

## A Study of Performance estimate and Flow Analysis of the 100kW Counter-Rotating Marine Current Turbine by CFD

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The rotor design is fundamental to the performance and dynamic response of the Counter-rotating marine tidal current turbine. The wind industry has seen significant advancement single rotor blade technology, offering considerable knowledge and making it easy to transfer to tidal stream energy converters. In this paper, 3D flow and performance analysis on a 100 kW counter-rotating marine current turbine blade was carried out by using the 3-D Navier-Stokes commercial solver(ANSYS CFX-11.0) to provide more efficient design techniques to design engineers. The front and rear rotor diameter is 8m and the rotating speed is 24.72rpm. Hexahedral meshing was generated by ICEM-CFD to achieve better quality of results. The rated power and its approaching stream velocity for design are 100 kW and 2 m/s respectively. The pressure distribution on the blade's suction side tells us that the pressure becomes low at the leading edge of the airfoil as it moves from the hub to the tip.

**Key words** : HAT(수평축터빈), Tidal stream power generation(조류발전), Performance analysis(성능해석), CFD(전산 유체역학),

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## 인천만 조력에너지 개발을 위한 GIS 데이터모델링

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### GIS Data Modeling Plan for Tidal Power Energy Development in Incheon Bay of Korea

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Incheon Bay of Korea is one of the most famous regions for high tidal range. Ministry of Land, Transport and Maritime Affairs(MLTM) has implemented preliminary investigation for tidal power energy development in this area since 2006. Through field observations, various kinds of marine data consisting of depth and geography, marine weather, tidal currents, wave, seawater characteristics, geology, marine ecosystem and marine environment were gathered. To use these data efficiently for the determining of feasibility of developing and appropriateness of project scale, spatial data management and application system is essential. Therefore, in this study, the concept, methodology and procedure of spatial data modeling are defined for tidal energy development. Spatial data modeling consists of essential model relating to tidal energy directly and optional model including environmental factors. Essential model is composed with fundamental elements like as depth, geography, and several numerical modeling results(tide, tidal current, wave).

**Key words** : Tidal Power, Spatial data modeling, GIS, Incheon Bay

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