

SERENGEO RockLab



SERENGEO brings to market innovative services deriving from the results of the researches developed at the University and from the knowledge acquired in the field of Mining Engineering, in order to support and improve the productive world.

Our objective is to spread design and characterization criteria for rock materials and rock masses, which have to be technically, economically and environmentally sustainable.

SERENGEO addresses to the construction companies, the public administrations and the industry, providing the following services:

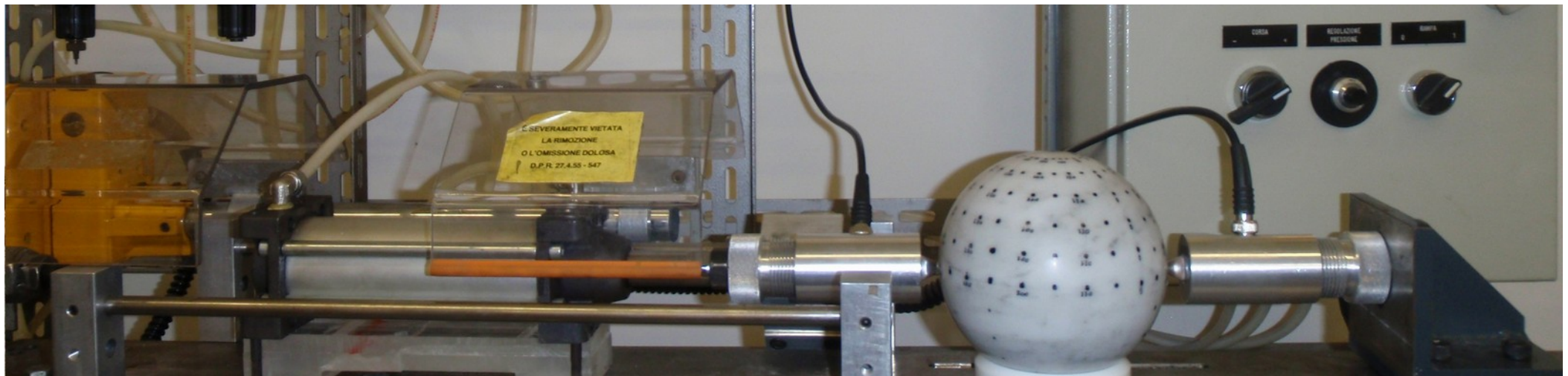
- **rock materials & rock masses characterization**
- **innovative geomechanical test design & planning**
- **environmental monitoring.**

Why choose SERENGEO?

- We have a cumulated experience of more than 50 years in the environmental mining sector and collaborations with the most important national and international research centers
- We put the high level knowledge acquired during years of research in Georesources Engineering at your service.
- We provide a highly customized service, to effectively meet your needs.

Work tools

SERENGEO provides its services in collaboration with the Laboratory of Geoengineering and Natural Resources (LAGIRN) of DICAM, which disposes of facilities for the execution of geomechanical tests according to National and International Standards (UNI, EN, ASTM, ISRM) and the Suggested Methods of International Society of Rock Mechanics (ISRM), and ad-hoc equipment developed at DICAM for peculiar applications



Rock materials characterization

Rock materials have many applications and their characterization is essential to assess their performances in various fields, such as in mining and civil engineering and tunneling, as well as in the Cultural Heritage preservation.

SERENGEO provides assistance in rock materials characterization, in **critically analyzing and interpreting the results of geomechanical tests.**

The cutting edge know-how coming from scientific research is used to serve the customer.

In addition to the conventional techniques, SERENGEO is able to **design ad-hoc tests on rock materials for specific applications.** This service requires a long experience and a deep expertise in the rock mechanics field, which the members of SERENGEO acquired in the years through the research activity at the University, and it allows obtaining a **detailed and personalized analysis of the material studied**, related to the problem at hand.

Rock masses characterization

The construction of every civil work in rock needs a **preliminary investigation to determine the mechanical properties of the rock masses** (rock materials and discontinuities) affected by the excavation. For carrying out rock masses tests, SERENGEO collaborates with the laboratory LAGIRN of Bologna University which is supplied with equipment to perform geomechanical testing on rock masses both in situ and in laboratory.

In addition to the standard survey techniques, SERENGEO is able to design ad-hoc tests on rock masses to solve specific problems.

For instance, in the past the members of SERENGEO designed and performed non-conventional shear tests (Bim Test) for "bimrocks". Furthermore, SERENGEO also utilizes a 3D camera probe for cored and drilled holes, to examine the rock masses structures, with continuous logging and a software for images processing.

Innovative geomechanical test design & planning

Rock materials have many applications in various fields, from civil engineering to chemical industry and agriculture. **The rock materials applications, especially as building or ornamental stones, are rarely supported by a deep knowledge of the rock behavior in relation to their specific use.** Designers often underestimate the key importance of a careful preliminary characterization of the rock that takes into account the specific applications.

