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STATISTICAL ANALYSIS OF BLACK MARLIN GLIDER WING TORPEDO

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Abstract

The statistical geometry model is designed using CATIA software and constructed using Generative Shape and Assembly. Torpedo with a high ratio of length to diameter of Black Marlin Glider Wing $(L/D = 9.5)$. A torpedo is a self-propelled underwater ranged weapon with an explosive warhead that detonates either on contact with or in close proximity to the target. Design technique for glider wing torpedo's that allows the designer insight into the final configuration's protection and is subject to design parameter changes. The contra-rotating propellers over conventional propulsors in terms of open water efficiency is confirmed.

In the present study design results have been reported and found to be suitable black marlin profile for advanced torpedo. It helps to improve the overall performance of the torpedo but also provides the profiles of essential design variables of torpedo.

Introduction

Black Marlin found in the Indian and Pacific Oceans in tropical and subtropical climates. The fast-paced Black Marlin is among the 10 quickest animals in the world. It is the fastest fish in the world and is able to swim faster. The fish are capable of achieving incredible velocities of up to 129 km/h which is measured by their speed when they are able to snatch a fishing

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line. The uttermost popular fishes for sports fishermen thanks to its size and speed.

Torpedoes are among the oldest weapons in maritime inventory and were invented over 130 years ago, but they are also many of the most significant deadly anti-shipping and anti-submarine weapons. The torpedo warhead is exploding beneath water, and its destructive effect is being increased. The surrounding air absorbs some of its strength if the missile explodes. In the workbench for assembly design, the compounds are built and constructed using suitable parametrical assembly restrictions. Types of assembly design methodology to develop assembly models in CATIA, you can choose one of two possibilities.

Black Marlin

Black marlin is Indian and Pacific Oceans they normally live between 35oS and 40oN and the warm Kuroshio Current and its branches are of highest concentrations. Black marlin is mainly harvested in Taiwan's waters by long line, harpoon and gill nets. A key viewpoint for managing fisheries may be the development and age of fish.

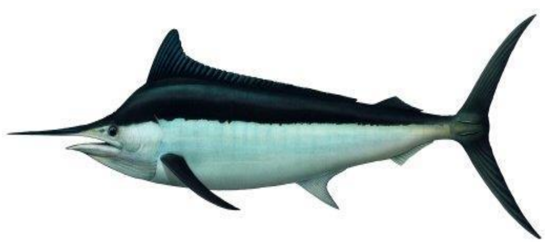

Figure 1. Black marlin fish.

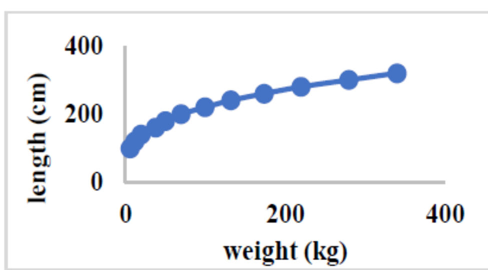

Figure 2. Black marlin age and growth of fish.

However, there was almost no attempt at the age of Black marlin save for Spear, who assessed black marlin age and growth in recreational fishing in eastern Australia with dorsal and anal spines, although other methods were utilized to research age and growth. The age of the catch can be determined using this information. It will enable the assessment using yield-by-recruit or sequential population analysis methodologies of black marlin's stock in waters outside Taiwan, in turn. Hear we designed torpedo length at 190cm with a weight of 60kg.

Torpedo

Homing torpedoes have been a relatively new invention since the executive summary of its Second World War. In homing torpedoes, even if its exact position and depth is unknown, a warship can strike an immersed submarine. Figure shows the outline of the torpedo. Torpedoes today are categorized based on their power source, water travel style of control, target type and kind of boat. The drive is normally by electric motors supplied by batteries. In many respects, underground traveling is monitored. Activated-acoustic torpedo's provide sound signals on the received echo similar to sonar and home. Passive torpedoes at home with the target noise.

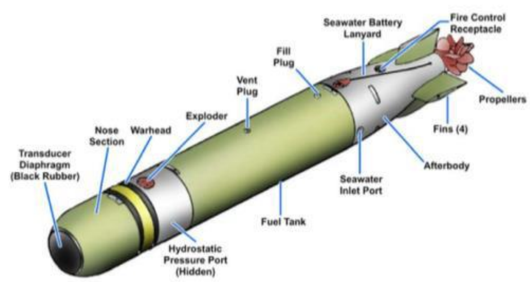

Figure 3. Photographic view as torpedo.

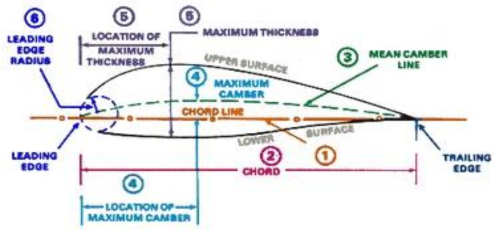

Figure 4. NACA airfoil.

Formulas

The National Advisory Committee on Aeronautics (NACA) developed airfoil designs for aircraft wings (NACA). A series of numerals after the term "NACA" describe the shape of the NACA-Airfoils. Parameters may be entered into numerical code equations to precisely create the airfoil's cross section and determine its characteristics. This approach was the first aviation family to be yielded in the four-digit NACA series. The first figure represents a chord (airfoil length) maximum camber (m); the second digit shows the camber maximum position (p) of the chord tenths and the final two digits indicate a chord maximum chord thickness (t). For example, NACA 2412 airfoils are 12% thick with a 2% camber positioned 40 percent from the airfoil's leading edge (or 0.4c). With these numbers m, p and t we can use the following relationships to calculate the co orders throughout the entire airfoil.

