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Description

The present invention relates to a practice sea mine.

Presently, real mine cases filled with an inert substance, e.g. sand/cement, instead of explosive, are used as practice mines (see e.g. US-A-3,086,464). These may be deployed from a submarine or ship or are sometimes deployed from an aircraft. As real mine cases are costly items an effort is made to recover these which in itself is a costly operation and the recovery rate is low. Real mine cases clutter up the sea bed and can cause damage to fishermen's nets.

The use of biodegradable materials for the casing of a practice missile has been proposed in FR 2,364,425.

The present invention consists of a practice mine comprising a body shell containing an inert substance, characterised in that the body shell is provided with an internal tubular member sealed at one end by a removable plug for allowing passage of water on deployment of the mine, and in that both the body shell and tubular member are fabricated from material which decomposes on exposure to water.

Preferably, the mine is designed to degrade within a predetermined time period after deployment, for example, between one and six months. The mine may comprise means for initiating degradation on deployment such as a lanyard and pull-off patch.

Preferably, the body structure of the mine is made from wood, e.g. plywood and the inert filler may be a soluble cement/plaster mix.

Particular embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a view in longitudinal cross section of a practice sea mine according to the present invention;

Figure 2 is a view in transverse cross section of a second embodiment of the present invention;

Figure 3 is a view in transverse cross section of a third embodiment of the present invention.

Referring to Figure 1, a practice sea mine is indicated generally at 10 and comprises a tubular casing 12 made from plywood (14/15 laminations) which is formed from two vacuum moulded halves jointed and bound and fastened with low water resistant glues. A central tube 14 of spun cardboard extends almost the entire length of the casing 12. The casing 12 is filled with a hydrodegradeable concrete/plaster mix indicated at 16. An annular plywood block end cap 18 provides a filling access aperture 19 and bolted thereto is a nose piece 20 which may be a metal mine nose piece or may be made from hydrodegradeable material. At

the other end of the casing 12 a block 22 of cardboard material is inserted to adjust the centre of gravity of the mine 10 and a plywood block end cap 24 abuts the end wall of the casing 10 to which a tail piece 26, of metal or of wood for example, is attached. A lanyard 28 is attached to a pull-off patch 30 initially sealing the end of the central tube 14. A top lug 32 is provided for keying the mine 10 in the launch tube of a submarine.

The length of the practice mine 10 is approximately 2.5 metres, its weight approximately 800-900kg. and it simulates the shape of a specific real mine.

In use, the practice mine 10 may be deployed from a submarine or an aircraft and is arranged so that, on deployment, the lanyard 28 is tugged to release the pull-off patch 30 (simulating weapon arming) thus allowing water to enter the central tube 14 to initiate degradation.

Initially, the central tube 14 is degraded, then the concrete/plaster mix 16 and finally the casing 12. It is envisaged that the mine 10 will be designed so as to degrade almost totally within between one and six months on the sea bed.

The practice mine described above simulates a real mine whilst being fabricated of low cost materials using low cost production techniques. The mine can be suitably coated to help prevent unwanted external degradation prior to deployment and/or to provide a realistic sonar image for mine hunting practice. The practice mine is structurally sufficiently strong to withstand transport and deployment, even from an aircraft, but degrades to a required standard during a predetermined time after deployment.

An alternative configuration is shown in Figure 2 which shows a practice mine 50 which is generally the same in external appearance as the mine 10 of Figure 1. Internally, the mine 50 comprises a plywood casing 51 containing seven tubes 52-58 of soft plywood which may be filled with sand sausages vacuum packed in polythene. Runners 60-65 which are triangular in cross section are positioned around the periphery of the mine casing 51 to maintain the tubes 52-58 in position. Six softwood poles are positioned around the central tube 58 as shown.

The tubes 52-58, runners 60-65 and poles are strapped together and glued with water soluble glue prior to fitting of the casing 51. This embodiment has the advantage of being structurally relatively strong and furthermore the tubes 52-58 provide several passages to allow water to circulate the start dissolving glue and initiating the degradation process.

A further alternative is illustrated in Figure 3 in which a practice mine 80 comprises an outer casing 82 of plywood and three laminated, soft ply-

wood struts 84, 86 and 88 defining a cruciform structure. The struts 84, 86 and 88 extend along the length of the casing 82 and are held in place relative to the casing 82 by channelled wooden runners 90-93. Quarter pieces 94-97 of softwood are glued in place as shown.

The struts 84, 86 and 88 are apertured as indicated at 98 to allow keying of a filling 100 e.g. a salt and plaster mix.

This embodiment has the advantage that the struts 84, 86 and 88 lend extra strength in all three dimensions to the mine 80 and in that load spreading is achieved by the keying of the filling 100 through the apertures 98 in the struts 84, 86 and 88.

Another possible construction would be to fabricate the mine casing in the form of a barrel with interlocking stays held by hoops e.g. of aluminium alloy.