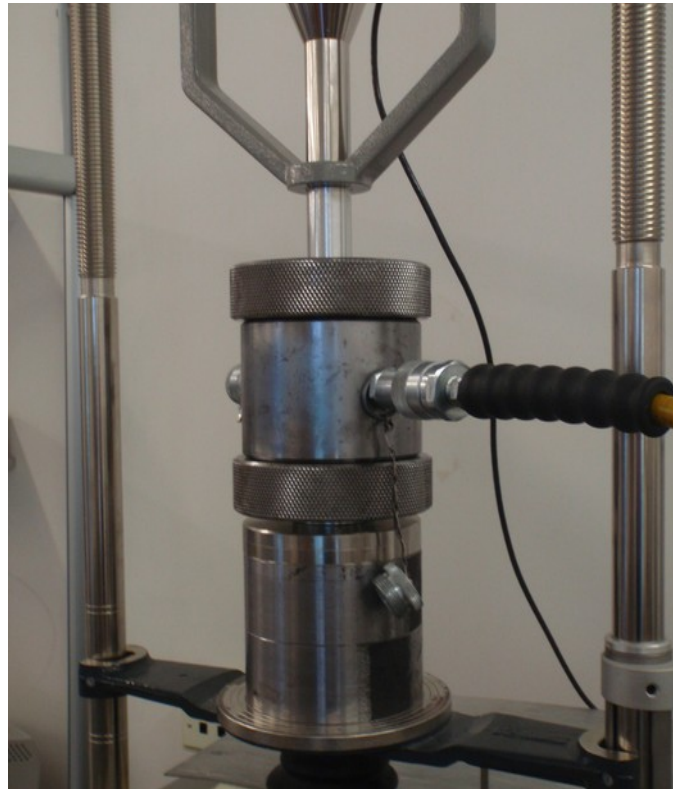
SERENGEO provides services of designing of geomechanical tests to assess the performance of the rock in specific applications, proposing new approaches and innovative procedures.

The **service customization**, the high scientific and professional expertise of the working group, the scientific support of Prof. Berry (Full Professor in Mining, Tunneling and Excavation Engineering at the University of Bologna) and the collaboration of the LAGIRN, laboratory of rock mechanics of Bologna University, are the main strengths of SERENGEO.

Rock materials characterization

Construction sites TAV - COCIV

Drillability test on rock material for the selection of the mechanized digging machine and for forecasting the excavation performance.

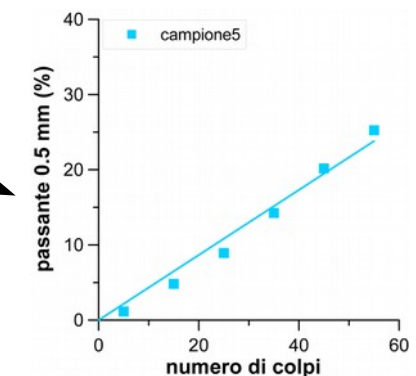
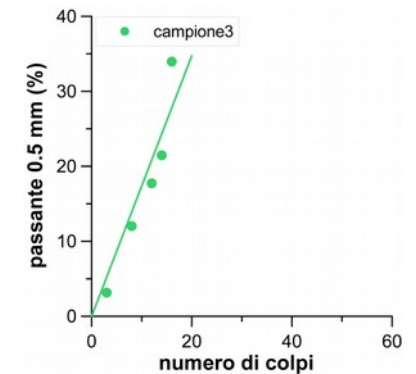


Rock masses characterization

Solvay Italia

Expeditious characterization of limestone rock used for Solvay soda's production.

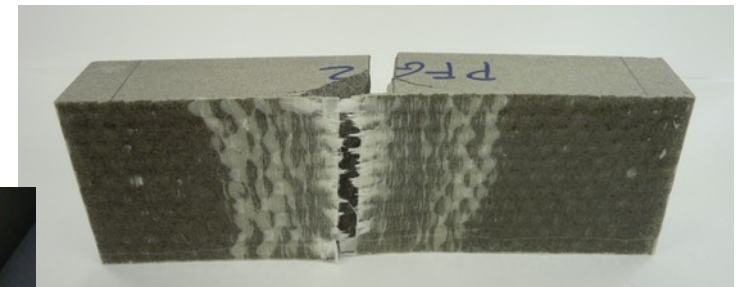
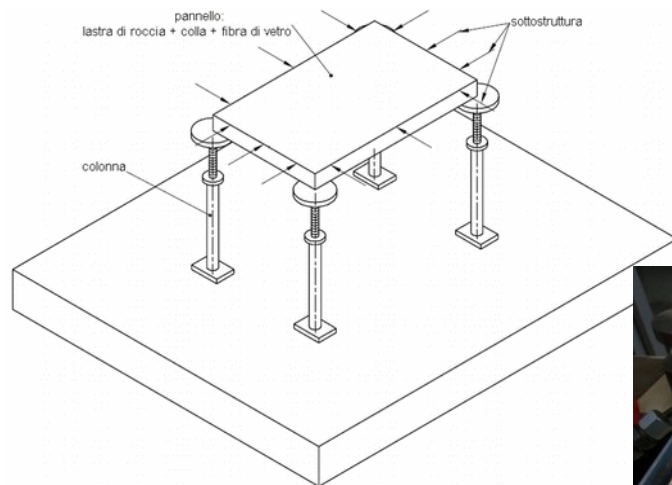
Development of a distructive test for the selection of the material in the quarry.



