8th World Congress on Computational Mechanics (WCCM8)
"5th European Congress on Computational Methods in Applied Sciences and Engineering(ECCOMAS 2008)"

JUNE 30- JULY 5, 2008 Venice/ ITALY

STRENGTH EQUATIONS AND FINITE ELEMENT MODELLING OF JIB CRANE CONSTRUCTION

C.Erdem İMRAK	İsmail GERDEMELİ	Derya OZER
ITU, Faculty of Mech. Eng.	ITU, Faculty of Mech. Eng.	ITU, Faculty of Mech.Eng.
Mech.Eng. Department	Mech.Eng. Department	Mech.Eng. Department
Gumussuyu,34437 Istanbul, Turkey	Gumussuyu,34437 Istanbul, Turkey	Gumussuyu, 34437 Istanbul, Turkey

ABSTRACT

In this study, JIB crane which is one of the lifting equipments frequently used in materials handling is investigated. JIB cranes which are affected by a number of load combinations can be used in seaports, shipyards and warehouses with a wide range of usage areas during the operation. Most important loads are self weight of the system elements and the movement of operation load. Moreover, it is considered that, additional forces act on the JIB portal crane, particularly operating in open-air, arise from wind and climate conditions, the great stress values can be observed on JIB portal crane, especially on its body. It is completely modelled utilizing computer aided design program named AutoCAD in 3-D solid modeling environment.The specifications of the jib crane are given in table1.The forces acting on the jib crane are given in figure 1. JIB crane's boom part is generated by using Msc. Patran and Hypermesh as in figure 2. Then linear static analyses of the finite element model of JIB crane are computed by Msc.Nastran solver under certain load combinations and boundary conditions.

Keywords : JIB Crane, Strength Equations, Stress Analysis

Type	JIB Gantry Crane
Max. Height of Hoisting	71.000 mm
Max. Height of Crane	(12,5m Radius) 75.120 mm
Upper Chord Lower Level	7.345 mm
Span	10.000 mm
Hoisting Capacity	(12,5m ÷ 20m) 20.000 daN (50m Radius) 5.000 daN

Table 1.The specifications of Jib crane

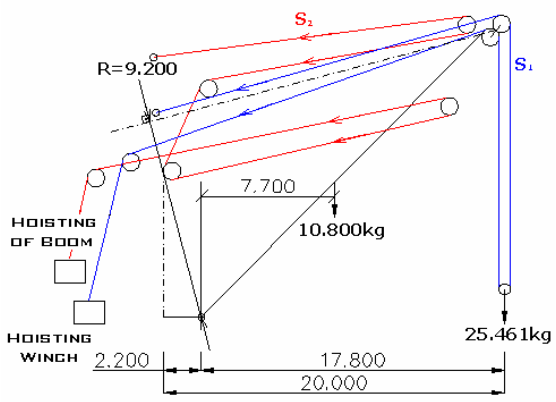

Figure1: Static Analysis of Jib crane

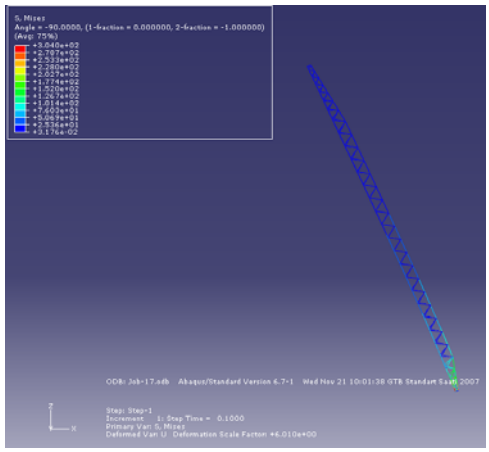

Figure2.Finite element analysis of the Jib Crane.

REFERENCES

[1] **Zeid I.,** 1991. CAD/CAM Theory and Practice, USA

[2] **Rao S.S.,** 1988. The Finite Element Method in Engineering Second Edition, Pergamon Pres, Oxford