SERENGEO Mining

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SERENGEO brings to market innovative services coming directly from the results of academic researches and the skills acquired in the area of Mining Environmental Engineering, to support and benefit the manufacturing world.

Our objective is to spread **new approaches, tools and methodologies for the mines and quarries design and reclamation**. Our attention is focused on the technical, economic, social and environmental sustainability of the operations.

SERENGEO addresses to the public administrations, to the mining industry and to all those using raw mineral materials in industry processes, supporting them in resource management, optimizing the productive processes and solving complex issues, provinding the following services:

- **Mineral Resource Planning**
- **Mines & Quarries design and reclamation**
- **Environmental Impact Assessment**

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Why choose SERENGEO?

- We have more than 50 years of cumulated experience in the planning, design, reclamation and environmental impact assessment in the mining sector.
- We put at your service innovation and scientific skills, used in research projects in the area of Georesources.
- We provide a highly customized service, to effectively meet your needs.

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Work tools

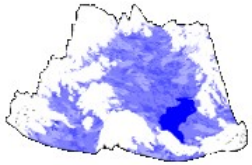
CAD and 3D modeling

- AutoCAD
- BricsCAD
- 3DStudiomax



Geostatistical code

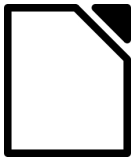
- SGems
- Geo-MS




Planning and organization

- Gantt
- PERT
- In-house developed codes





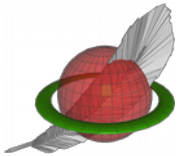

Geographical Information Systems and Scientific Visualization software

- GRASS GIS
- QGIS
- Paraview



Database Management System

- SQLite
- Spatialite



Mineral Resource Planning

The supply of mineral resources and environmental protection activities are often seen as opposing and irreconcilable, but in fact represent two **essential needs for modern societies**. The earth resources, as non-renewable, must be exploited in an efficient manner, using tools that ensure the environmental, social and economic sustainability of minerals extraction.

SERENGEO provides a**dvice to Public Administrations for the proper planning and management of mining activities**, proposing new approaches and innovative tools to support decision-making processes.

Achieving excellent results is guaranteed by the skills acquired during over 30 years of applied research activities supporting public bodies, by the expert use of open source GIS software and Geo-database, by the development of tools to support the planning process and by continuous innovation.

Mines & Quarries design and reclamation

The rational exploitation of mineral resources and the environmentally sustainable extraction design. These two elements are central to the philosophy with which SERENGEO addresses the design of the mining.

Each project starts from the end, that is the reclamation project, which defines the morphologies conferred to the extraction site and the environmental, cultural and social factors to which particular attention has to be paid. Resource exploitation is designed according to mining engineering principles, and it implies defining an **exploitation plan** (mining, transport and mineral processing methods and techniques), an **economic-financial evaluation** of the project, a study of the **geomechanical stability** of slopes and excavation faces, a **design of the environmental interventions** (reclamation intervention and water drainage system).

The experience gained in the implementation of projects for open pit and underground mining, and in the environmental rehabilitation of active, decommissioned and/or abandoned mining sites, guarantees the customer excellent results in terms of technical, economic and environmental feasibility.

Environmental Impact Assessment

Our modern society cannot do without the use of mineral resources, but also has a **duty to re-use non-renewable resources and find alternative solutions**. In addition, **it is necessary to protect the environment as common good**, avoiding a need (the supply of mineral raw materials) to become an evil (environmental degradation and incorrect use of the resource).

SERENGEO uses tools specifically developed for the Environmental Impact Assessment (EIA) resulting from the extraction of mineral:

- **AEVIA matrix**, conceived at DICAM to determine the impact produced by the typical mining actions on the environmental components;
- specific procedures for the **evaluation of the best reclamation interventions**, including through the mechanisms of public-private partnership;
- models for **assessing the impact produced from mining** (visual impact, induced ground vibrations, airblast).

Mineral Resource Planning

2011 – ARPA Puglia. Feasibilty study for the identification of recovery solutions for areas degraded by the mining activities with participation public-private.

