环面蜗轮减速器

摘 要

本文主要是关于设计一套系统的环面蜗轮减速器的方法，该方法在传递动力与运动的机构中应用广泛。该设计方法以物理公式为基础，结合了蜗轮减速器的使用条件和加工过程的数学模型，主要是在减小负载惯量的同时提高输出扭矩和减速度。本文首先简要介绍了蜗轮蜗杆的设计原理和理论计算，减速器的零部件尺寸计算和校核需要以环面蜗轮减速器设计的设计准则和理论为基础，这也是环面蜗轮蜗杆设计的一般过程，对其他蜗轮蜗杆的设计有着重要的参考价值。

目前，国内外先进的环面蜗杆减速器的设计、生产设计和应用水平还存在很大差距。本文主要介绍了我国的蜗轮蜗杆减速器的设计与制造。

关键词：蜗轮；蜗杆；减速器；设计；校核

Abstract

This article is mainly about the method of designing a system of toroidal worm gear reducer, which is widely used in the mechanism of transmitting power and motion. The design method is based on physical formulas, combined with the use conditions of the worm gear reducer and the mathematical model of the machining process, mainly to reduce the load inertia while increasing the output torque and deceleration. This article first briefly introduces the design principles and theoretical calculations of the worm gear and worm. The size calculation and verification of the reducer parts need to be based on the design criteria and theory of the design of the toroidal worm gear reducer, which is also the general process of the design of the toroidal worm gear. It has important reference value for the design of other worm gears.

At present, there is still a big gap in the design, production design and application level of advanced toroidal worm reducers at home and abroad. This article mainly introduces the design and manufacture of worm gear reducer in China.

Key words: Worm;Gear;Reducer;Design;Check.

目 录

第 1 章 绪论 1
1.1 本文的研究的目的及意义 1
1.2 国内外研究现状 1
1.3 提升机主要技术参数 3
1.4 主要内容 4
第 2 章 减速器的作用及特点 5
2.1 减速器的作用 5
2.2 齿轮减速器的特点 5
2.3 蜗杆减速器的特点 6
2.4 本章小结 7
第 3 章 电动机的选择 8
3.1 电动机类型和结构型式的选择 8
3.2 电动机的容量 9
3.3 电动机的技术数据 10
3.4 本章小结 11
第 4 章 减速器部件的选择计算 12
4.1 蜗杆传动设计计算 12
4.2 轴的结构设计 17
4.3 箱体的结构设计 22
4.4 减速器的附件 23
4.5 本章小结 26
第 5 章 减速器各部件的校核计算 27
5.1 环面蜗轮蜗杆的校核计算 27
5.2 轴的校核 29
5.3 滚动轴承的选择及校核 34