TECHNOLOGICAL EDUCATION INSTITUTE OF
CENTRAL MACEDONIA
SCHOOL OF TECHNOLOGICAL APPLICATIONS
DEPARTMENT OF MECHANICAL ENGINEERING

Graduate Studies Program:

Academic Year 2014 - 15

"Renewable Energy Systems: Design, Development and Optimization"

Supervisor's Name: Anastassios Moissiadis

Subject:

Topology and Shape Optimization

Introduction & Motivation:

Machine components need nowadays to be light in weight, easy in construction and strong in receiving the nominal loads derived from the normal use of the machines.

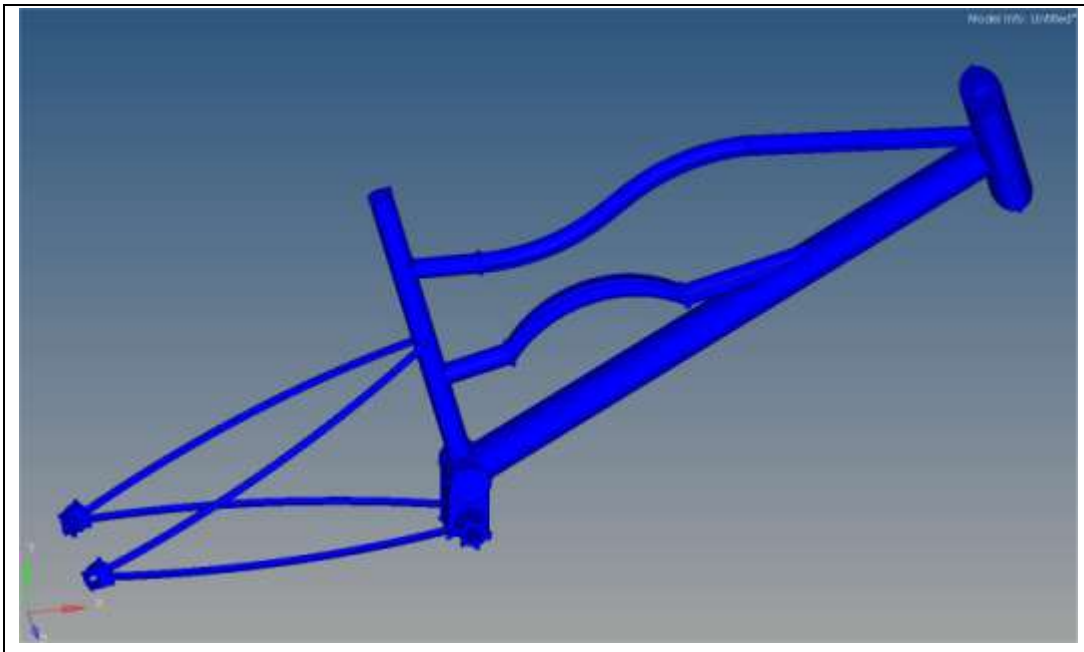
In the following pictures we see a bicycle body, an off road alloy 8 x 16, a bicycle pedal and a sprocket motor. Each of these components has to be optimized in order to carry all the loads coming from their use with the minimum weight.

Implementation & Means:

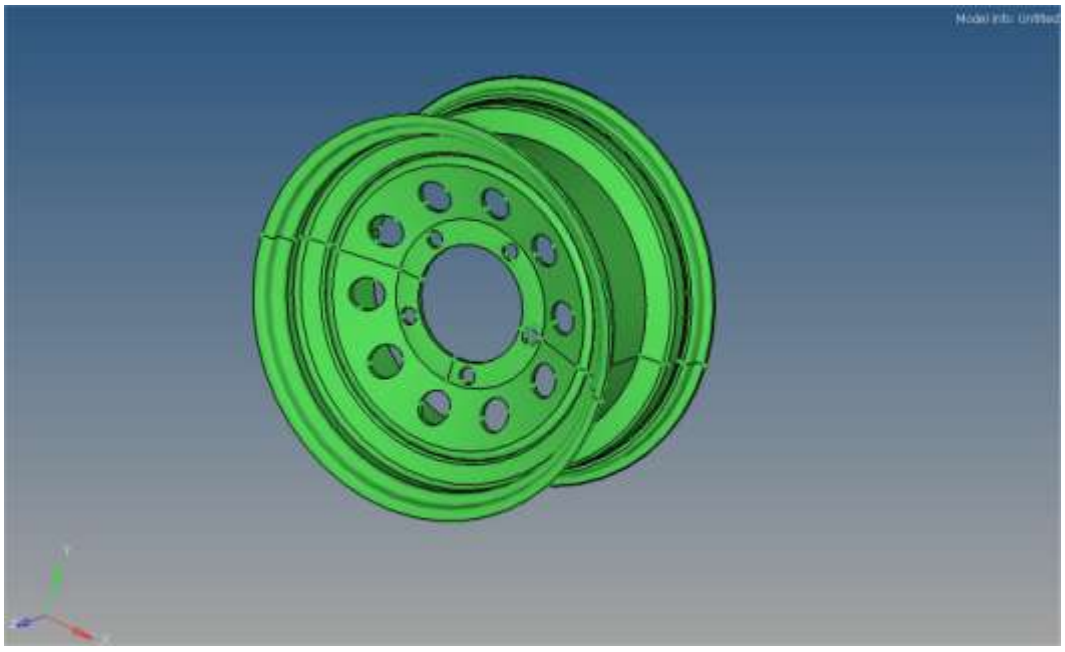
Each component is designed with its real shape and form. The dimensions are real.

