How small solar powered autonomous container ships could affect maritime transport and environment

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Abstract (300 word limit)

Nowadays most cargo is transported using container ships, powered by diesel engines. Bunkering and crew costs consist of 53,5% of total maritime transportation costs. Based on our experience with building A-class solar boat, we tried to estimate what would happen if container ships were replaced by small, autonomous ships powered by solar energy. Collected measurements allow us to calculate economical and ecological impact of such solution. This paper will compare theoretical design with currently available solutions by using real life routes as example.

Some of boat's elements would be build using carbon/epoxy composite. Such material provides high mechanical properties with minimum weight. Density of carbon/epoxy is 70% lower than steel, which is the material used to build conventional container ships. This solution allows to reduce amount of energy needed to drive the boat. Energy would be generated from monocrystalline thin-film solar panels. Sun is a source of renewable energy using which allows to reduce usage of fossil fuels and exhaust emission. Low weight of the boat and usage of solar energy from panels allows to save a lot of energy and therefore save money.

On average, a container ship emits sulphur compounds every year as much as 50 million cars and large transport is responsible for at least 18% of the world's emissions of nitrogen oxides into the atmosphere.

Image



Recent Publications (minimum 5)

1. Łebkowski, A (2018) Design of autonomous boat for coastal areas
2. https://ieeexplore.ieee.org/abstract/document/5152113
3. https://patents.google.com/patent/US6321673B2/en
4. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.872.7059&rep=rep1&type=pdf

5.https://www.researchgate.net/profile/Mark_Neal2/publication/37145520_An_Autonomous_Sailing_Robot_for_Ocean_Observation/links/0fcfd50c9a7034a364000000/An-Autonomous-Sailing-Robot-for-Ocean-Observation.pdf



Biography

Igor Łukasiewicz as a member of the AGH Solar Boat Team, specifically part of the Construction Group, has highly developed his skills in CFD and materials strength analysis of the solar boat based on carbon sandwich composite structure, in analytical thinking and project improvements as well. Igor is well experienced Ansys specialist. What is more, in Marketing Group he has established great cooperation with many project partners connected with composite, marine and renewable energy industry. He easily works under pressure of time and as a part of a team. He presented his knowledge at numerous scientific conferences in the field of composites and numerical calculations.

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