

Marios Leonardos

Mining & Geomechanical Consultant, MSc, PhD

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Summary

Strategic Planning - Mine Economics

See analysis on Page 3.

Slope stability in deep excavations:

- Development of procedures for increased accuracy in strength determination in multilayered slopes
- Sampling simplification procedures
- Stability Studies (approx. 1300 calculated profiles)
- Monitoring - Micro deformation and displacements measurement technics
- Kinematics of landslides
- Stability assessment,
- Early warning for impending failure and
- Failure counter-measures

Stability of waste materials depositions (dumps):

- Lignite mines waste materials strength testing and estimation
- Design of the dumps
- Operating practices for increased stability
- Settlements estimation
- Monitoring
- Failure counter-measures

Other topics of professional experience

- Copper tailing's dams rise design
- Leaching heaps stability (copper, nickel laterites)
- Outside mine waste dumps reclamation and productive use of the impoundment top surface (copper)
- Lignite ash dumps.
- Drilling and blasting design
- Blast vibrations and reduction measures
- Drilling parameters correlation to material strength and composition

Specialties: Electricity from coal and lignite

Experience

Self-employed

Mining & Geomechanical Consultant, MSc, PhD
July 2017 - Present
Greece

PPC S.A.

31 years 7 months

Senior Mining Expert

December 2014 - June 2017 (2 years 7 months)
Athens, Greece

Strategic Planning Manager / Mines

January 2007 - November 2014 (7 years 11 months)
Athens, Greece

Head in Geomechanics Dept / Mines

December 1985 - December 2006 (21 years 1 month)
Athens, Greece

LARCO GMMSA

Pit Manager, Planning & Design

December 1976 - November 1985 (9 years)

Larymna & Evia Mines

1982-1985 Section Head, Surface Operations with parallel tasks in the design of new Mines

1980-1982 Planning & Design Engineer, Investments, Mine Economics - Evia Mines

1977-79 Section Head, Ore Transportation - Crushing - Homogenization, EviaMines

1976-1977 Section Head, U/G mines of LARYMNA

Education

National Technical University of Athens

Doctor of Philosophy (PhD), Mining Geomechanics (2004)

Imperial College London

MSc, Rock Mechanics (1979 - 1980)

National Technical University of Athens

Diploma; Master of Science, Mining and Metallurgical Engineering (1970 - 1975)

Strategic Planning - Mine Economics

- ▶ Strategic and business plans
- ▶ Energy Balances, Lignite production and stripping ratios allocation to pits, detailed Budgets.
- ▶ Investments and feasibility studies for investments
- ▶ Expenses and Budget control
- ▶ Production and quality analysis and reporting
- ▶ Reassessment and annual revision of the lignite deposits reserves .
- ▶ Policymaking for mixtures of lignite (model connecting a mine with a power station) for the better functioning of the old power stations designed for depleted deposits.
- ▶ Monthly bulletin with the mines results, comprising:
 - Results of production, compared with the past and the current program
 - Costs (compared to past results and budget)
 - Cost per mine
 - P & L per mine
- ▶ Cost comparisons of continuous excavation systems with contractors operating trucks and shovels.
- ▶ System design and implementation of the contractors payment procedure based on distance and slope of transport road (work based on extensive computer simulations and data statistical processing).
- ▶ Establishment of electronic publishing and distribution of reports, presentations and results in a wide circle of recipients plus on-line“bookstore”.
- ▶ Compete redesign of cost centre codes for the new PPC ERP (based on SAP). The new codes are:
 - Short (4 instead of 10 digits of the old system)
 - Tree-like structure
 - Alphanumeric, so machinery standard naming is used.
 - Data use directly from warehouses instead of integrating information in code analysis.

Results:

- Simple and accurate cost center charging
- Ability to easily charge at the level of foreman
- Production costs two-dimensional (type of expenditure - work phase)
- Production machinery costing (cost per hour or per t or m³)
- Easy and plethora comparative costs between Mines
- Better budgeting

