.

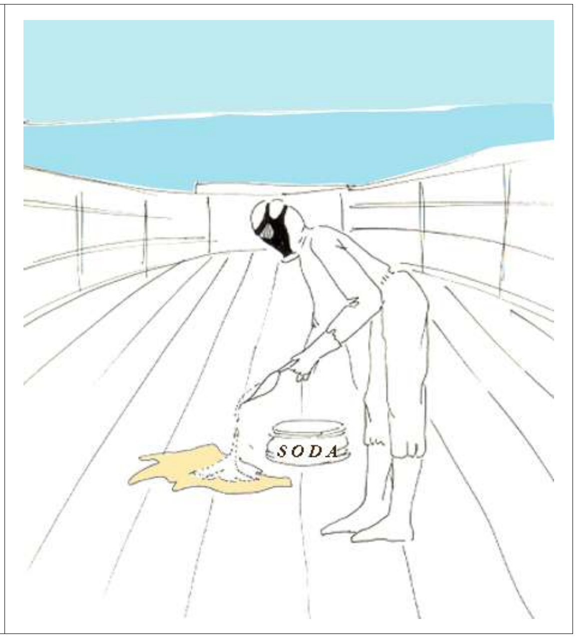
The solutions are generally expressed in the percentage of the compound dissolved in water. The weight of a litre of water is considered to be equal to 1000 grams. Therefore, in order to prepare a <u>2% solution of sodium bicarbonate</u>, 200 grams of the compound must be placed in a 10 litre container, which must then be filled up with distilled water.

The <u>potassium permanganate</u> should be used in 4:1000 solutions (to clean the affected skin areas). This compound is generally available from the chemist's in packets of ten tablets of 250 milligrams. Therefore, in order to obtain a 4:1000 solution 16 tablets in one litre of water are necessary. To obtain a 6:1000 solution 24 potassium permanganate tablets are needed in one litre of distilled water.

Careful attention must be paid to preparing the correct doses for the solutions. In fact, if the concentration is greater than the one advised it can be harmful to the organism, and a weaker solution could lead to a less effective decontamination operation.

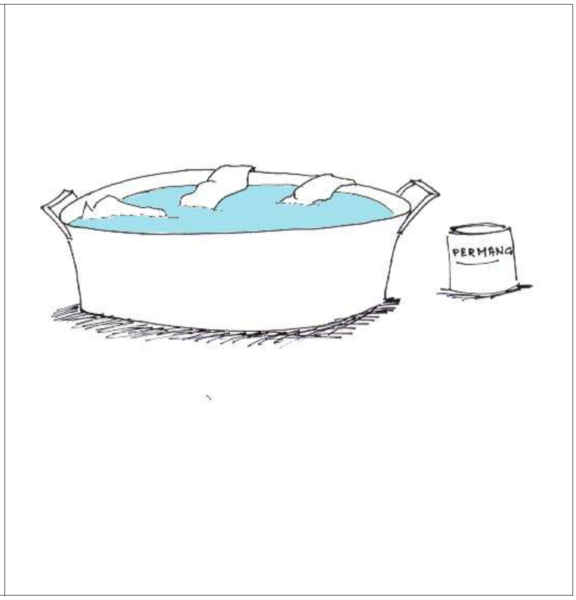
Summary of procedures for the decontamination of materials

1. Apply sand or fossil flour to the contaminated area.



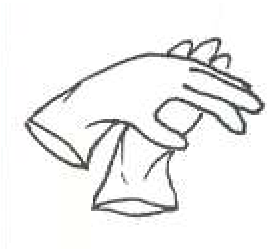
2. Apply either sodium hypochlorite or caustic soda solutions.

3. Rinse with a jet of hot soapy water.



3. soak contaminated clothing in permanganate of potassium solution 4:1000 or 6:1000 for 24 hours.

Materials and equipment to keep on board

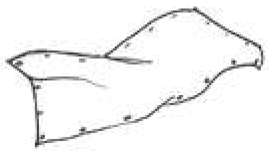


anti-acid rubber gloves

Butyl gum boots

Protective suit

gas mask with activated carbon filter



water proof sheet

cotton wool

Materials and equipment to keep on board (continued)

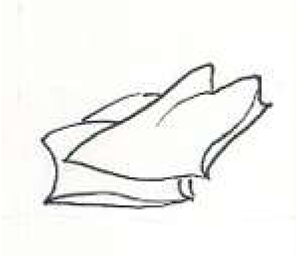
Sodium bicarbonate

Potassium permanganate

Sand or fossil flour

Sodium hypochlorite (bleach)

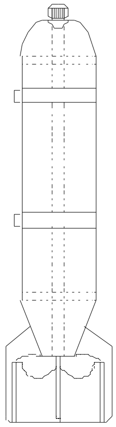
Caustic soda



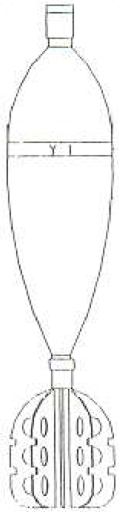
Plastic bags,sponges and cloths

Appendix

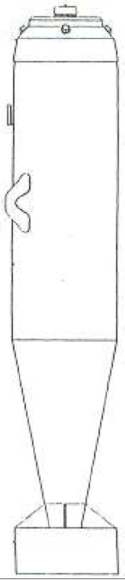
Principle chemical war surplus recoverable from the seafloor of the Southern Adriatic



