

Stress Analysis and Design Optimization of Pulleys

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ABSTRACT

This study uses Solidworks Cosmosworks finite element analysis software, carry on modal static analysis to the flat pulley and flat belt transmission, bestow the effective tension on the pulley with the belt, make the pulley produce the stress, finite element analysis software of the computer to show the stress of the pulley is distributed the situation, and then carry on the optimization. The optimization is designed and divided into ellipse and rectangle and H arm with the form of arm of the pulley mainly, and then divide into six and five with the number of yarn of arm of the pulley, carry on six groups of optimization analysis altogether. The pulley of every group turns a design object of the optimization minimumly with quality, under the prerequisite of the size with sectional arm is a design parameter of the optimization, with permitting the stress as the stress limiting conditions of the optimization the most greatly of gray cast iron of pulley material. The result of study shows, find the pulley no matter the number of yarn of arm is six or five, the lightest in weight with the pulley of the H arm, secondly it is the rectangle, the end is an ellipse. Make the pulleys designed reach the optimization, in order to be regarded as the structural design of belt pulley and reference of development.

Keywords : Finite Element Analysis , Static Analysis , ; Effective Tension , Pulley , Optimization

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