

Geophysics for Mining Professionals

PROFESSIONAL CERTIFICATE



Geophysical Methods for Mining Investigations

Method	Sensitive to	Typical applications	Advantages
Seismic Refraction	Changes in strata type (soil, weathered rock, rock), rock quality (joined, weathered), elastic properties.	Rock interface, overburden mapping, rock quality, degree of weathering/jointing, faults, fracture mapping.	Excellent method for rippability assessment, stratigraphy.
Resistivity Imaging/Electrical Resistivity	Moisture content variations, conductivity, water table, porosity, chargeability.	Sulphides, some oxides, mapping of geological structures, groundwater, engineering and environment.	Excellent method for ore body mapping, and water table mapping.
Induced Polarisation	Polarizability / chargeability.	Sulphides, some oxides, particularly disseminated ores like porphyry copper deposits, ground water and environmental problems.	Excellent method for mineral exploration in case of disseminated ores.
Gravity Surveys	Changes in density of the material.	Mapping of ore bodies having significant difference in density compared to host material.	Excellent tool for chromite, manganese, barytes etc. Also used for buried channels, folds, faults etc.
Magnetic Surveys	Difference in magnetic properties of the material.	Mapping of ore bodies based on magnetic content in ore.	Excellent tool for iron ore mapping.
Seismic Reflection	Difference in acoustic impedance (velocity x density).	Detects interfaces, maps faults/fractures/water lenses/shear zones along tunnel routes.	Excellent tool for coal bed mapping.
Ground Penetrating Radar	Change in dielectric properties.	Detection of buried pipes and cables, with exact location and depth. Also used for inspection of concrete structures.	Avoids costly mistakes (foundation over pipe)/accidents/damage to utilities.
Marine (reflection, magnetics, refraction, sonar)	Changes in geological structure (reflection imaging), changes in material velocities (reflection and refraction), buried UXO or metal (magnetics), seabed imaging and sediment analysis (side scan sonar).	Pipeline routes, Horizontal Drilling, stratigraphy investigations, bedrock identification, paleo channel imaging, geohazard identification for dredging and port construction.	Provision of datasets between existing boreholes, limiting the requirement for intrusive testing (over water boreholes), cost reduction in construction planning.
Electro Magnetics	Conductivity.	Conductive ore body delineation, near surface applications for metallic items, ground water and salinity studies, environmental applications.	Easily transported, can be attached to aircraft and vehicles, excellent cost-effective tool.

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Learn and apply geophysical concepts, methods, and industry practices to deliver meaningful results and value to mining projects.

Gain a solid understanding of geophysical concepts to help you better prepare statement of works, obtain quotes, interpret geophysics reports and work with geophysicists.

Whether you're a design engineer or project manager, this detailed introduction to geophysics will enable you to understand, apply and harness geophysics for mining and infrastructure projects, as well as communicate confidently with other industry geophysicists.

Learn current methods and how to apply them; and explore an introduction into data interpretation with respect to their aim.

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