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Modeling and analysis on wing of A380 flight

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ABSTRACT

We are conducting structural & thermal analysis on AIR BUS A380WING TO Calculate the stress, strain & thermal flux for finding the wing to be safe.

For calculate the stress, strain& flux we have to use software like CATIA for determining model for analysis FEA package ANSYS. For finding the accurate results in ANSYS.CATIA is a surface modeling package, which we can model the wing and we can import it to ANSYS for conducting analysis.

In this analysis we are conducting three different conditions like steady state thermal analysis with uniform pressure &steady state thermal analysis with varying pressure &transient heat analysis on the wing.

By conducting all these three conditions we find out the results and stress, strain& deformation of the wing from the analysis.

Under the above conditions the obtained stress and strain values are within the limiting range. The maximum stresses that wing of a flight can with stand are 700pa. But obtained stress is 400pa. The analyses that are carried on the wing are steady thermal analysis with varying pressure and transient thermal analysis. Under these analyses the wing that was modeled was a safe. The above work can be extended to different parts of flight.

Key words: wing of A380 flight design, modeling, Steady state thermal analysis with uniform pressure, Steady state thermal analysis with varying pressure, Transient thermal Analysis.

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1. INTRODUCTION

The **Airbus A380** is a double deck, wide body, four-engine jet airliner manufactured by the European corporation Airbus, a subsidiary of EADS. It is the world's largest passenger airliner and due to its size, many airports have had to expand their facilities to properly accommodate it. Designed to challenge Boeing's monopoly in the large-aircraft market, the A380 made its maiden flight on 27 April 2005 and entered initial commercial service in October 2007 with Singapore airlines. The aircraft was known as the Airbus. The A380's upper deck extends along the entire length of the fuselage, with a width equivalent to a wide-body aircraft. This allows for an A380-800's cabin with 478 square meters (5,145.1 sq ft) of floor space; 49% more floor space than the next-largest airliner, the Boeing 747-400 with 321 square meters (3,455.2 sq ft), and provides seating for 525 people in a typical three-class configuration or up to 853 people in all-economy class configurations. The A380-800 has a design range of 15,400 kilometers (8,300 nmi; 9,600 mi), sufficient to fly from New York to Hong Kong, and a cruising speed of Mach 0.85 (about 900 km/h or 560 mph at cruising altitude)

