

Design Modification in CNC Milling Machine to Reduce the Weight of Structure

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Abstract : The need of continuous improvement in a product or process in this era of global competition leads to apply value engineering for functional and aesthetic improvement in consideration with economic aspect too. Solar industries located at G.I.D.C., Makarpura, Vadodara, Gujarat, India; a manufacturer of variety of CNC Machines had a challenge to analyze the structural design of column, base, carriage and table of CNC Milling Machine in the account of reduction of overall weight of a machine without affecting the rigidity and accuracy at the time of operation. The identified task is the first attempt to validate and optimize the proposed design of ribbed structure statically using advanced modeling and analysis tools in a systematic way. Results of stress and deformation obtained using analysis software are validated with theoretical analysis and found quite satisfactory. Such optimized results offer a weight reduction of the final assembly which is desired by manufacturers in favor of reduction of material cost, processing cost and handling cost finally.

Keywords : CNC milling machine, optimization, finite element analysis (FEA), weight reduction

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