Life-cycle CO2 emissions of bulk carriers: A comparative study

In order to maintain shipping capacity to serve seaborne trade, new ships have to be built to replace those scrapped. The cost of building, manning, operating and repairing a ship throughout its life is borne by society at large through market mechanisms. Gratsos and Zachariadis (2005) had investigated through a cost/benefit analysis how the average annual cost of ship transport varies with the corrosion additions elected at the design stage. The results of that paper clearly indicated that ships built with sufficient corrosion allowances, truly adequate for the ship’s design life, have a lower life cycle cost per annum despite the fact that such ships would carry a slightly smaller quantity of cargo. Furthermore the safety and environmental benefits due to the reduced repairs and extended lifetime of such ships were briefly discussed. The debate of how "robust" a ship should be was also transferred to IMO in the context of Goal Based Standards following a submission by Japan which stated that the increased steel weight of a more robust ship will result in increased CO2 emissions due to a reduced cargo carrying capacity. Greece replied by submitting a summary of the aforementioned paper and preliminary estimations on Life cycle CO2 emissions disputing the Japanese contentions. However, taking onboard the challenge, an update is provided in the present paper, using the final Common Structural Rules (CSR) of the International Association of Classification Societies (IACS) bulk carrier corrosion margins and taking into account the major environmental implications of the heavier ship scantlings for two bulk carrier size brackets, Panamax and Handymax. The results show that the more robust ships would produce less CO2 emissions over their lifetime. © 2010: The Royal Institution of Naval Architects.