3. Conceptual design of flight A380

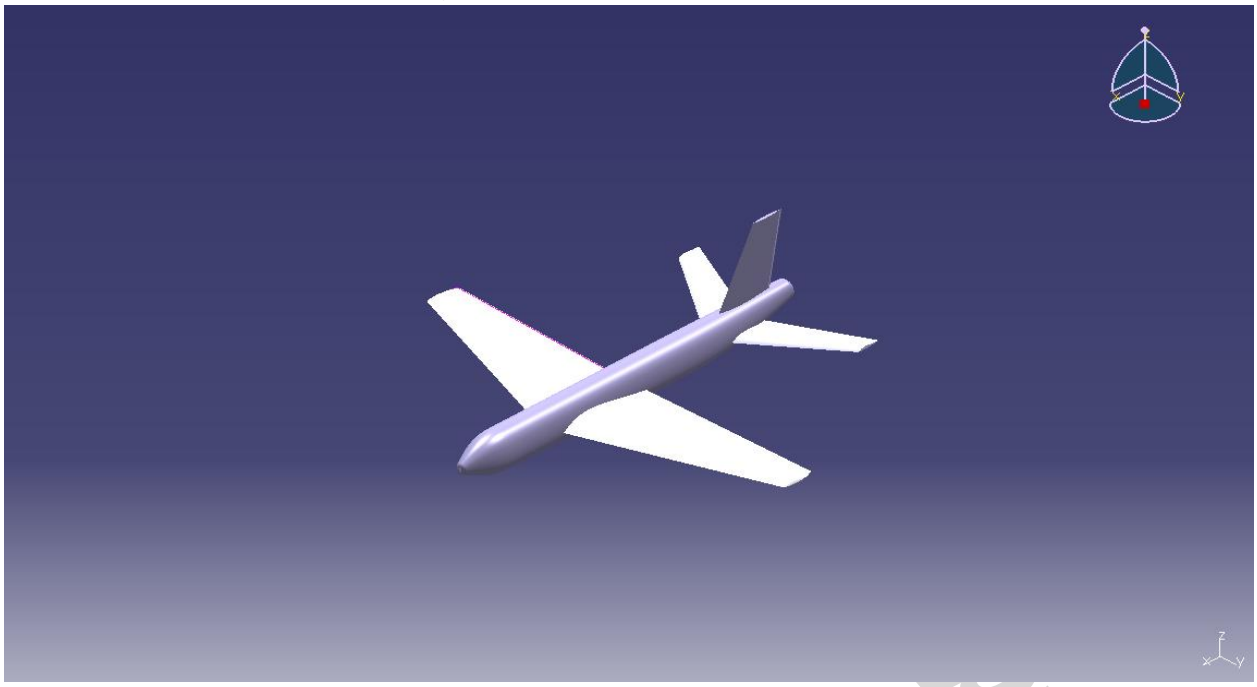

Fig.1

3.1 Top view of A380

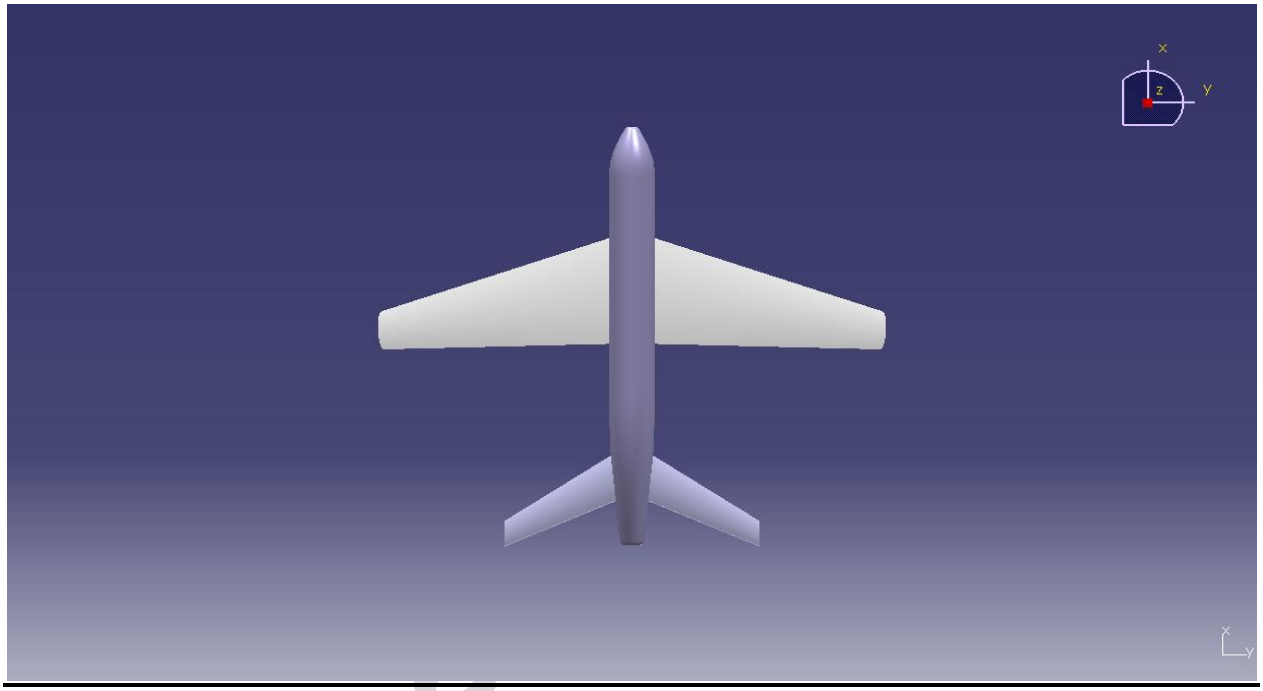

