



# SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Sheriguda (V), Ibrahimpatnam (M), Hyderabad, R.R. Dist., Telangana State-501 510.

## DEPARTMENT OF MECHANICAL ENGINEERING

### STUDENT PROJECTS (2017-2018)

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## DESIGN AND FABRICATION OF HELICAL GEAR

### ABSTRACT

Gear is a machine element used to transmit motion and power between rotating shafts by means of progressive engagement of projections called teeth. Generally gear transmits motion or power between rotating shafts when the centre between two shafts is comparatively low.

In helical gears, the leading edges of the teeth are not parallel to the axis of rotation, but are set at an angle. Since the gear is curved, this angling causes the tooth shape to be a segment of a helix.

The aim of the project is to design a helical gear for marine applications by using empirical formulas. A 2D drawing is drafted from the calculations and a 3D model is designed using 3D modeling software solid works. Structural analysis and thermal analysis are done using two materials Nickel Chromium Alloy steel and Aluminum Alloy A360. Structural analysis is done to validate the strength and thermal analysis is done to validate the thermal properties like nodal temperature, thermal gradient and thermal flux.

Analysis is done in ANSYS.

In next stage of the project is manufacturing the helical gear. For manufacturing helical gear following methods are used - 1.Casting 2.Hot-rolling 3.Powder metallurgy 4.Machining From above methods we are using Machining method.

In the machining method we are using reciprocating method. In this, first step is blank preparation; second step is gear cutting by using gear cutting machines. In third step is gear hobbing. After doing machining processes we have to do heat treatment processes.

Gears made of a plain carbon steels are hardened by quenching in water from temperature of 820C to 840C,with subsequent high tempering at a temperature of 520to 550C to obtain hardness from 220 to 250 H.B.

The helical gear is manufactured and a prototype is created. In prototype we are going to manufacture the scale model.

solid works is the standard in 3D product design, featuring industry-leading productivity tools that promote best practices in design.

ANSYS is general-purpose finite element analysis (FEA) software package. Finite Element Analysis is a numerical method of deconstructing a complex system into very small pieces (of user-designated size) called elements.

<b>Roll Number</b>	<b>Name of the student</b>	<b>Internal Guide Name</b>
14X31A0354	KUNUGUNTLA GOPI KUMAR	Mr. N.CHANDRA SHEKAR
14X31A0373	KASOJU SAIKRISHNA	
15X35A0301	BANDA SHASHIDAR REDDY	

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