2008 – Environmental reclamation plan of a mining area, Marcellina (RM)

2007 – Reclamation plan of a quarry, Montecorvino Pugliano (SA)

2000 – Regional Plan of Mining Activities for Regione Marche.

Portfolio | Projects

Mines & Quarries design and reclamation

Campania

Limestone quarries, Roccarainola (CE), S. Felice a Cancello (CE)

Pozzolana quarry, S. Giuliano in Campania (NA)

Conglomerate quarry, Battipaglia (SA)

Puglia

Ornamental rock quarry, Apricena (FG)

Toscana

Gypsum quarry, Gambassi Terme (FI)

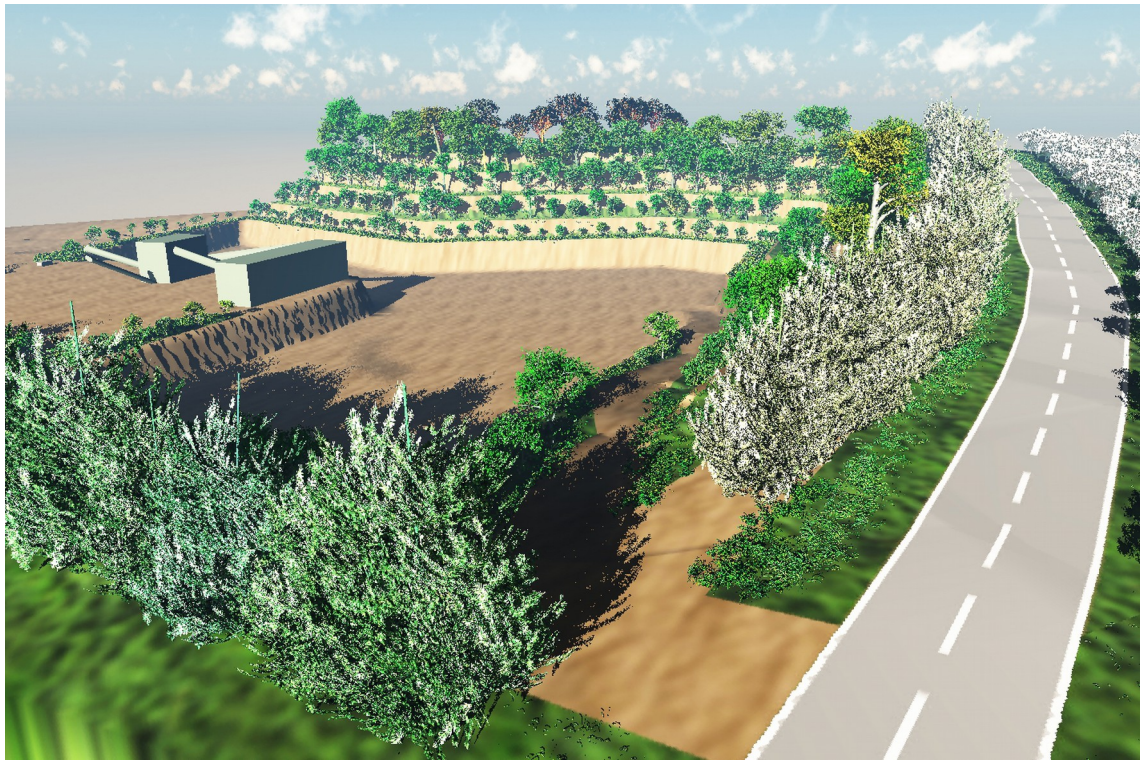
Chile

Mineral processing plant for copper recovery, Tiltil, Santiago

Portfolio | Added values

Photorealistic rendering

Mineral extraction modifies modifica irreversibly the intervented areas, whose visual impact has to be carefully evaluated. For this purpose, SERENGEO produces photorealistic 3D reconstructions which, more than clarifying the project result of the extraction and environmental reclamation, allow an easier evaluation of the landscape effects of the intervention.