Fig.2

3.2 Side view of A380:

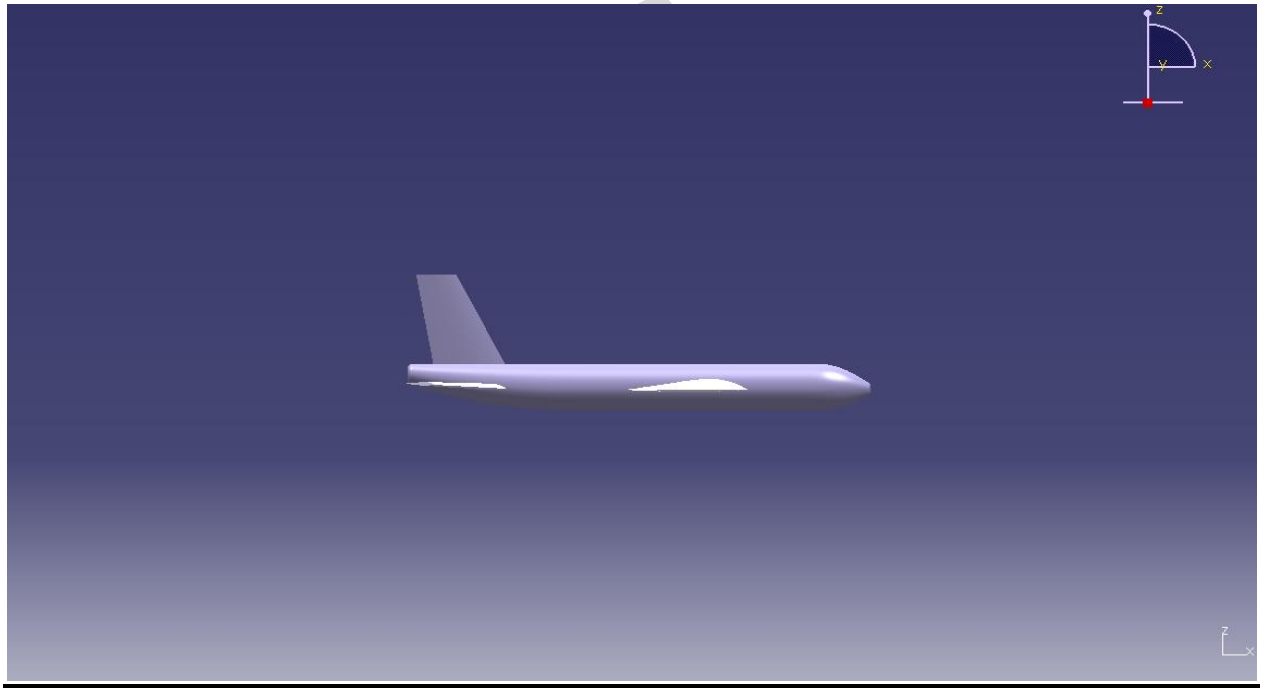

Fig.3

3.3 A380 in wire frame:

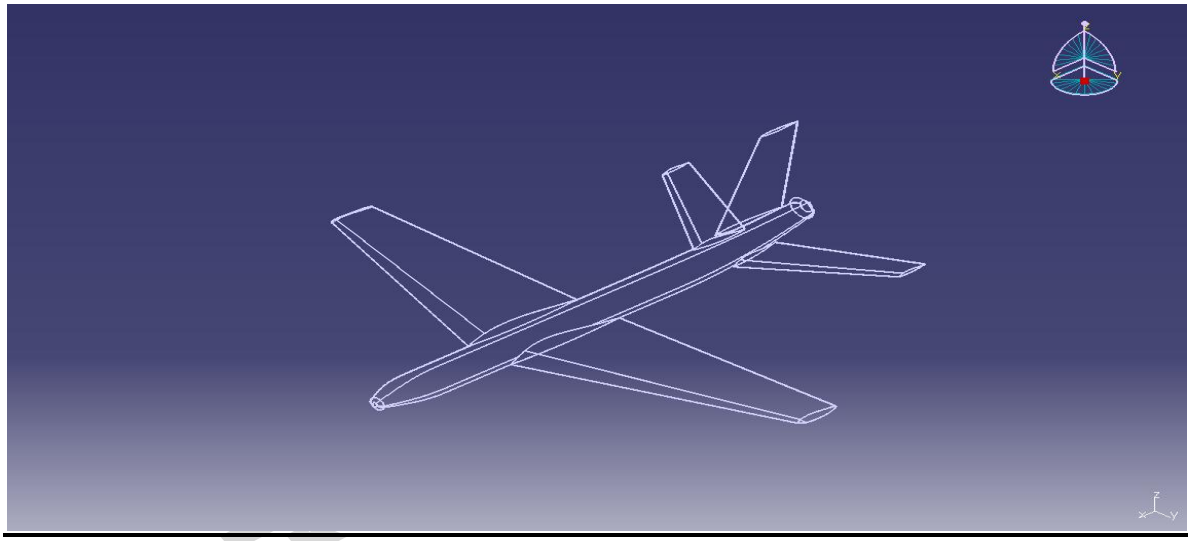

Fig.4