It is envisaged that very many hydrodegradeable materials could be chosen for incorporation in a practice mine according to the present invention including corrodable materials such as Swedish Iron, Aluminium, Magnesium, bi-metal combinations giving cathodic effects, sodium etc. All sorts of fillings might be used such as soluble salts, salt and plaster mixes, clay and gravel mixes, salt and sand mixes etc. Organic materials for attracting marine organisms to consume them may be used and it is also envisaged that the practice mine may incorporate biological organisms or materials such as enzymes to ensure degradation.

Claims

1. A practice sea mine (10) comprising a body shell (12) containing an inert substance (16), characterised in that the body shell (12) is provided with an internal tubular member (14) sealed at one end by a removable plug (30) for allowing passage of water on deployment of the mine (10) and in that both the body shell (12) and tubular member (14) are fabricated from material which decomposes on exposure to water.
2. A practice mine (10) according to claim 1 having a lanyard (28) attached to the removable plug (30) for facilitating removal of the plug (30) on deployment of the mine (10).
3. A practice mine (10) as claimed in claim 1 or claim 2 in which the body shell (12) is fabricated from plywood.
4. A practice mine (10) as claimed in claim 1 or claim 2 in which the body shell (12) is fabricated from a metal which corrodes on expo-

sure to sea-water.

5. A practice mine (10) as claimed in any preceding claim in which the internal tubular member (14) is fabricated from spun cardboard.
6. A practice mine (10) as claimed in any of claims 1 to 4 in which the body shell (12) is provided with a plurality of tubular members (52-58), each tubular member being fabricated from soft plywood.

Patentansprüche

1. Übungsseemine (10), die einen Hüllkörper (12), angefüllt mit einer inerten Substanz (16), aufweist, dadurch gekennzeichnet, daß der Hüllkörper (12) mit einem inneren Rohr (14) versehen ist, das an einem Ende durch einen entfernbaren Stopfen (30) verschließbar ist, um den Durchtritt von Wasser beim Aussetzen der Mine (10) zu ermöglichen, und daß sowohl der Hüllkörper (12) als auch das Rohr (14) aus einem Material bestehen, welches sich zersetzt, wenn es dem Wasser ausgesetzt wird.
2. Übungsmine (10) nach Anspruch 1, welche eine Reißleine (28) besitzt, die an dem entfernbaren Stopfen (30) befestigt ist, um ein Herausziehen des Stopfens (30) beim Aussetzen der Mine (10) zu ermöglichen.
3. Übungsmine (10) nach den Ansprüchen 1 oder 2, bei welcher der Hüllkörper (12) aus Sperrholz hergestellt ist.
4. Übungsmine (10) nach den Ansprüchen 1 oder 2, bei welcher der Hüllkörper (12) aus einem Metall besteht, welches korrodiert, wenn es dem Meerwasser ausgesetzt wird.
5. Übungsmine (10) nach einem der vorhergehenden Ansprüche, bei welcher das Innenrohr (14) aus umsponnenem Karton hergestellt ist.
6. Übungsmine (10) nach einem der Ansprüche 1 bis 4, bei welcher der Hüllkörper (12) mit einer Mehrzahl von rohrförmigen Teilen (52-58) versehen ist, von denen jedes rohrförmige Teil aus weichem Sperrholz hergestellt ist.

Revendications

1. Mine marine d'exercice (10) comprenant une enveloppe de corps (12) contenant une substance inerte (16), caractérisée en ce que l'enveloppe de corps (12) comporte un élément tubulaire interne (14) fermé à l'une de ses

extrémités par un bouchon amovible (30) afin de permettre le passage d'eau lors du déploiement de la mine (10), et en ce que l'enveloppe (12) du corps et l'élément tubulaire (14) sont constitués d'une matière qui se décompose lors de son exposition à l'eau. 5

2. Mine d'exercice (10) selon la revendication 1, ayant un cordon (28) fixé au bouchon amovible (30) pour faciliter l'enlèvement du bouchon (30) lors du déploiement de la mine (10). 10
3. Mine d'exercice (10) selon la revendication 1 ou la revendication 2, dans laquelle l'enveloppe (12) du corps est en contreplaqué. 15
4. Mine d'exercice (10) selon la revendication 1 ou la revendication 2, dans laquelle l'enveloppe (12) du corps est constituée d'un métal qui se corrode par exposition à l'eau de mer. 20
5. Mine d'exercice (10) selon l'une quelconque des revendications précédentes, dans la quelle l'élément tubulaire interne (14) est en carton centrifugé. 25
6. Mine d'exercice (10) selon l'une quelconque des revendications 1 à 4, dans laquelle l'enveloppe (12) du corps comporte une multitude d'éléments tubulaires (52-58), chaque élément tubulaire étant réalisé en contreplaqué tendre. 30

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Fig.1.