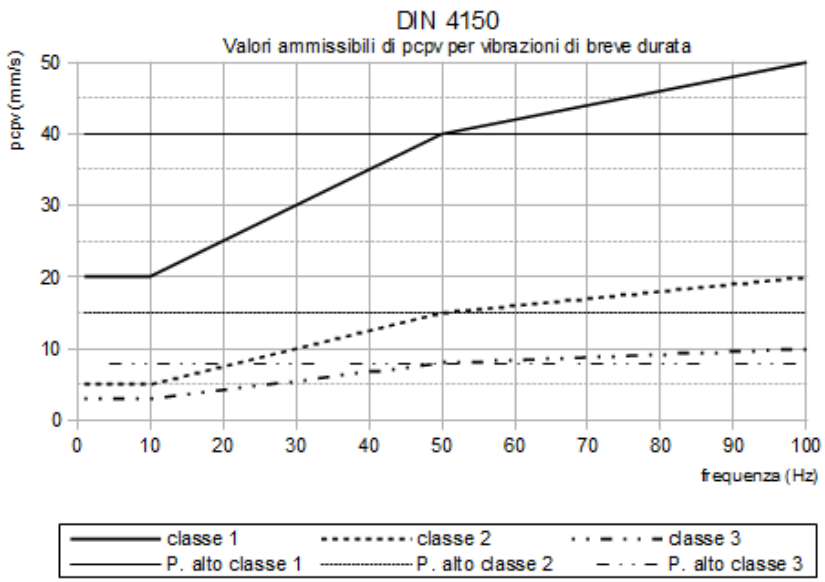


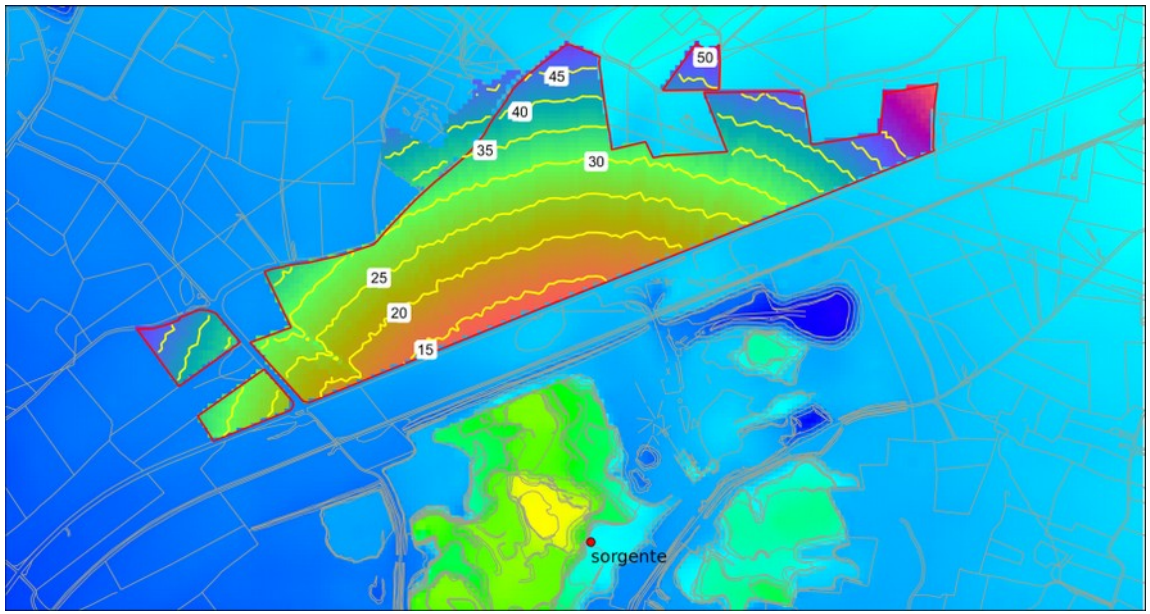
Portfolio | Added values

Prediction of blast induced ground vibrations

The blast induced ground vibrations, as a result of drill & blast excavation technique in quarry, can produce severe damages to the surrounding structures / buildings.

Thanks to a GIS-based prediction model, that automatically calculates the scaled distance and the maximum blastable charge, SERENGEO provides an improved design the blast and a more accurate monitoring plan for the surrounding structures / buildings.



