## DESIGN AND VALIDATION OF INVOLUTE SPUR GEAR WITH ASYMMETRIC TEETH TO IMPROVE BENDING LOAD CARRYING CAPACITY

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### ABSTRACT

Gear is a machine element used to transmit motion and power between rotating shafts by means of progressive engagement of projections called teeth. Gears are classified according to the relative position of the axes of the shaft, type of gearing, peripheral velocity of the gears and position of teeth on gear surface. Presently gears are suffered by backlash the amount by which the width of a tooth space exceeds the thickness of the engaging tooth on the pitch circles, undercut a condition in generated gear teeth when any part of the fillet curve lies inside of a line drawn tangent to the working profile at its lowest point and interference is an important aspect of kinematics of gearing. When the gear tooth tries to dig below the base circle of mating gear then the gear tooth action shall be non-conjugate and violate the fundamental law of gearing this non conjugate action is called the interference .These defects can be eliminated by increasing the pressure angle, by increasing the addendum of mating gear and another way of increasing the load capacity of transmissions is to modify the involute geometry. This has been a standard practice in sophisticated gear design for many years; the nomenclature describing these types of gear modifications can be quite confusing with reference to addendum modification or profile shift. An additional alteration that is very rarely used is to make the gears asymmetric with different pressure angles for each side of the tooth.In this study, geometric design of asymmetric gear involute meshing is done. This method is appropriate for the geometric design of spur gears with a small teeth number and is based on the generalized model of involute meshing.

## FINITE ELEMENT BASED DYNAMIC ANALYSIS OF E-GLASS EPOXY COMPOSITE LAMINATES

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### ABSTRACT

Free vibration analysis of E-glass composite laminates is carried out using finite element method. An 8 node shell element consisting of 48 degrees of freedom is used. Results obtained by the analysis demonstrate the efficiency of the present model. Numerical results for different thickness ratios and aspect ratios are presented. It is observed that the natural frequency parameter decreases for plate aspect ratio.

## DEVELOPMENT OF CO2 GASSING SYSTEM FOR OPTIMIZED USE OF GAS IN MOULD HARDENING OF STEEL CASTINGS

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### ABSTRACT

In CO2 mould hardening, once mould cavity is produced, CO2 gas is passed through it which reacts with sodium silicate to make the mould harder. CO2 moulding process due to its ability to produce harder moulds is widely used for casting variety of metals and especially high density alloys like steels. The study is focused on development of a system for optimization of CO2 consumption & process time. In previous practice, the CO2 from CO2 cylinder was directly passed into mould at lower temperature than desired & higher pressure due to uncontrolled throttling through air gun which resulted in loss of CO2, non-uniform mould strength & more process time. To overcome these problems, a gassing system has been developed which reduces CO2 consumption as well as process time. Also, an automation of the system is proposed to time the gas flow in more efficient manner.