Optimal design and development for a new quick-released type slide seat of machine tools

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ABSTRACT

The direction of this research is discussed the CNC machine tool table because the natural vibration and external vibration caused by the modal frequency response analysis. This paper is used the finite element method and the concept of machine tool design to analysis and development for a new quick-released type slide seat of machine tools. Finally, this paper is used PSO with the finite element analysis of ANSYS software to search optimal design parameters for the machine tool table that improve and compare the actual of table machine tool structure and optimization results. In order to verify the optimal design method could effectively improve the static and dynamic characteristic of the structure. The new quick-released type slide seat of machine tools of this paper is based on industry-university partners design and R&D. This paper was continuation of the design concept to improve the design shape of the new quick-released type slide seat of machine tools to avoid the resonance frequency, and at the same time to reduce the weight of bed for the final design goal of table. This research will be had moderated simplify model to get the optimize design size. In the milling force experimental is used ANSYS software to verify strain differences and actually used in CNC machine tools machine platform.

Keywords : Finite element analysis、Structural shape optimization、Machine tool table、Natural frequency、Modal analysis

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