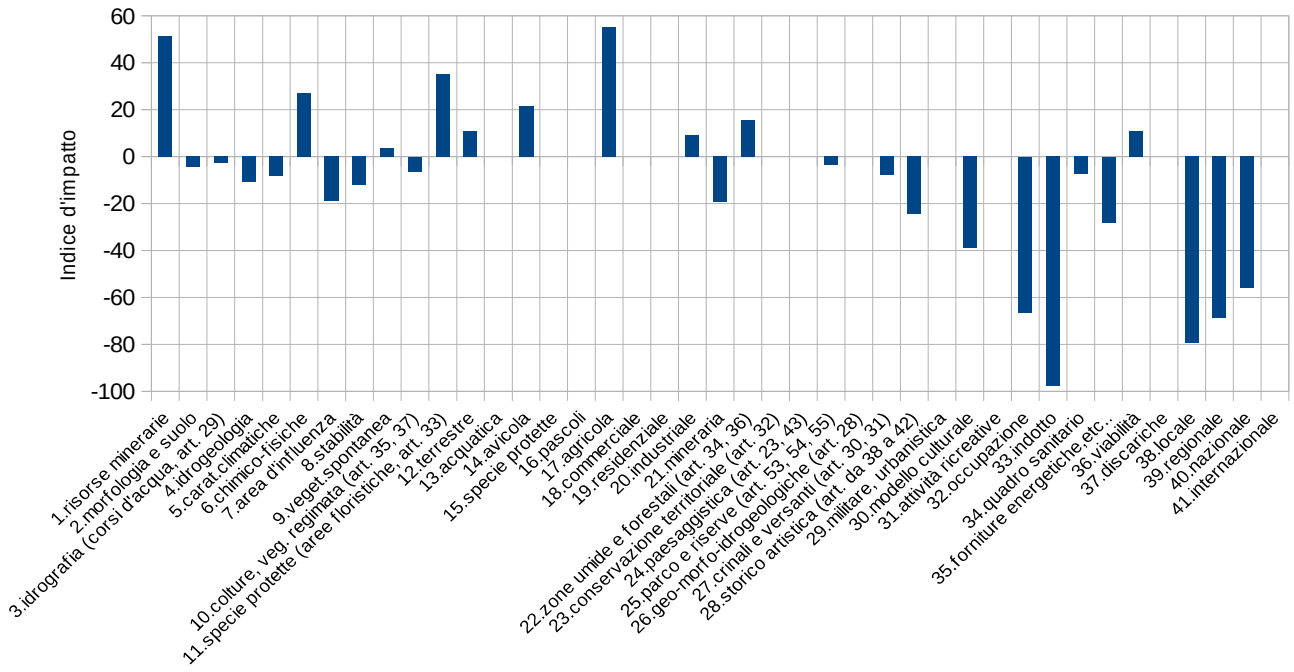


Portfolio | Added values

AEVIA matrix for Environmental Impact Assessment

For evaluating the effects of mining activities on the environment, taking into account the technical, economic and social aspects, SERENGEO uses the AEVIA matrix, expressly developed by DICAM.

This tool allows for a semi-objective evaluation of the impact produced by a mining project, through the calculation of a global environmental impact index to be compared with that obtained by alternative solutions, seeking for the best compromise between technical, economic and environmental aspects.



Portfolio | Added values

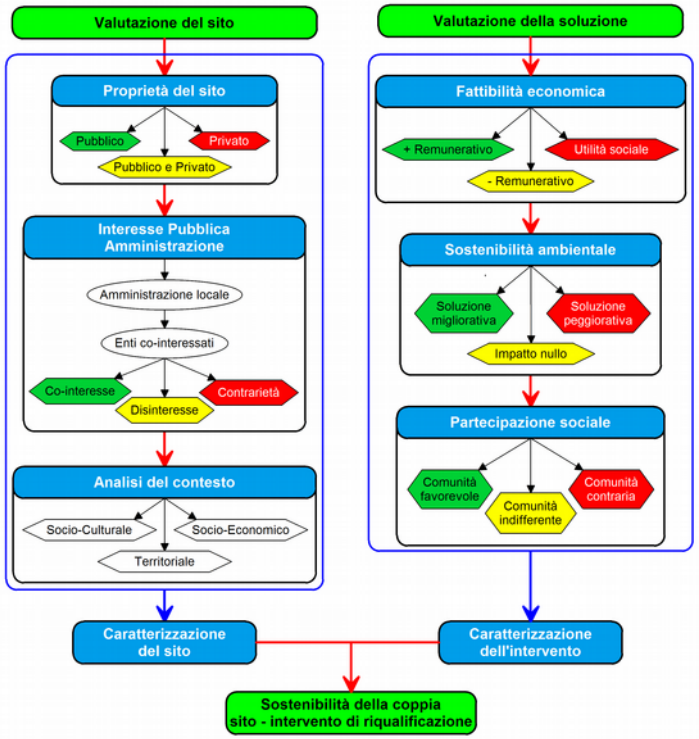
Selection of abandoned extractive sites and reclamation projects

Dismissed or abandoned mining sites represent a scar in the landscape, but also an opportunity for urban development and land use planning.

Identifying the parameters which characterize the site and the feasible reclamation solutions, it is possible to define the solutions with more chances of being realized, recurring to public-private partnership.

An innovative approach has been developed for an efficient selection of abandoned extractive sites and reclamation projects, optimising time, efforts and investments.

The model can be applied, with proper modification, for the selection of reclamation interventions to be realized in active quarries.

