Kuźniewski's type of WEC – its potential and directions of development

Chybowski Leszek[1], Chybowska Dorota[2]

[1] Faculty of Marine Engineering, Maritime University of Szczecin, ul. Waly Chrobrego 1-2, 70-500, Szczecin, Poland

[2] Technology Transfer Office, Maritime University of Szczecin, ul. Waly Chrobrego 1-2, 70-500, Szczecin, Poland

E-mail: l.chybowski @am.szczecin.pl, d.chybowska@am.szczecin.pl

Professor Bolesław Kuźniewski (June 22, 1935 - August 20, 2017) was a specialist in the field of fluid mechanics [1]. His research concerned, inter alia, sea wave energy conversion. His inventions are, among others, an innovative method of extinguishing sea waves [2, 3] and two versions of a vane motor driven by sea waves operating in a horizontal [4, 5] and vertical [6, 7] system. The inspiration for the development of Kuźniewski's vane motor was the movement of seagull wings [1]. The solution is potentially an alternative to the known and currently developed sea wave transducers, such as oscillating water columns, attenuators with hydraulic systems or point absorbers based on floats. The advantages of Kuźniewski's motor are its relatively simple design and the associated high operational reliability [6]. In addition, the solution can operate as a multi-module system, which allows to increase the efficiency of the sea area where the system of energy converters is installed. It is proposed to continue prof. Kuźniewski's work by building numerical models of the system and carrying out their simulation studies, and as the next step studying the physical model in the model tank. The research should particularly focus on analysing the influence of water wave characteristics and size of the vanes, the vane profile and the inter-vane angles on the operating indicators of the motor, such as the rotational speed of the motor shaft, developed power and general efficiency of the motor.

References

1. Chybowski, L., *Prof. dr hab. inż. Bolesław Kuźniewski - Wspomnienie.* Akademickie Aktualności Morskie, Nr 3 (95)/2017, 2-4.
2. Kuźniewski, B., *The manner of embankment protection against sea waves and unit dampening energy of sea waves.* Patent PL 210447, 23 March 2007.
3. Chybowski, L., Grządziel, Z., Gawdzińska, K., *Simulation and Experimental Studies of a Multi-Tubular Floating Sea Wave Damper.* Energies, 11(4), 2018, 1012: 1-20, DOI: 10.3390/en11041012
4. Kuźniewski, B., *Underwater Generator Set.* Patent PL 223873, 23 December 2013.
5. Chybowski L., Kuźniewski B., *An overwiew of methods for wave energy conversion.* Scientific Journals of the Maritime University of Szczecin, Zeszyty Naukowe Akademii Morskiej w Szczecinie, no 41(113), 2015, 17-23, DOI: 10.17402/002.
6. Chybowski, L.; Kuźniewski, B., *Liquid Flow Based Operation-type Machine Assembly.* Patent PL 227343, 21 August 2015.
7. Chybowski L., Kuźniewski B., *Utilising water wave energy – technology profile.* Scientific Journals of the Maritime University of Szczecin, Zeszyty Naukowe Akademii Morskiej w Szczecinie, nr 47 (118), 2016, 183-186, DOI 10.17402/167.

COST is supported by the EU Framework Programme Horizon 2020. COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. COST Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers.