

Investigation of Chadormalu iron ore mine haul roads wearing course materials and their functional defects

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ABSTRACT

In any surface mining operations, transportation of ore and waste materials is accomplished on the roads which have been empirically designed and relying strongly on local experiences. Considering the direct relationship between mine haul road wearing course and vehicles, functional design of mine haul roads, which relates to the selection of appropriate wearing course materials, plays an important role in the efficiency of the hauling operation, because inadequate design will reduce safety and operational efficiency and will increase costs of maintaining both vehicles and roads. With the aim of investigating the wearing course materials of Chadormalu mine haul roads, laboratory tests were carried out to find out the engineering and geotechnical characteristics of these materials. Considering the lack of material selection guidelines for mine haul road wearing course material in Iran, the determined results of the foregoing tests were compared with the given guidelines in South Africa, which are based on the engineering characteristics, identification and classification of functional defects. With the aid of those guidelines and visual assessment of Chadormalu mine haul roads, functional defects of used materials were identified. Finally, concerning the tests results and recognition of functional defects of haul roads, adequacy or inadequacy of wearing course materials was investigated.

Keywords: surface mining; haul road; wearing course material; functional defect score; functional performance

INTRODUCTION

In any surface mining operations, transportation of ore, and waste materials, is accomplished by large haul trucks running on haul roads that have been empirically designed. These kinds of designs, that relying strongly on local experiences result in increases in cost per ton hauled and reductions of operational efficiency and safety.

One of the Iranian surface mines, which its haul roads have been designed empirically, and deals with mentioned problems is Chadormalu iron ore mine. Chadormalu is located in the center of Persia (Iran) Desert, north of Gray Chahmohammad Mountains, and the southern part of Saghand salt marsh. It is 180Km to the northeast of Yazd and 300Km to the south of Tabas city, where no human life effects can be seen except Chadormalu members. This mine is connected to the Iranian Rail Road network and via asphalt road to the main Yazd – Mashhad, road.

In order to investigate wearing course material of Chadormalu mine haul roads, first, the engineering and geotechnical pr