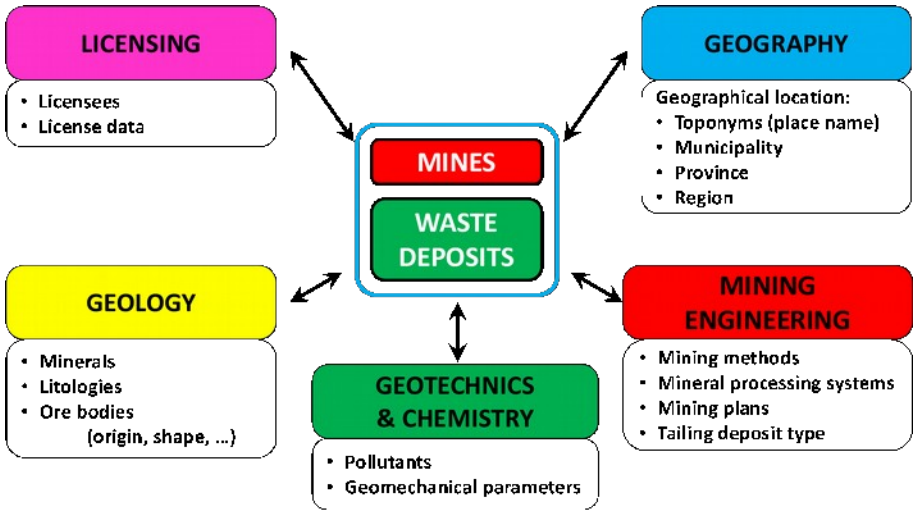


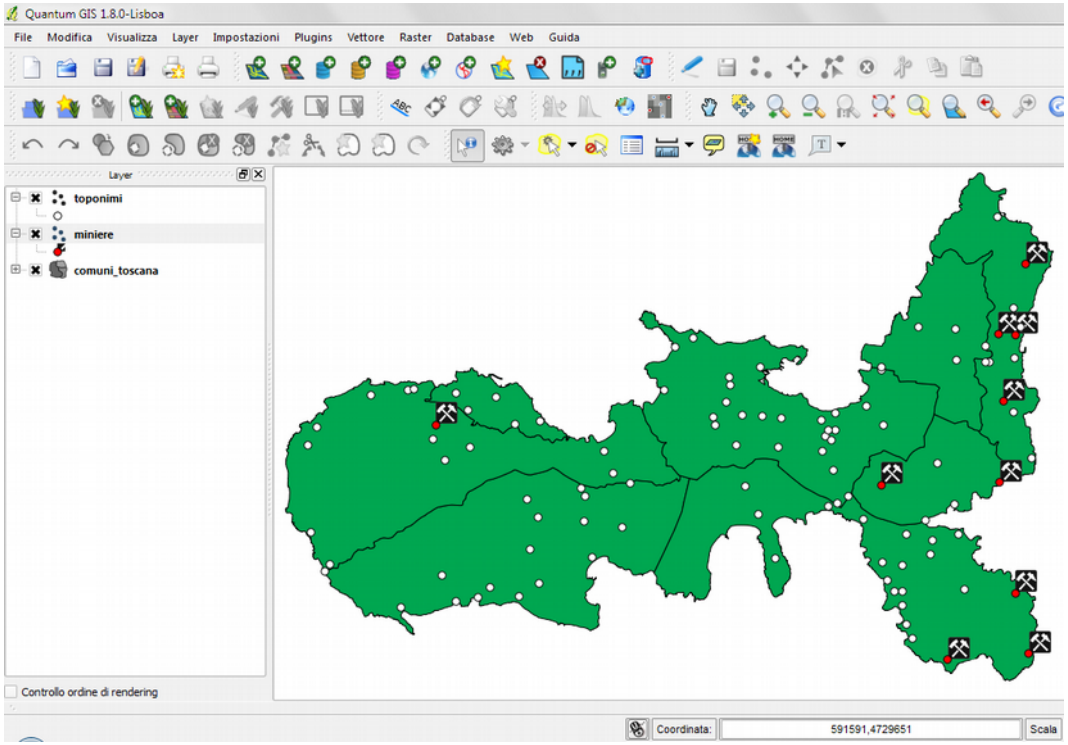
Portfolio | Added values

Mining sites & waste-rocks inventory

From the 80's, in the area of applied research projects in collaboration with AGIP Petroli and ISPRA, it started the collection of information about 3000 italian mining sites, with the objective of evaluating the size of the mining heritage, the chance of reuse of the abandoned sites, the conditions of geomechanical stability of the underground voids and of the mining waste disposals.

Today these information are stored in a geo-database with a modular structure easily extendable to other applications.





Portfolio | Publications

Bandini A., Berry P., Cormio C., Italiano M. An inventory of Italian mines heritage for environmental applications, mining and statistical analyses. Journal of Environmental Management

Bandini A., Berry P., Colaiori M., Cormio C., Lisardi A. Il franco di sicurezza nello scavo di gallerie. NIR 2013 – Note Interregionali di Ingegneria della sicurezza nello scavo di gallerie. Bologna 4 – 5 Luglio 2013

Bandini A., Berry P., Cormio C. Nascita ed evoluzione delle NIR. NIR 2013 – Note Interregionali di Ingegneria della sicurezza nello scavo di gallerie. Bologna 4 – 5 Luglio 2013

Alta Scuola – Scuola di Alta Specializzazione e Centro Studi per la Manutenzione e Conservazione dei Centri Storici in Territori Instabili. Ciclo di conferenze 2012, SAIE 2012, 19/10/2012. Gli effetti ambientali e paesaggistici delle cave e la riqualificazione del sito estrattivo. Presentazione.

Alta Scuola – Scuola di Alta Specializzazione e Centro Studi per la Manutenzione e Conservazione dei Centri Storici in Territori Instabili. Ciclo di conferenze 2012, SAIE 2012, 19/10/2012. Metodi di coltivazione efficienti , a basso impatto ambientale ed elevata sicurezza. Presentazione.

Bandini A, Berry P, Dacquino C (2009) Implementation of a database for risk assessment of abandoned Italian mining sites. Proceedings SWEMP2009. Banff (AL, Canada) 16-18 November 2009. Irvine: The Reading Matrix Inc., volume unico, p. 494-502, ISBN/ISSN: 978-0-9784416-0-9.

Berry P, Bandini A, Dacquino C (2011) Classificazione dei siti minerari sotterranei abbandonati mediante un indice di rischio statico strutturale. Recupero e Valorizzazione delle miniere dismesse: lo stato dell'arte in Italia. ISPRA, Quaderni, Ambiente e società n. 3/2011, p. 31-43, Roma: ISPRA - Settore Editoria, ISBN: 978-88-448-0478-7

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