

STATIC STRUCTURAL ANALYSIS OF CATERPILLAR D70 FORKLIFT WITH DIFFERENT MATERIALS APPLIED TO MAST AND ARMS ASSEMBLY

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ABSTRACT

This article illustrates a research, involved the optimization of forklift mast & arms assembly in order to control the deformation, maximum shear stress, von-mises strain and stress since the stiff mast channels and arms are planned to resist bending for safe handling of the designed load. The analysis is to be fulfilled by 3D model of the whole forklift structure and carried out in terms of strength and stiffness by means of F.E.M. technique using ANSYS 14.5 to compare two types of low cost high strength composite materials which are (Ductile cast iron GGG-70 as a matrix and reinforced by a 5% Ultra high modulus Carbon fiber) and (Ductile cast iron GGG-70 as a matrix and reinforced by a 5% Porous Ceramic fiber) along with the original manufacturing material which is (Structural Steel “SAE 15B35H”) for the same loading condition. The Caterpillar DP70N pneumatic tire lift truck is chose as a mathematical model for this work with the extremely endurance load of 7 Tons exerted on the fork arms.

KEYWORDS: Forklift, Finite Element Method, Static Structural Analysis, 3D Modeling