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三峡永久船闸输水洞衬砌混凝土施工期温度现场试验研究

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摘要 摘要：早期施工的三峡永久船闸输水洞衬砌混凝土，有不少的结构段在1/2长度附近发生了裂缝，而且一般都是贯穿的，严重影响了工程质量和寿命。为此，在北一延长段NY9和NY10结构段，进行了浇筑温控混凝土和常规混凝土的温度现场试验研究，分析了衬砌混凝土温度场的分布和随时间的变化规律。试验结果表明，衬砌混凝土的最高温度达到50 ℃以上，温升和温降快，在不到3 d龄期即开始降温，而且降温幅度大。由于结构的厚度小，围岩的约束强，早期混凝土的抗拉强度又很低，加之干缩等影响，衬砌混凝土很有可能产生早期裂缝。对衬砌混凝土施工期裂缝的原因进行了分析，指出了隧洞衬砌混凝土温控防裂的重要性，提出了一些可行的温控防裂措施，并在输水隧洞衬砌混凝土的后期施工中得到了应用，取得了良好的防裂效果。

关键词 关键词：水利工程 输水隧洞 衬砌混凝土 温控防裂 现场试验

分类号

STUDY ON FIELD TEMPERATURE EXPERIMENT FOR CONCRETE LINING OF WATER-CONVEYING TUNNEL OF PERMANENT SHIPLOCK IN THREE GORGES PROJECT

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Abstract

Abstract：In water-conveying tunnel of permanent shiplock of Three Gorges Project，some cracks are found in early phase cast concrete lining. These cracks，existing in the middle of a tunnel section，and transverse direction，seriously effect the quality and life span. So，field experiment on concrete lining temperature field of tunnel sections NY9 and NY10 of north extension，where temperature-controlled concrete and no special temperature controlled concrete are cast，respectively，is conducted. Experimental results show：(1) the highest temperature of lining caused by hydration heat can reach above 50 ℃；and (2) both the temperature rise and the temperature drop are quickly. The concrete lining temperature begins to drop within 3 days with large drop scope. Because of the thin structure and strong constraint of surrounding rock，lower tensile strength of concrete，etc.，early stage cracks occurred. The reason that cracks are developed during construction periods is analysed；and the importance of temperature controlling to prevent cracks in tunnel lining during construction periods is pointed out. Some feasible measures and proposals are put forward. These measures and proposals，adopted by construction units are proved to be effective and economical.

Key words Key words：hydraulic engineering water-conveying tunnel concrete lining temperature controlling and cracks prevention field experiment

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