Papers in scientific journals and conferences

1. Leonardos M., "Vibration due to the excavation of rock with explosives", Mining and Metallurgical Chronicles (1984), pp. 61 - 64 (in Greek)
2. Kavvadas M., A. Anagnostopoulos, M. Leonardos and B Karras. "Mechanical properties of the Ptolemais lignite", Proc. Int. Symp. on Hard Soils - Soft Rocks, 1993, Athens, Greece, pp. 585-592
3. Leonardos M. & Terezopoulos N., "Determination of the occurrence time of the collapse of a landslide in rim slopes of deep lignite mines", Mineral Resources, 124 (2002), pp. 7 -18 (in Greek)
4. Leonardos M. & Terezopoulos N. "Rim slope failure mechanism in the Greek deep lignite mines - a case study", IMM Mining Technology, December 2003, vol. 112, no. 3, pp. 197-204 (8) Maney Publishing
5. Leonardos M. "Rim slopes failure mechanism, kinematics and remedial measures in the Greek deep lignite mines", Advances in Mineral Resources Management and Environmental Geotechnology, Hania 2004, Greece
6. Leonardos M. "Stability improvement measures for landslides in rim slopes of the deep Greek lignite mines", Mineral Resources (2004), 131 pp. 7 -18 (in Greek)
7. Leonardos M., "The importance of the residual shear strength of soil materials for the stability of the slopes of the mining projects", Mining and Metallurgical Annals, in December 2004, 14 pp. 61-79 (in Greek)
8. Leonardos M., "Introduction to the stability of the dumps of the mining and metallurgical industry", Mineral Wealth (2006) 135, p. 9 -18 (in Greek)
9. Leonardos M., "Pore water pressure changes and monitoring in the slopes of the mining projects", Mining and Metallurgical Annals, 2005, Volume 15, pp. 19-30 (in Greek)
10. Leonardos M., "The kinematics of landslides in regional slopes of deep Greek lignite mines", 5th National Geotechnical Conference, tee (2006), Volume 1, p. 253-257 (in Greek)
11. Leonardos M., "PPC Lignite Mines as a factor energy security for the country and the economic development in Western Macedonia" - Prospects, Future of the Treasures of Northern Greece, May 29, 2010, Thessaloniki (in Greek) <http://www.sme.gr/images/stories/PDF/imerida-thessaloniki-2010.pdf>, http://elladitsamas.blogspot.gr/2010/07/h_07.html
12. Leonardos M., "They nickel laterite Western Macedonia", - Prospects, Future of the Treasures of Northern Greece, May 29, 2010, Thessaloniki (in Greek)
13. Leonardos M., "Rim slopes failure mechanism, kinematics and remedial measures in the Greek deep lignite mines", MARIN 2011, 8-11 / 06/2011, Lazarevac, Serbia
14. Leonardos M., "Lignite Mines Dumps Stability - Principles And Case Studies From The Greek Lignite Mines", COAL 2011,18-23 / 10/2011, Zlatibor, Serbia
15. Leonardos M., "Is there any future for EU Energy Road Map 2050 ?", 6th International Conference on Sustainable Development in the Minerals Industry, 30 June - 3 July 2013, Milos island, Greece pp.401406 (in electronic form <http://elladitsamas.blogspot.gr/2013/08/is-there-any-future-for-eu-energy-road.html>)
16. Leonardos M., "Is the Greek lignite competitive?" - The Energy Planning of the country and the competitiveness of lignite in electricity production - SPARTAKOS Union, 11.11.2013, Athens (in Greek)
17. Leonardos M., "Rim slopes failure mechanism and kinematics in the Greek deep lignite mines", 12th International Symposium Continuous Surface Mining, Aachen, Germany, 21 - 24/9/2014
18. Leonardos M., "Fossil fuels after EU 2050 Roadmap and 2030 Package, Mineral Resources and Development Capabilities - Modern Perceptions ", Nicosia, Cyprus, 20-22 November 2014 (in Greek)
19. Leonardos M., "Strategy and planning of PPC on the role of lignite in Greek System Power", Green European Foundation and the Green Institute under SERIND Program ("Socio-ecological reindustrialisation"), Athens, December 6, 2014 (in Greek)
20. Leonardos M., "Fossil fuels after the EU Energy Road Map 2050 and 2030 Energy Package", 5th IF Mineral Resources in Greece, 24/4/2015, Athens
21. Leonardos M., "Solid fuels in the EU after the 2050 Roadmap for Energy and Energy Package 2030", Greek Republic, Region of Western Macedonia, Conference "Mining activity in Florina - present and future", Florina, 23/5/2015 (in Greek)
22. Leonardos M., "A view from Greece on the LCP BREF revision", EC-Euracoal, 11th Coal Dialogue, 8 July 2015, Centre Albert Borchette, Brussels, <https://euracoal.eu/events/ec-euracoal-coal-dialogue/11th/>
23. Leonardos M., "Greek Lignite under EU and Market Forces Pressure", IX International Brown Coal Mining Congress "BROWN COAL AS A SAFEGUARD OF ENERGY SECURITY", Belchatow, Poland, 11 - 13 April 2016
24. Leonardos M., "Lignite Mines Dumps Stability - Principles and Case Studies From the Greek Lignite Mines", 13th International Symposium Continuous Surface Mining, September 11 - 14, 2016, Belgrade, Serbia
24. Leonardos M., "Practical measures to improve slope stability for the Balkan lignite mines", 8th International Conference COAL, 11-14/10/2017, Zlatibor, Serbia,p.165-175

