Selection of a Mechanical Mining System for an Underground Chromite Mine

N. BILGIN[♣], H. COPUR[♣], C. BALCI[*♣], H. TUNCDEMIR[♣], D. TUMAC[♣], and C. FERIDUNOGLU[♣]

The success of adapting mechanical excavation technology to small-scale mines comes with a motivated team work of mine personnel, consultants and machine manufacturers, as in the examples of many successful applications. A research project supported by the Turkey Republic Prime Ministry State Planning Organization (DPT) is partly summarized in this study. A typical operating underground chromite mine, which is candidate for application of a mechanical excavation system, is chosen for analyses. After gathering some operational and geological information, a few blocks of chromite ores and host rock harsburgite are sampled during mine visits. Samples are subjected to full-scale laboratory cutting tests and physical and mechanical property tests. Adaptability of selected system to the mine is discussed in detail based on production rate, shaft capacity, mine layout design, muck size, ore processing, backfilling, machine cost, cutter consumption, loading, haulage, support, workforce, scheduling and machine adaptation process.

A light-weight multi-tool miner interchangeable with an impact hammer tool and a roadheader cutterhead could be technically and efficiently adapted to the chromite mine for production at stopes having around 8 m^2 trapezoidal cross-sections.

[*♣] *Corresponding Author, Assist. Prof. Dr., Istanbul Technical University, Mine Mechanization and Technology Division, Phone: +90 (212) 285-6138, Fax: (212) 285-6131, Email: cemalb@itu.edu.tr*

[♣] *Istanbul Technical University, Department of Mining Engineering, 34469, Maslak-Istanbul / TURKEY*