4. Modeling procedure of wing

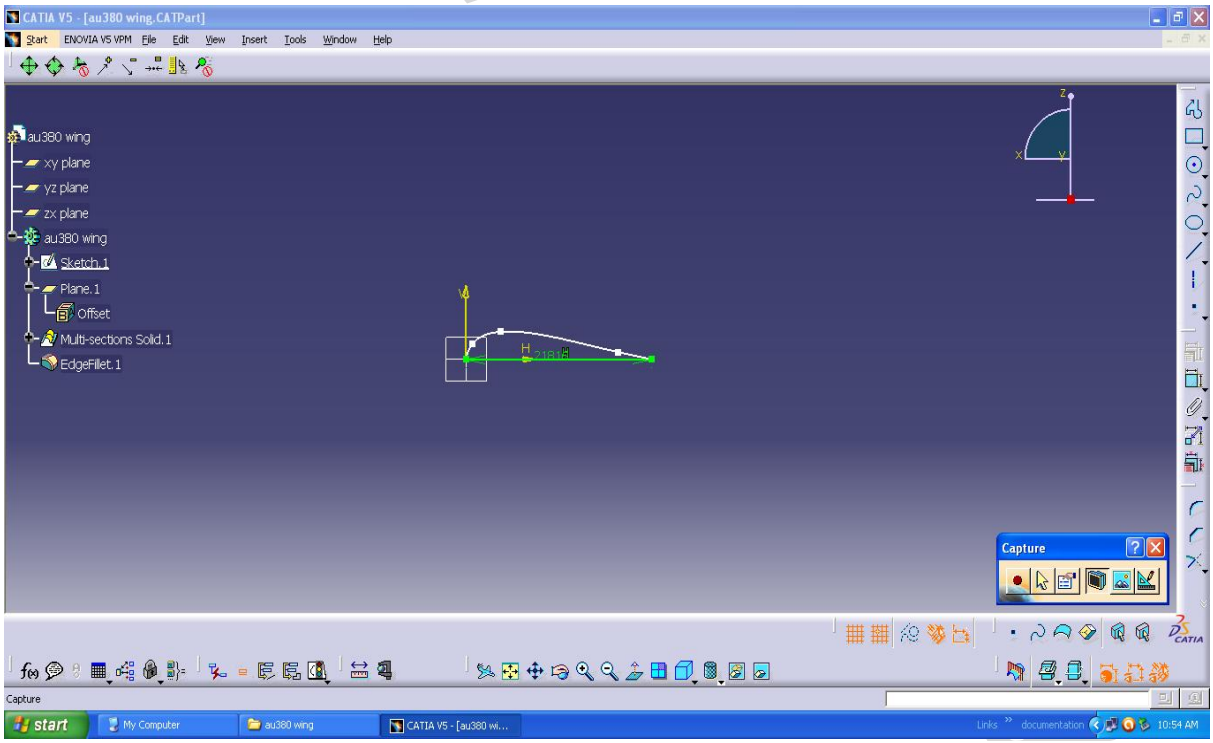

Fig.5

Draw a curve with spline and join them with a line of length 21816mm.