Each component has to be optimized while its strength has to remain in the permitted area.

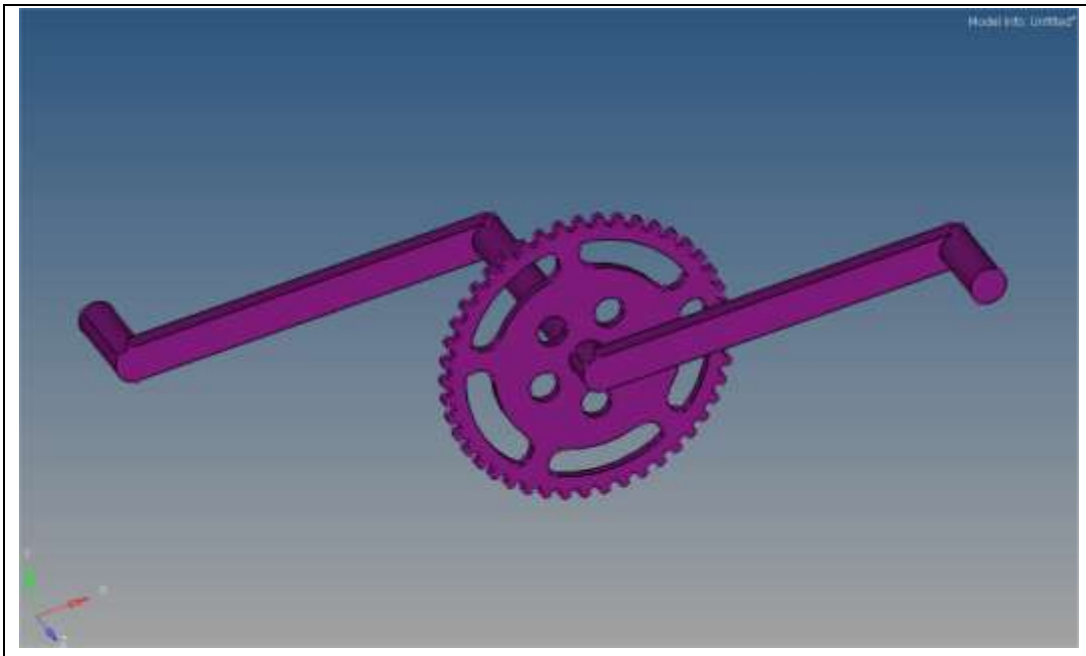
Each component optimization project is a different thesis.



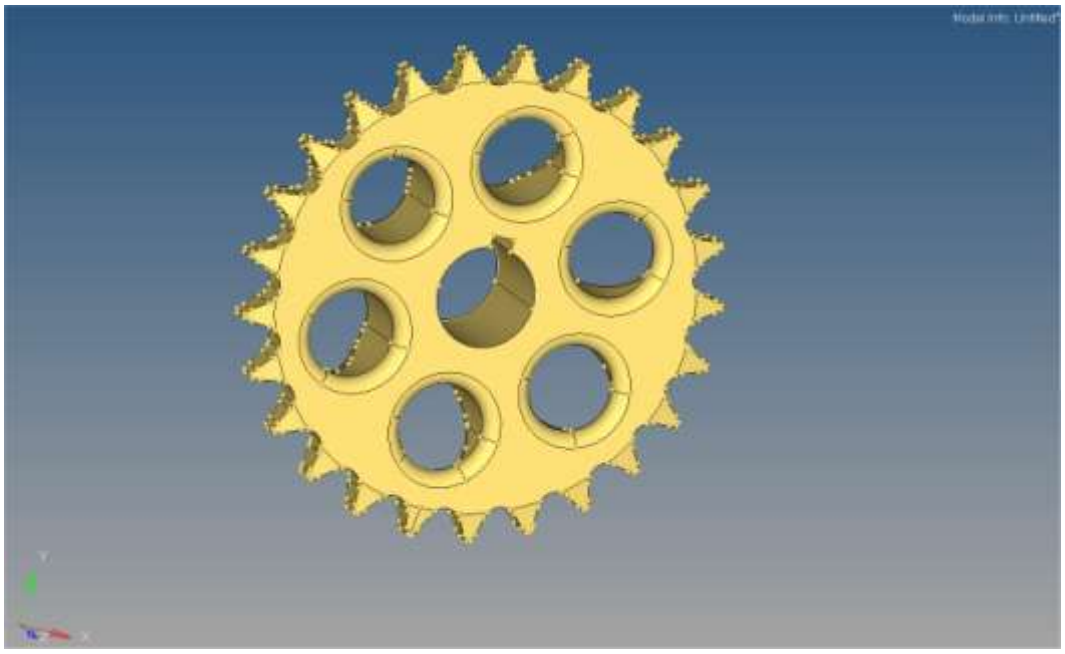
Bicycle body



Off road alloy 8 x 16



Pedal



Sprocket motor

References:

[1] Optistruct, Altair Engineering

[2] Engineering Optimization

Theory and Practice, Singiresu Rao

[3] Topology Optimization

Theory, Methods and Applications

Martin Philip Bendsoe, Ole Sigmund

Requirements: *Knowledge needed for a successful dissertation*.

a) Good use of Optistruct or another Optimization Program,

b) Good use of the Optimization algorithms for linear and non linear Programming.