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Validation of SST 300 bearing casing for SST 200 bearing casing in static load condition

KEYWORDS: Tilting pad, thrust pad, radial bearing, thrust bearing outside, Thrust bearing inside upper bearing casing, bottom bearing casing

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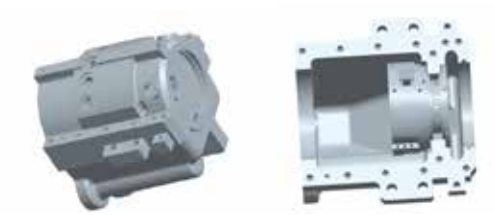
ABSTRACT *SST-200 is a steam turbine which is used for 10MW power production and SST-300 is also an another steam turbine which is used for 20 MW power productions. In order to increase the capacity of SST-200 its front bearing is replace by SST-300 front bearing .But before replacing this bearing assembly some modification must be there and also ensure for static loading condition. So in this paper we have make 3-D model of different components of SST-200 bearing and SST-300 bearing in pro-e and analyze in ansys. And conclude whether it is possible or not.*

Static Analysis
Parts of SST 200 and SST 300 Steam Turbine Bearing

I. Tilting Pad
II. Thrust Pad
III. Radial Bearing
IV. Thrust Bearing Outside
V. Thrust Bearing Inside
VI. Upper Bearing Casing
VII. Bottom Bearing Casing

1. SST 200 Steam Turbine bearing Assembly



2. SST 300 Steam Turbine bearing Assembly

3.Static Analysis
3.1 Force Pattern
The stresses generated on axial pad and bearing casing due to axial and radial force, because bearing is connected to casing and casing is supported with turbine casing. Now the extra load is acting upon axial pads, as these axial pads can sustain more load and they are connected with bearing body. In this case, bearing casing is supported in Y, X and Z direction with turbine casing, because Y and X directions resists the radial and axial loads, and the Z direction resist the casing's rotation w.r.t. rotor.