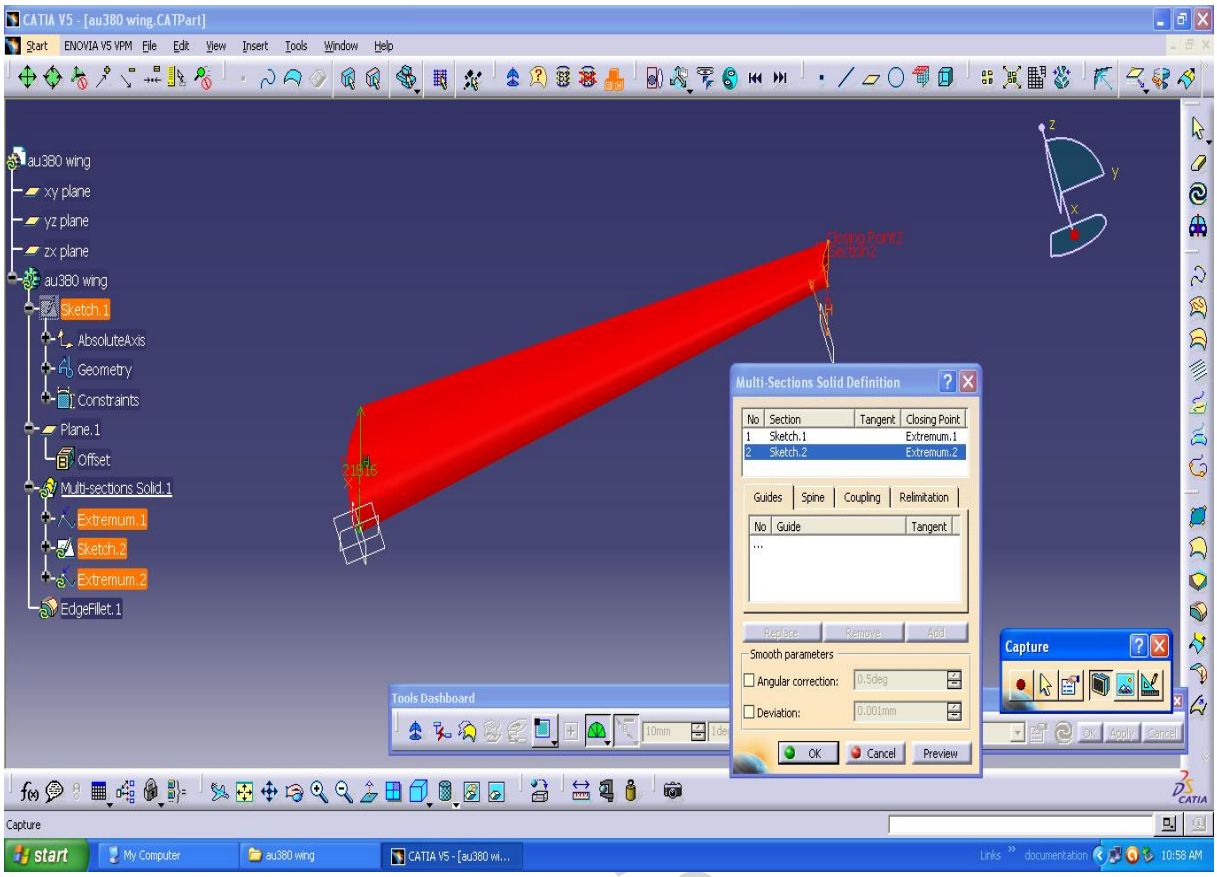

Fig6

Use multi section solid to join both ends to make it into wing.

