Intelligent Belt Drive Systems in Hybrid Powertrains: a Multipurpose Test Rig

https://doi.org/10.3301/ABSGI.2024.02

Bari, 2-5 September 2024

ABSTRACT BOOK

a cura della Società Geologica Italiana

BARI 2024

Geology for a sustainable management of our Planet

PRESIDENTS OF THE CONGRESS

Luisa Sabato (SGI), Emanuela Schingaro (SIMP).

VICEPRESIDENT OF THE CONGRESS

Marcello Tropeano (SGI).

SCIENTIFIC COMMITTEE COORDINATOR

Sandro Conticelli (Università di Firenze).

SCIENTIFIC COMMITTEE

Lucia Angiolini (Università di Milano), Giuseppina Balassone (Università di Napoli), Domenico Calcaterra (Università di Napoli), Angelo Camerlenghi (OGS), Serafina Carbone (Università di Catania), Chiara Cardaci (Protezione Civile), Domenico Chiarella (Royal Holloway, London), Angelo Cipriani (ISPRA), Paolo Conti (Università di Siena), Giovanni De Giudici (Università di Cagliari), Patrizia Fiannacca (Università di Catania), Diego Gatta (Università di Milano), Guido Giordano (Università di Roma Tre), Lara Maritan (Università di Padova), Annalisa Martucci (Università di Ferrara), Ilaria Mazzini (CNR-IGAG), Stefano Mazzoli (Università di Camerino), Barbara Nisi (CNR-IGG), Stefano Poli (Università di Milano), Giovanna Rizzo (Università della Basilicata), Laura Scognamiglio (INGV), Mauro Soldati (Università di Modena e Reggio Emilia), Mario Tribaudino (Università di Torino), Chiara Varone (CNR-IGAG).

ORGANISING COMMITTEE

Donato Belmonte (SIMP), Bernardo Carmina (Università di Pisa), Fabio Dioguardi (Università di Bari), Giacomo Eramo (Università di Bari), Lorenza Fascio (SIMP), Vincenzo Festa (Università di Bari), Marilena Filippucci (Università di Bari), Fulvio Franchi (Università di Bari), Salvatore Gallicchio (Università di Bari), Giulia Innamorati (SGI), Maria Lacalamita (Università di Bari), Isabella Serena Liso (Università di Bari), Stefania Lisco (Università di Bari), Piernicola Lollino (Università di Bari), Daniela Mele (Università di Bari), Patrizia Maiorano (Università di Bari), Nadia Malaspina (SIMP), Virginia Marchionni (SIMP), Giuseppe Mastronuzzi (Università di Bari), Ernesto Mesto (Università di Bari), Francesca Micheletti (Università di Bari), Mario Parise (Università di Bari), Fabio Massimo Petti (SGI), Angela Rizzo (Università di Bari), Giovanni Scardino (Università di Bari), Giovanni Scicchitano (Università di Bari), Luigi Spalluto (Università di Bari), Simona Tripaldi (Università di Bari), Alessandro Zuccari (SGI).

COMMUNICATION COMMITTEE

Giovanna Agrosì (Università di Bari), Giulia Innamorati (SGI), Christian Leo (Università di Bari), Fabio Massimo Petti (SGI), Virginia Marchionni (SIMP), Nicola Venisti (Museo di Scienze della Terra, Università di Bari), Martina Zucchi (Università di Bari).

ABSTRACT BOOK EDITORS

Bernardo Carmina, Lorenza Fascio, Giulia Innamorati, Virginia Marchionni & Fabio Massimo Petti.

COVER IMAGE

The Pontifical Basilica of Saint Nicholas (Bari).

Sonic drilling: evaluation of the best techniques for tailings and mining waste exploration and valorization

Scervini S.*[1], Baldassarre G.[2] & Bellopede R.[2]

[1] Horizonte Mineiro Serviços Geológicos Ltda, Brazil.
[2] Dipartimento di Ingegneria dell'Ambiente, del Territorio e delle Infrastrutture DIATI, Politecnico di Torino.

Corresponding author email: salvatore.scervini@horizontemineiro.com.br

Keywords: sonic drilling, waste.

Sonic Drilling is an advanced form of drilling that employs the use of high frequency resonant energy to advance a barrel or casing in underground formations. During drilling, the resonant energy is transferred by the drill head to the drill string at various sonic frequencies. The main advantages are: high performance and high recovery rates in poorly consolidated or fractured material such boulders, sand and heterogeneous material; dry drilling or with low water content; minimization of drilling discard: about 70% less discard compared to traditional drilling; straight holes with minimum deviation; up to 4 times faster compared to traditional drilling; big core diameters.

Most of the current applications are related to exploration drilling, for example: titanum exploration in sands; lithiums exploration in salars; bauxite, kaolin, uranium, REE (Rare Earth elements) in clays. Other relevant applications are related to the characterization of heterogeneous material present in tailing dams, stock and waste pile. Actually this technique is mostly used in Australia, USA, Canada, Brazil ,Cile, and in few European countries (Orberger et al., 2018, 2019; González-Díaz et al., 2022, Santos et al., 2022) and it is innovative for mining dumps exploration.

In addition the main goal of Europe Commision highlighted in recent Critical Raw Material Act is to investigate the potential for recovery of critical raw materials not only from extractive waste in current mining activities but also from historical mining waste sites. For all the above mentioned reasons this technique could be a interesting opportunity of exploration with the objective of circular economy in the mining sector.

The research aim to give an overview of the exploration activities by means sonic drilling of Horizonte Mineiro Serviços Geológicos Ltda, in Brazil in order to select the best technologies to be used for the mining tailing storage facilities and waste rock dumps in Europe.

Orberger B. et al. (2018) - Increasing Resource Efficiency Through Sonic Drilling. SEG Discovery July 01, 2018, 1-12.

Orberger B. et al. (2019) - Sonic drilling coupled with on-line-on-mine-analyses: field tests at the Villeveyrac bauxite deposit (Southern France). In 15th SGA Biennial Meeting on Life with Ore Deposits on Earth 2019.

González-Díaz E. et al. (2022) - Geochemical, mineralogical and geostatistical modelling of an IOCG tailings deposit (El Buitre, Chile): Implications for environmental safety and economic potential. Journal of Geochemical Exploration, 239, 106997.

Santos S. et al. (2022) - Technical feasibility study of the exploitation of seabed potassium salts by solution mining. Journal of Materials Research and Technology, 16, 433-441.