1. Choose x values between 0 and the maximum chord c.

2. Plug the values of m and p into the following equations for each of the x positions to get the Coordinates of mean camber line.

$$Y_C = \frac{m}{p^2}(2px - x^2) \text{ from } x = 0 \text{ to } x = p$$

$$Y_C = \frac{m}{(1-p)^2}((1-2p) + 2px - x^2) \text{ from } x = p \text{ to } x = c.$$

3. For each of the x coordinates, insert the value of t into the following equation to get the thickness distribution above $(+)$ and below $(-)$ the mean line.

$$\pm Y_t = \frac{t}{0.2}(0.2969\sqrt{x} - 0.1260x - 0.3516x^2 + 0.2843x^3 - 0.1015x^4).$$

4. Coordinates of mean camber line for the airfoil's upper-surface (X_U, Y_U) and lower-surface (X_L, Y_L) utilizing the connections listed below.

$$X_U = X - Y_t \sin\theta$$

$$Y_U = Y_c - Y_t \cos\theta$$

$$X_L = X - Y_t \sin\theta$$

$$Y_L = Y_c - Y_t \cos\theta$$

$$\text{Where } \theta = \arctan\frac{dy_c}{dx}$$

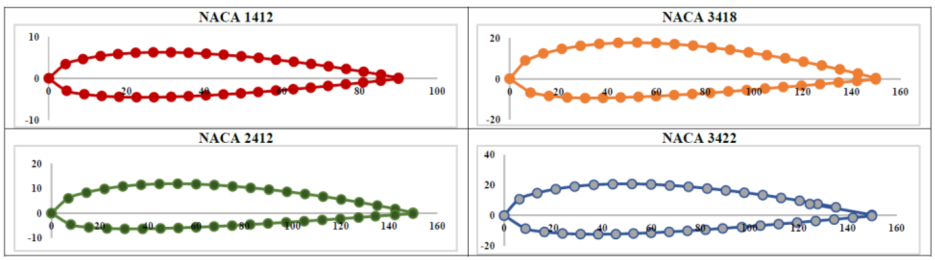

Figure 5. NACA profiles.

Design of Glider wing and Torpedo

The wing's properties are signifies by a variety of surfaces in the surface model. Each wing is integrated to the solid model. The solid model is suitable for design purposes, yet it's miles important to appropriately integrate both necessary to get rid and the surface solid geometry into the same wing model. This exercise demonstrates how two surfaces or two curves can be joined. Surfaces or curves that connect together must be contiguous. The designs of the part were developed and assembled using CATIA software because CATIA is easy to design compared with other software.

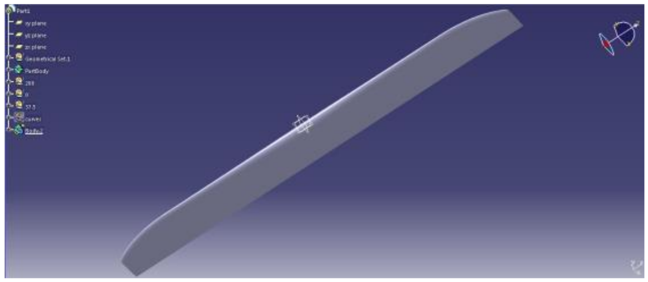

Figure 7. Glider wing.

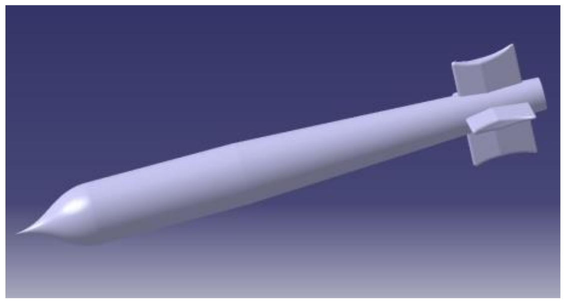

Figure 6. Design of torpedo.

Design of Black Marlin Glider Wing Torpedo

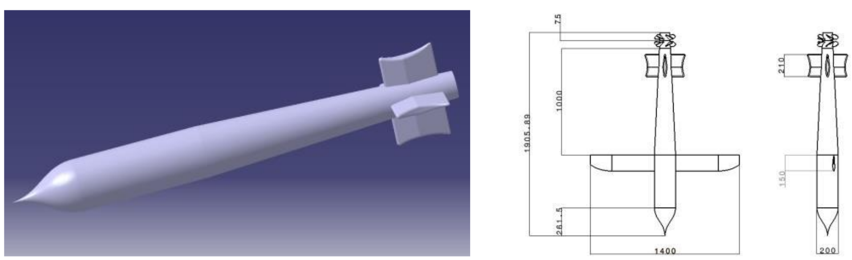

Figure 8. Geometry of the Black Marlin glider wing Torpedo.

Conclusions

The Black marlin glider wing Torpedo of underwater gliders with different capacity of payload delivery and operational depths and used for subsea installations and maintenance. If target is pointed under deep sea Black marlin torpedo separates from glider wing and reach the respected target.

This paper is to maintain stability and to provide against to atmospheric disturbances. Which is required to complete a specific mission. However, more research on the overall design of the glider wing can be made by contemplating the impact of NACA airfoil designs, as per the calculated design requirements, the modelling of Black Marlin glider wing torpedo is carried out with the help of software CATIA V5R20. The purpose of the present paper is to structurally design and ensure that the glider wing has higher strength then torpedo.

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