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Ocean Engineering 32 (2005) 85–99
OCEAN ENGINEERING
www.elsevier.com/locate/oceaneng

Technical Note

A conceptual design of an underwater missile launcher

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Received 8 January 2004; accepted 22 April 2004
Available online 11 September 2004

Abstract

The paper presents a conceptual design of an underwater missile launcher, which will be more difficult to detect by the enemy than conventional surface missile launchers which are currently being used.

The paper suggests that the material of construction should be a composite and not a metal, as use of the latter for a large deep diving underwater vessel will result in such a structure sinking like a stone, due to the fact that it will have no reserve buoyancy. The paper also shows that composites have better sound absorption characteristics, thereby making the underwater structure difficult to detect through sonar equipment. It is proposed that this launcher should operate up to a depth of 5000 m, as at this depth, some 60% of the oceans' bottoms can be reached.

The author shows that current technology can be used to construct and operate such a vessel.

Keywords: Underwater; Missile launcher; Submarine

1. Introduction

Some three-fourths of the Earth's surface is covered by water and only about 0.1% of the oceans', bottoms have been explored. Indeed, the surface area of the Earth's surface covered by water is 10 times larger than the surface area of the moon. The average depth of the oceans is somewhere between 5000 and 6500 m and the greatest ocean depth is found

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doi:10.1016/j.oceaneng.2004.04.008

in the Mariana's trench, which is some 7.16 miles (11.52 km) deep. This distance is about 30% larger than the height of Mount Everest!

Undersea technology is already used for military purposes, but most large submarines can only dive to a depth of about 400 m. It is the author's belief that as the average depth of the oceans is between 5 and 6.5 km, the potential of the oceans for military purposes is not being fully exploited. It is the author's belief that an underwater missile launcher will prove far superior to a conventional surface missile launcher.

The advantages of using an underwater missile launcher are as follows:

- Radar does not work underwater.
- Heat-seeking missiles do not 'work' underwater.
- Satellite spy cameras for the filming of submarines, operating at depths of 5000 m, will be ineffective.
- The surface area of the Earth's ocean bottoms is about three times larger than the Earth's land area.
- The underwater missile launcher can move around the ocean bottoms without detection more easily than a surface missile launcher.

Disadvantages of the underwater missile launcher are as follows:

- The underwater missile launcher can be detected by sonar.
- It will be necessary to supply the underwater missile launcher with food and other provisions.
- The discharge of refuse from the underwater missile launcher can be detected by the enemy.

These disadvantages can, however, be overcome to some extent. For example, to decrease detection by sonar, its hull can be constructed with a material which has a high sound absorption coefficient, as presented by the present author (Ross, 1992), when he proposed a conceptual design for a stealth submarine. In the case of the shortage of provisions, these can be overcome by supplying the launcher with provisions (say) every month with the aid of mini and larger submarines. After the missile launcher has been supplied with its monthly provisions, it can stealthily move away just above the oceans' bottoms. Similarly, the discharge of refuse can also take place at monthly intervals. The above arguments appear to show that the advantages of operating an underwater missile launcher clearly outweigh the disadvantages.

2. The design

2.1. Hull form

The usual shape of a submarine pressure hull is in the form of a ring-stiffened circular cylinder, blocked by end caps, as shown in Fig. 1. The pressure hull is sometimes surrounded by a hydrodynamic hull, which is in a state of free-flood and is therefore unlikely to fail due to hydrostatic pressure.