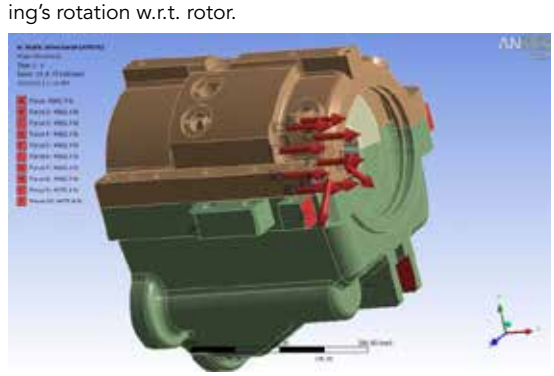


Fig. Different Forces on SST 200 Bearing for Static Analysis

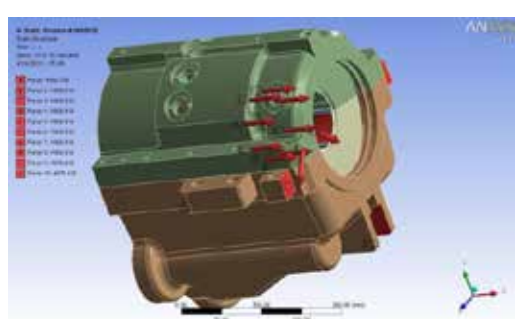


Fig. Different Forces on SST 300 Bearing for Static Analysis

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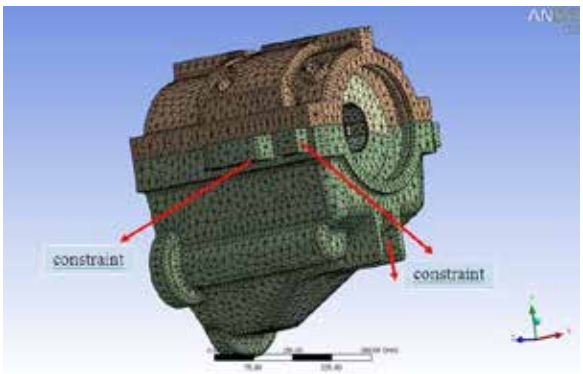
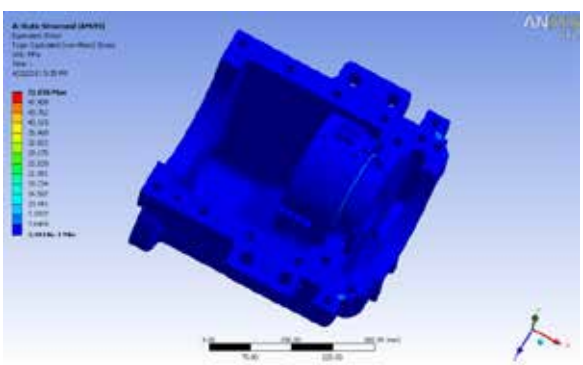
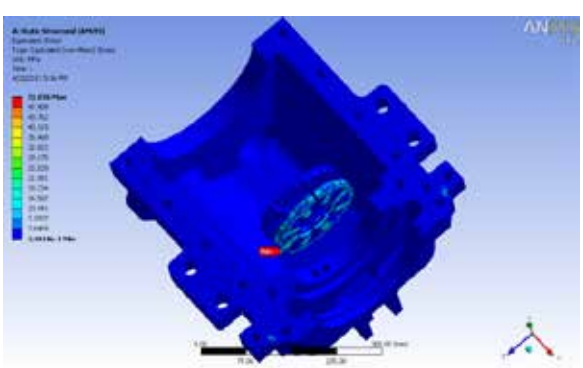
Given Data:
Radial Load = 9751.6 N

Thrust Load = 39687.5 N

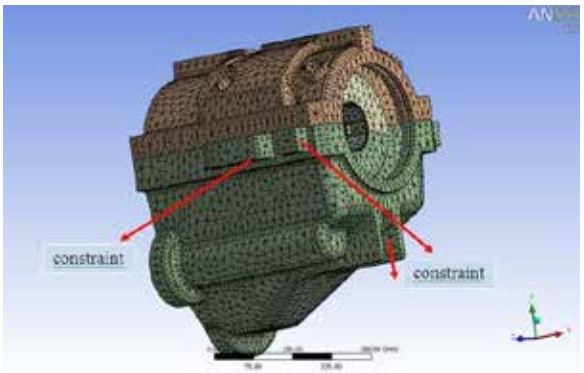
3.2 Static Analysis for SST 200

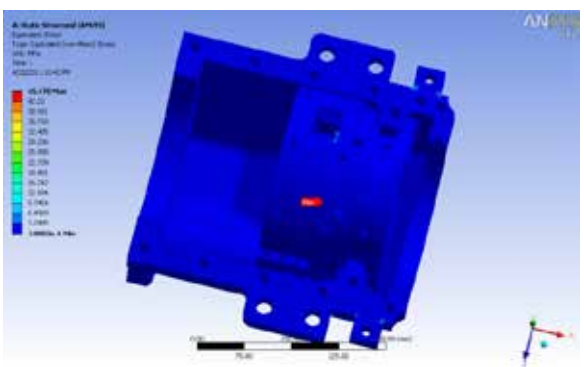






3.3 Static Analysis for SST 300





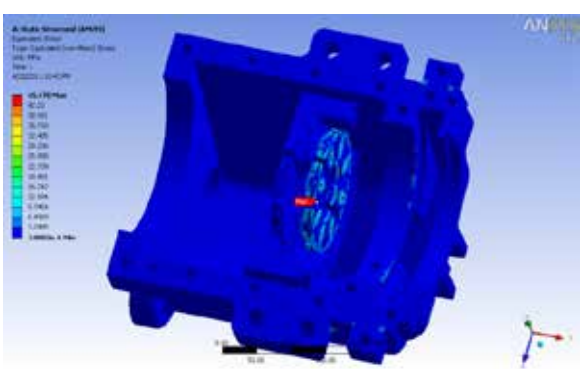


Fig. Static Analysis of SST 300

4. Result

The von-Mises stress for SST 200 is 51.056 MPa and for SST 300 bearing 45.478 MP.The stress values are coming nearer to same. So, SST 300 front bearing assembly is suitable into SST 200 front bearing casing.