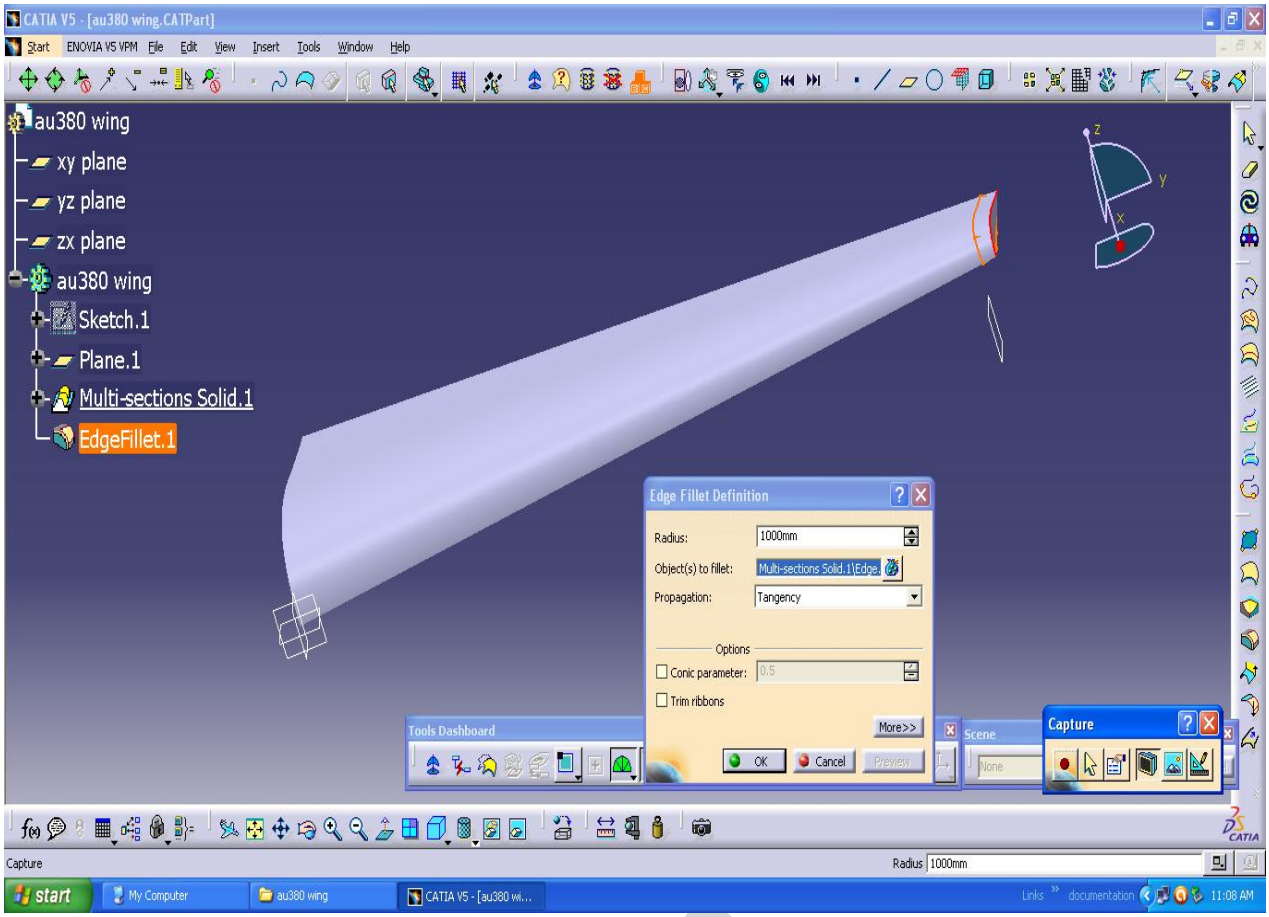

Fig.7

Use edge fillet with radius 1000mm to make wing to curve.

RESULTS AND DISCUSIONS

The different types of analysis that carried on wing are:

a. Steady state thermal analysis with uniform pressure.
b. Steady state thermal analysis with varying pressure.
c. Transient thermal Analysis

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Model > Static Structural > Solution > Total Deformation > Image

