Contribution ID: **707** Contribution code: **THU-PO3-508-03** Type: **Poster**

Conceptual design of a linear generator suitable for marine energy power generation

Thursday 18 November 2021 10:00 (20 minutes)

Marine energy power generation fits the concept of Sustainable Development Goals: SDGs because it is renewable, safe and widely available energy source. It is expected to be developed as a predictable energy resource in island nations and countries facing the sea since the force generated by seawater is persistent. Conventional generators are good for high-speed and low-torque fluid, so we need a new concept generator that captures the slow-speed and high-torque mechanical changes produced by seawater. Many kinetic generators are made up of rotating machines, but linear generators also have often been used to capture repetitive and sustained ocean energy. In this presentation, we show the conceptual design of a new linear power generation module we are developing to obtain the power by capturing fluctuations of seawater tidal currents or ocean waves. In general, a marine energy power generator is preferably small projected area so as not to obstruct the seawater flow. In order to realize a small power generation module with low flow velocity and high torque corresponding to seawater, we are studying an electrical novel structure that consists of multi-layered field poles with several strong bulk magnets. We expect that this linear power generation module will obtain high performance by using high-temperature superconducting bulk magnets for the field pole, so we will show the result of conceptual design by finite element analysis simulation compared with the case of using the permanent magnets. The properties of field pole which influences the size, weight, power density and torque of the linear generator are important for practical application of the marine energy power generation because they improve the commercial viability.

Primary author: Mr KAMBO, Petrus (Tokyo University of Marine Science and Technology)

Co-authors: Mr YAMANOUCHI, Yuhi (Tokyo University of Marine Science and Technology); Mr CAUNES, Antomne (Tokyo University of Marine Science and Technology); Prof. WATASAKI, Masahiro (National Institute of Technology, Hiroshima College); Prof. YAMAGUCHI, Kota (National Institute of Technology, Oshima College); Prof. IDA, Tetsuya (Tokyo University of Marine Science and Technology)

Presenter: Mr KAMBO, Petrus (Tokyo University of Marine Science and Technology)

Session Classification: THU-PO3-508 Superconducting Rotating Machines, Linear Machines, and Related Subjects III