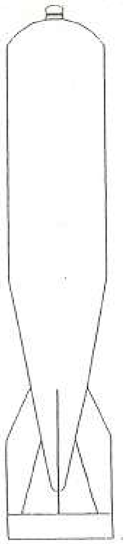
Description	M47 A1 Aerial bomb The casing is made of a steel sheet reinforced by two metal rings. There are two hooks used to lift the bomb.
Chemical warfare agent	Yperite (page 9) or white phosphorus
Length (cm)	116
Diameter (cm)	21
Weight (kg)	75



Description	Mortar grenade with a vane made up of six fins. If the device is in a secure position, a screw on cover protects the spool.
Chemical warfare agent	Yperite (page 9) or chloropicrine (page 12 or Phosgene (page 10).
Length (cm)	52
Diameter (cm)	11
Weight (kg)	12

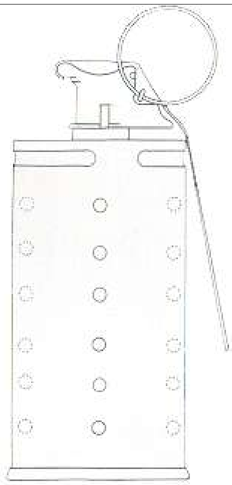


	DESCRIPTION	Aerial bomb made of a sheet iron body and a sheet metal conical rear at the vane end. The vane is cylindrical and has four fins to regulate direction.
	CHEMICAL WARFARE AGENT	Yperite (page 9) or white phosphorus (inflammable)
	LENGTH (cm)	80
	DIAMETER (cm)	12
	WEIGHT (kg)	Unknown

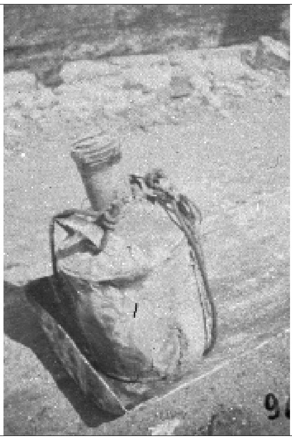


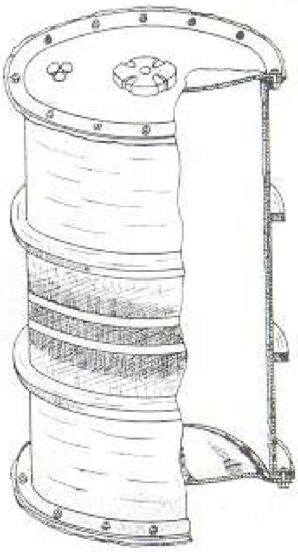
	DESCRIPTION	Aerial bomb, which releases its contents in a spray form. Bomba d'aereo capace di liberare, quando attivata, il proprio contenuto sotto forma di spray
	CHEMICAL WARFARE AGENT	Yperite (page 9) or phosogene
	LENGTH (cm)	177
	DIAMETER (cm)	33
	WEIGHT (kg)	Unknown

Description	Artillery bomb
Chemical Warfare agent	Yprite (page 9)
Length (cm)	60
Diameter (cm)	75
Weight (kg)	Unknown



Description	Cylindrical hand grenade
chemical warfare agent	Hydrogen cyanide (page 12)
Length (cm)	14
Diameter (cm)	6
Weight (kg)	Unknown

	DESCRIPTION	Drum like a demijohn. The bomb is cylindrical with handles used for transporting purposes. The neck contains the charge and a stopper to eliminate excess steam.
	CHEMICAL WARFARE AGENT	Yprite (page 9)
	LENGTH (cm)	64
	DIAMETER DIAMETRO (cm)	30
	WEIGHT PESO (kg)	45

	DESCRIPTION	It looks like a petrol drum, and is made of sheet steel and covered in a lead layer. Two metal rings can be found on the central part of the body.
	CHEMICAL WARFARE AGENT	Yprite (page 9) or diphosgene (page 11).
	LENGTH (cm)	74
	DIAMETER (cm)	52
	WEIGHT (kg)	c. 400

	DESCRIPTION	Mortar bomb that has a lamp like shape. The body is divided into two parts: the part at the spool end may or may not contain a toxic liquid; the part near the vane contains the explosive or chemical agent.
	CHEMICAL WARFARE AGENT	Unspecified phenol and cyanide compounds.
	LENGTH (cm)	38
	DIAMETER (cm)	9
	WEIGHT (kg)	c.3

	DESCRIPTION	Smoking drum
	CHEMICAL WARFARE AGENT	Chlorosolfonic acid (page 11).
	LENGTH (cm)	Unknown
	DIAMETER (cm)	Unknown
	WEIGHT (kg)	95