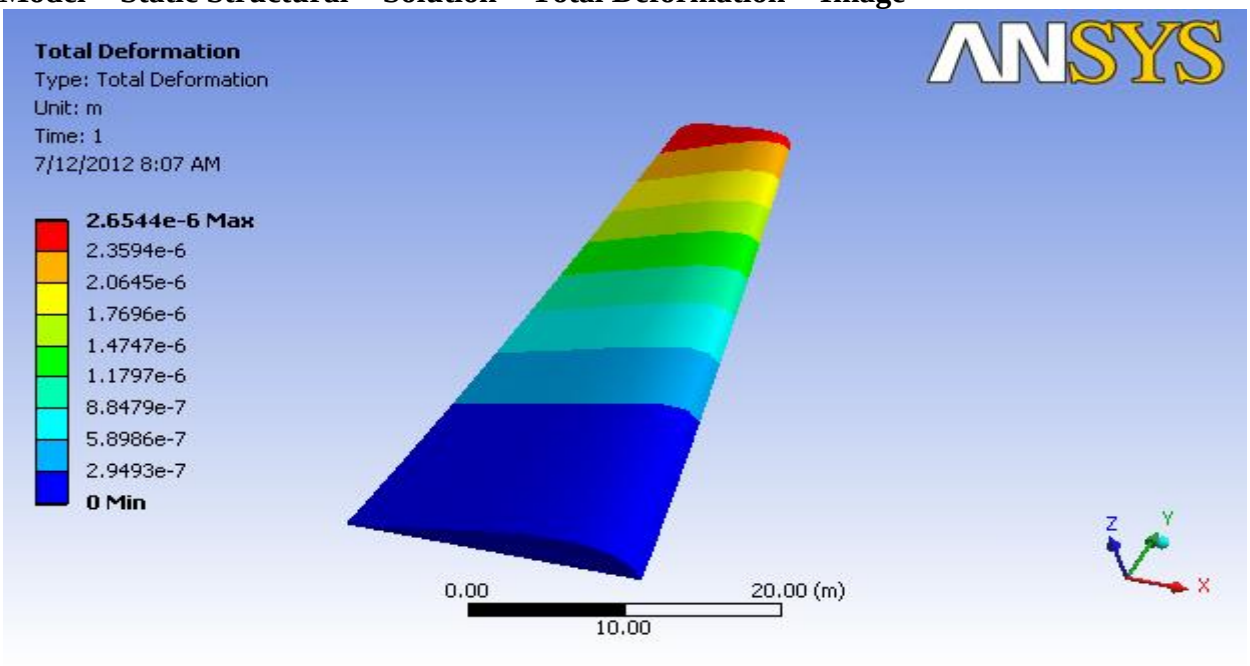

Fig.8

TABLE 1: Units

Unit System	Metric (mm, kg, N, °C, s, mV, mA)
Angle	Degrees
Rotational Velocity	rad/s

TABLE 2: Model > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	
Source	C:\Documents and Settings\Administrator\Desktop\au 380\au380_wing888.igs
Type	Iges
Length Unit	Meters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	21816 mm
Length Y	39875 mm
Length Z	3008.2 mm
Properties	
Volume	7.9355e+011 mm³

Mass	2.1981e+006 kg
Statistics	
Bodies	1
Active Bodies	1
Nodes	1381
Elements	595
Preferences	
Import Solid Bodies	Yes
Import Surface Bodies	Yes
Import Line Bodies	Yes
Parameter Processing	Yes
Personal Parameter Key	DS
CAD Attribute Transfer	No
Named Selection Processing	No
Material Properties Transfer	No
CAD Associativity	Yes
Import Coordinate Systems	No
Reader Save Part File	No
Import Using Instances	Yes
Do Smart Update	No
Attach File Via Temp File	No
Analysis Type	3-D
Mixed Import Resolution	None
Enclosure and Symmetry	Yes

Conclusion:

Under the above conditions the obtained stress and strain values are within the limiting range. The maximum stresses that wing of a flight can with stand are 700pa. But obtained stress is 400pa. The analyses that are carried on the wing are steady thermal analysis with varying pressure and transient thermal analysis. Under these analyses the wing that was modeled was a safe.

Future work:

The above work can be extended to different parts of flight.

References:

1. J. D. Anderson: *A History of Aerodynamics*
2. B. K. Donaldson: *Analysis of Aircraft Structures*, Second Edition
3. J. H. Saleh: *Analyses for Durability and System Design Lifetime*
4. D. *Aircraft Conceptual Design Synthesis*. Professional Engineering Ltd.