

题 目： 龙门铣床横梁夹紧机构设计

摘 要

龙门铣床在机床行业中的应用较为普遍，随着科学技术的发展，对龙门铣床加工的精度、刚度、跨度和效率，都有了更高的要求，传统龙门铣床的设计方法亟需改进。在新型龙门铣床的设计中，横梁的设计尤为关键，其结构特征直接影响到铣床的性能以及受力情况，将夹紧机构应用于横梁的设计中，能够有效保证刀具在进行切、削等加工动作时，不会由于作用力或刀具自身重量等因素的介入，造成加工工件或机床部件产生震动或偏移，从而大大提高龙门铣床加工工件时的精确值和稳定性，也能在一定程度上降低铣床操作的安全事故。在传统的设计方法中，经验和类比是主要的两种主要的设计方法。对于像横梁这样的大型钢结构体，在结构的刚度和强度上设计是最常用的办法。在此行业背景下，本文主要是对龙门铣床中横梁的夹紧机构进行设计，主要内容如下：

首先对横梁结构以及横梁夹紧机构的国内外研究现状进行了分析。并对选题的背景、意义和目的进行介绍。其次分析了横梁夹紧机构的总体结构和设计方式。最后部分是该机构的总体设计和相应计算。

关键词：龙门铣床；横梁；夹紧机构

Abstract

The application of gantry milling machine in machine tool industry is more common. With the development of science and technology, there are higher requirements for the machining accuracy, stiffness, span and efficiency of gantry milling machine. The design method of traditional gantry milling machine needs to be improved. In the design of the new gantry milling machine, the design of the crossbeam is particularly critical, and its structural characteristics directly affect the performance and force of the milling machine. The clamping mechanism can be applied to the design of the crossbeam, which can effectively ensure that when the cutting and cutting actions are carried out, the vibration or offset of the machining workpiece or machine tool parts will not be caused by the intervention of the force or the weight of the cutting tool itself. Thus, the accuracy and stability of the machining workpiece of the gantry milling machine can be greatly improved, and the safety accident of the milling machine operation can also be reduced to a certain extent. In the traditional design method, experience and analogy are the main two main design methods. For large steel structures such as beams, the design of structural stiffness and strength is the most commonly used method. Under the background of this industry, this paper mainly designs the clamping mechanism of the beam in the gantry milling machine, the main contents are as follows:

In the first part, the background and significance of the selected topic are introduced, and the research status of beam structure and beam clamping mechanism of gantry milling machine is analyzed.

In the second part, the overall structure and design mode of the beam clamping mechanism of the gantry milling machine are analyzed, and how to take into account the efficiency and safety of the actual clamping mechanism is emphasized by using the mechanical clamping mode to solve the problem of efficiency and safety in the actual clamping mechanism.

The third part is mainly about the design and calculation of the beam clamping mechanism of the gantry milling machine, including the check of motor power, the design of worm reducer, the design of spiral drive part, the check of clamping force and so on.

Key words: Gantry milling machine; crossbeam; clamping mechanism

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