

利生大桥设计计算书

摘要

根据毕业设计任务书要求，结合大学本科四年所学的专业课程，依据相关公路桥涵设计规范，综合考虑预修建桥址处的地形地质情况、气象水文条件等要求，提出了中承式钢管混凝土拱桥、预应力混凝土独塔斜拉桥、预应力混凝土连续梁桥三个比选方案。按照“安全、耐久、适用、经济、环保、美观”的设计原则进行设计，综合分析了三个方案的优缺点，最终选择了预应力混凝土连续梁桥作为推荐方案。推荐方案以桥梁基本设计理论为基础，参考了相关公路桥梁设计规范，拟定了65米+118米+65米的跨径方案，主梁采用1.8次抛物线变梁高的单箱单室箱主梁，桥墩为空心混凝土桥墩，基础采用钻孔灌注桩基础，主要施工方法为悬臂浇筑法和满堂支架法。同时，对推荐方案进行了结构细部尺寸的拟定，进行了内力计算、配筋设计（预应力钢筋和普通钢筋）及控制截面强度验算、应力验算，抗裂验算等。经过对计算结果的分析比较，验算结果表明该桥梁设计较为合理，符合设计任务的要求。

关键词：预应力混凝土连续梁桥、悬臂浇筑法、推荐方案、抗裂验算

ABSTRACT

According to the requirements of the graduation design task book, combined with the professional courses learned in the four-year undergraduate course, and based on the relevant highway bridge and culvert design specifications, comprehensive consideration of the terrain and geological conditions, meteorological and hydrological conditions at the pre-built bridge site, a half-through concrete filled steel tube is proposed. Three comparison and selection schemes of arch bridge, prestressed concrete single tower cable-stayed bridge and prestressed concrete continuous beam bridge. According to the design principles of "safety, durability, application, economy, environmental protection, and beauty", the advantages and disadvantages of the three schemes are comprehensively analyzed, and finally the prestressed concrete continuous beam bridge is selected as the recommended scheme. The recommended scheme is based on the basic design theory of the bridge, with reference to the relevant highway and bridge design codes, and a 65-meter + 118-meter + 65-meter span scheme is drawn. The main beam adopts a single-box single-chamber box main beam with a parabolic variable beam height of 1.8 times. The bridge pier is a hollow concrete bridge pier with a cast-in-place bored pile foundation as the foundation. The main construction methods are the cantilever pouring method and the full hall support method. At the same time, the recommended plan was drafted for structural detail size, internal force calculation, reinforcement design (prestressed steel and ordinary steel), control section strength, stress check, crack resistance check, etc. After analyzing and comparing the calculation results, the verification results show that the bridge design is more reasonable and meets the requirements of the design task.

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