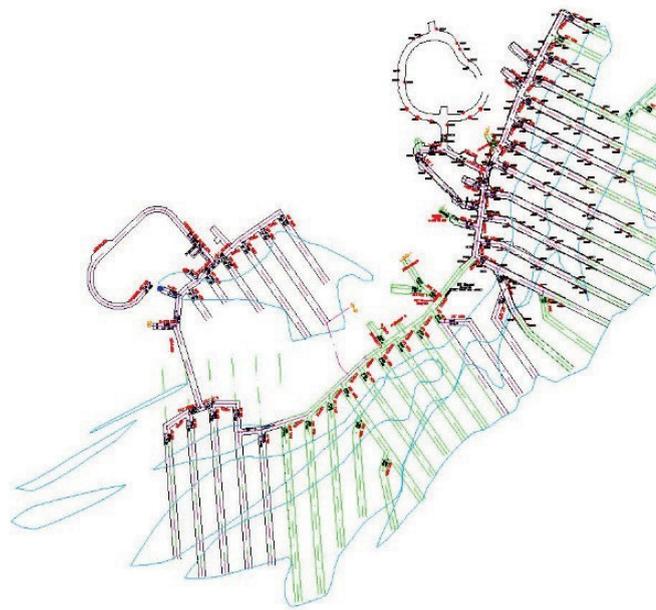# Alternative Fleet Configuration for Malmberget Mine

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PREFACE

The research work presented in this technical report is part of the I2 Mine Project (Innovative Technologies and Concepts for the Intelligent Deep Mine of the Future), WP 2 subtask 2.1.1 and has been carried out at the division of Mining and Geotechnical Engineering at Luleå University of Technology.

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ABSTRACT

Malmberget mine is a deep underground iron ore mine where the ore is extracted using sub level caving method. The mining operation is proceeding towards greater depth, and with increased depth the haulage of rock masses becomes a critical activity which needs to be optimised. Two of the concerns related with haulage of rock masses are the type and size (bigger, longer, denser or more complex systems) of the transportation systems. The mine is studied and analysed with respect to the challenges related to the current transportation practice, and part of the Malmberget mine haulage system is simulated and analysed under different operational constraints. The study aims to improve the current haulage operation by proposing the selection of an appropriate future haulage system for Malmberget mine. Taking into consideration use of 21-diesel and 21-electric LHDs the 4th, 10th, 20th and 21st scenarios show that it was possible to fulfill the current production performance targets close to 21 000 tonnes/day. In cases of 10th, 20th and 21st scenarios loading was performed after the blast operation from 2:30 a.m. to 6:00 a.m. The closest targeted production rate was achieved in the 4th scenario by four 21-diesel LHDs operating from 6:00 a.m in the morning until 00:30 a.m (21 175 tonnes/day), where no vehicles were loading after the blast operation.

Keywords: *Haulage systems, transportation, discrete event simulation, sub level caving and deep mining.*