

厦门翔安海底隧道防排水技术初步应用经验

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收稿日期 2007-6-17 修回日期 2007-8-13 网络版发布日期 2007-11-6 接受日期 2007-6-17

摘要 厦门翔安隧道陆域段多为回填土、砂土和强风化岩土地段, 地下水发育, 渗水量大。其浅滩段富水砂层和海域段4个风化深槽均直接与海水连通。翔安隧道地下水和海水总水头为50~70 m, 拱顶最大静水压力为0.65 MPa, 防水问题十分突出。综合考虑地质条件、水头高度、涌水量、地下水对结构的腐蚀情况以及结构形式等因素, 翔安隧道采用复合式衬砌, 按“以堵为主, 限量排放, 多道防水, 刚柔结合”的永久防排水原则, 设计采用“全封闭”与局部“限量排导”相结合的防排水方案, 主隧道在全、强风化、断层破碎带等渗水量较大的地段采用全封闭方案; 在I, II级围岩等渗水量小的地段采用限量排导方案, 允许少量渗水限量排放。服务隧道为近似圆形的小断面, 全部采用全封闭衬砌方案。通过注浆堵水, 加强结构的自防水功能, 严格控制防水施工质量等措施构建防水体系, 现场施工初步实践经验表明, 翔安隧道防排水系统的设计和施工效果比较好, 可供类似工程参考。

关键词 [海底隧道; 防排水技术; 设计方案](#)

分类号

PRIMARY APPLICATION EXPERIENCES OF WATERPROOF TECHNIQUE IN XIAMEN XIANGAN SUBSEA TUNNEL

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Abstract

Xiamen Xiang'an subsea tunnel is the first subsea tunnel in China. The geological conditions of land parts of this tunnel are mostly backfill soil, sandy soil or complete weathered rock. Moreover, underground water has strong seepage characteristic. Sandy layer is enriched in water and four weathered grooves under sea directly connect with the seawater. The total water head of groundwater and seawater is between 50 m and 70 m; and the hydrostatic pressure acting on the tunnel arch crown is 0.65 MPa. Therefore, the lining waterproof is a very prominent issue. Considering the geological factors, such as water level, gushing water, erosion of framework and formation of framework, composite lining structure is adopted in Xiamen Xiang'an subsea tunnel, and the long-time waterproof principle is main shutoff, limited discharge, multilayer proofing and rigidity-flexibility combination. Therefore, the waterproof project is set as part total-closure and limited discharge. For example, the total-closure waterproof is adopted in the parts of main tunnel, which is enriched in water; and the limited discharge project is adopted in the other parts of main tunnel where the surrounding rock is favorable. The total-closure waterproof is adopted in the service tunnel because of its little circle section. Waterproof can be reinforced through injecting pulp. Moreover, construction quality can ensure waterproof system of Xiamen Xiang'an subsea tunnel. In fact, the waterproof design of Xiamen Xiang'an subsea tunnel and construction effect is very well accepted. The achieved experiences can provide some references to similar projects.

Key words [subsea tunnel; waterproof technique; design scheme](#)

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