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论文

张集线旧堡隧道工程地质条件和岩体结构特征研究

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摘要：

新建的张集铁路（张家口　集宁段）旧堡隧道是全线关键性控制工程,位于河北省万全县旧堡乡与尚义县土夭村之间,隧道穿越由晚太古代马市口组(Arm)麻粒岩和黑云母斜长片麻岩组成的一套高级变质岩建造,断裂构造极为发育,岩体破碎。原设计Ⅱ、Ⅲ级围岩洞段占隧道线路总长的71.8%,而已施工揭露的工程地质条件较差,全部变更为Ⅲ级加强及Ⅳ、Ⅴ级围岩,变更率高达80.3%。施工过程中多次发生挤压大变形、塌方、突涌水等施工地质灾害,共处理大塌方段8处小塌方21处计130m,处理大变形18段计550m。本文分析了DK30+520～910洞段地层岩性、地质构造、地应力、地下水等隧道围岩主要工程地质条件,从结构面和工程地质岩组的物理力学特性出发,研究了该洞段特殊的岩体结构,指出该隧道围岩岩体结构特征主要受与隧道轴线小角度相交的构造挤压破碎带及软硬交替产出的岩组控制,隧道围岩变形破坏受岩体结构控制作用明显,并总结了施工中可能遇到的几种岩体结构。该研究对类似工程地质条件地区隧道工程围岩分类、支护设计和施工有一定的借鉴意义。

关键词： 工程地质条件〓岩体结构〓围岩分级〓旧堡隧道

ENGINEERING GEOLOGICAL CONDITIONS AND SPECIAL ROCKMASS STRUCTURAL CHARACTERISTICS OF JIUBAO RAILWAY TUNNEL

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Abstract:

　Jiubao Tunnel,located between Wangquan county to Shangyi county of Hebei province,is the key and controlling works of the under　constructed Zhangjiakou　Jining Railway Line. The tunnel passes through the granulite and the biotite gneiss of the Upper Archen Era,where faults well developed faults and the rock mass is fractured. The geological conditions disclosed during tunneling were greatly different from those of the construction design drawing. The alteration ratio of the classification of tunnel surrounding rocks even reaches 80.3%. It was due to insufficient understanding to rock mass structure. The high alteration directly caused the occurrence of many geohazards such as squeezing,collapse,water in rush during tunneling. The paper takes the section of DK30+520～DK30+910 as the example and makes the comprehensive analysis to the key geological conditions of tunnel surrounding rock. The key conditions include geology,geotechnics,earth stress and underground water. It studies the special characteristics of rock mass structure and directs that the tunnel surrounding rock is complicatedly controlled by the fault fracture zones and the alternative outcropping of weak and hard engineering geological rock masses. It is the special rock mass structural characteristics that controls the deformation and collapse of tunnel. It also summarizes the rock mass structure types which are possibly encountered during tunnel construction. The