Geomechanical test design

Il Casone

Design of geomechanical resistance tests for sandstone slabs reinforced with panels of glass wool, to be used as flooring for interior / exterior.



Bandini A., Berry P., Bemporad E., Sebastiani M., Chicot D. (2014) Role of grain boundaries and micro-defects on the mechanical response of a crystalline rock at multiscale. *International Journal of Rock Mechanics and Mining Sciences* 71: 429-441, DOI: 10.1016/j.ijrmms.2014.07.015, ISSN: 13651609.

Bandini A., Berry P. (2014) From nano to macroscale: A new experimental approach to mechanical characterization of rock materials. *Proceedings International Symposium on Geomechanics from micro to macro*. Cambridge (UK) 1-3 September 2014. Soga et al. (Eds) 2015 Taylor & Francis Group, London, p. 1055-1060. ISBN 978-1-138-02707-7.

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Bandini A., Berry P. (2014) Relazione tra comportamento deformativo di rocce ed emissioni acustiche per la previsione dei rockburst. *Incontro Annuale Ricercatori di Geotecnica (IARG2014)*. Chieti 14 – 16 Luglio 2014.

Bandini A., Berry P., Bemporad E., Sebastiani M. (2014) Nanomechanical characterization of brittle rocks. In: *Nanomechanical analysis of high performance materials*. Atul Tiwari (Ed.), Springer Verlag Publication, Series: Solids Mechanics and its application, vol. 203, cap. 11, p. 209-229, DOI: 10.1007/978-94-007-6919-9-11, ISSN: 09250042, ISBN: 978-940076918-2.

Bandini A., Berry P. (2013) Influence of marble's texture on its mechanical behavior. *Rock Mechanics and Rock Engineering* 46: 785-799, DOI: 10.1007/s00603-012-0315-1, ISSN: 0723-2632.

Bandini A., Chicot D., Berry P., Decoopman X., Pertuz A., Ojeda D. (2013) Indentation size effect of cortical bones submitted to different soft tissue removals. *Journal of the mechanical behavior of biomedical materials* 20: 338-346.

Bandini A., Berry P., Bemporad E., Sebastiani M. (2012) Effects of intra-crystalline microcracks on the mechanical behavior under indentation of a marble. *International Journal of Rock Mechanics and Mining Sciences* 54: 47-55.

Bandini A., Berry P. (2013) Determinazione speditiva della resistenza di materiali rocciosi: Rock Impact Hardness Number. *IAGIG 2013*. Como, 10-11 Maggio 2013.

Portfolio | Publications



Bandini A, Berry P (2012) Multi-scale investigations on the mechanisms affecting the strength and deformability of a marble varying in texture. Proceedings 46th U.S. Rock Mechanics/Geomechanics Symposium. Chicago (IL, USA) 24-27 June 2012, ISBN: 978- 162276514-0.

Coli N, Boldini D, Bandini A, Lopes DS (2012) Modeling of complex geological rock mixtures under triaxial testing conditions. Proceedings International Symposium on Rock Engineering & Technology for Sustainable Underground Construction. Eurock2012. Stockholm 28-30 May 2012.

Bandini A, Berry P (2012) Approccio innovativo alla caratterizzazione meccanica di rocce cristalline: dalla macro alla nano-scala. Incontro Annuale dei Ricercatori di Geotecnica –IARG2012. Padova 2- 4 Luglio 2012, Rubano (PD): Grafiche Turato Edizioni, p. 1-6, ISBN:978-88-89524-67-1.

Bandini A, Berry P (2012) Approccio multi-scala alla caratterizzazione meccanica in laboratorio di rocce cristalline. IAGIG2012. Bologna 4-5 Maggio 2012.

Bandini A, Fabbri S (2012) Caratterizzazione meccanica delle rocce tramite il Rock Impact Hardness Number. Torricelliana 61-62: 3-26, ISSN:1827-4919.

Coli M, Livi E, Berry P, Bandini A, Jia XN (2010) Studies for rockburst prediction in the Carrara Marble (Italy). Proceedings 5th International Symposium on In-situ Rock Stress (ISRSV). Beijing, China 25-27 August 2010, London: CRC Press Taylor & Francis Group A Balkema Book, vol. 1, p. 367-373, ISBN/ISSN: 978-0-415-60165-8.

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