

## DESIGN OF NON METALLIC SHIP HULLS FOR STRENGTH AND SUSTAINABILITY

MANJU DOMINIC<sup>1</sup> & NANDAKUMAR C. G<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Ship Technology, Cochin University of Science and Technology,  
Kochi, Kerala, India

<sup>2</sup>Associate Professor, Department of Ship Technology, Cochin University of Science and Technology,  
Kochi, Kerala, India

### ABSTRACT

Fibre Reinforced Polymers (FRP) have been used in the construction of marine composite vessels due to their inherent advantages over metal counterparts. Strength and Sustainability of such vessels are of extreme concern in today's world which in turn is directly connected with the strength and environmental impact of the composite laminate materials used for their construction. In this paper a strength index and a sustainability index has been developed for nine commonly used non metallic composite laminate materials used for ship hull construction. Based on these indices a two dimensional assessment of composite materials has been done and a design philosophy based on strength and sustainability has been proposed.

**KEYWORDS:** Fibre Reinforced Polymer, Strength Index, Sustainability Index, Design for strength and sustainability.

$A_m$  = cross-sectional area of matrix in a ply

$E_l$  = elastic modulus of laminate in the longitudinal direction

$E_f$  = elastic modulus of fibre

$E_m$  = elastic modulus of matrix

$V_f$  = volume fraction of fibre in a ply

$V_m$  = volume fraction of matrix in a ply