Business travel (except Conferences, Workshops)

<u>Year</u>	<u>Location</u>	<u>Company - Purpose</u>
1987	UK, Midlands,	Granite quarries and gravel, <i>Redland</i> . Trucks
1988	Greece, Fokida	<i>Parnassos Bauxite</i> . Vehicles for in situ preparation and charging of explosives
1988	Belarus	<i>Belaz</i> Factory. Heavy Duty Trucks
1988	Ukraine, Kryvyi Rih	Iron Ore Mining. Heavy Duty Trucks
1990	South France	<i>Carbonages de France</i> . Heavy Duty Trucks
1991	Greece, North Evia	<i>Fimisco</i> . Vehicles for in situ preparation and charging of explosives
1993	Greece, Zidani	<i>MABE</i> . Blast hole drills
1994	Germany, Cologne	<i>Rheinbraun</i> . Mine visit for geotechnical aspects
1994,5	Greece, Evinos Dam	Heavy Duty Trucks
1997	Germany, Cologne	<i>Rheinbraun</i> . Study of Vevi lignite mine
2001	Cyprus	<i>Hellenic Copper Mines LTD</i> , Skouriotissa Copper Project. New tailings pond site and layout
2002	Cyprus	Limni mines, waste dumps reclamation for the development of a housing area
18-21/3/2007	Kosova	<i>KEK</i> . Privatization of lignite mines - TPP (Thermal Power Plant)
14-20/5/2007	SW Australia	<i>Minara Resources</i> . Nickel extraction from lateritic deposits by sulfuric acid heap leaching
1-2/7/2008	Albania, Korce, Tirana	<i>PPC</i> lignite exploration
14-15/10/2008	Albania, Tirana	Meeting with members of the Government and the Geological Survey for lignite deposits
25-27/1/2009	Belgium, Brussels	EURACOAL Steering Committee
21-23/6/2009	Germany, Berlin	EURACOAL General Assembly
25-28/11/2009	Belgium, Brussels	Euracoal participation in Accidents in Mining Industry. EU Meeting
24-26/1/2010	Belgium, Brussels	EURACOAL Steering Committee
20-22/6/2010	Belgium, Brussels	EURACOAL General Assembly
27-30/6/2010	Kosova	<i>KEK</i> Privatization of Mines - TPP
14-17/9/2010	Kosova	<i>KEK</i> Privatization of Mines - TPP
23-25/1/2011	Belgium, Brussels	EURACOAL Steering Committee
23/3/2011	Korce, Albania	Market Research for importing to Greece lignite of high calorific value
15-16/3/2011	Belgium, Brussels	EURACOAL Participation in a EU Commission meeting on Energy Policy
10-11/6/2011	Serbia, Lazarevac	Visit to Tamnava field mine
18-21/6/2011	Spain, Madrid	EURACOAL General Assembly
23-26/10/2011	Germany, Berlin	Participation in the European Forum on Fossil Fuels
16-18/1/2012	Austria, Vienna	Privatization of Mines - TPP in Kosova (<i>KEK</i>)
22-24/1/2012	Belgium, Brussels	EURACOAL Steering Committee
15/5/2012	Czech rep., Slatinicka	Vrsany mine waste heap reclamation, visit of mine and the under construction lignite TPP
11.9/09/2012	Bulgaria, Stara Zagora	Visit (by invitation) to Maritsa lignite mines
10-12/10/2012	Germany, Berlin	Participation in the Meeting of the European Forum on Fossil Fuels
07.05/12/2012	Bulgaria, Sofia,	Meeting of the European research project "Locally underground coal gasification"
22-25/6/2013	Austria, Vienna	EURACOAL General Assembly
22-23/6/2014	Poland, Warsaw	EURACOAL General Assembly
24-25/3/2015	Belgium, Brussels	EURACOAL Energy Policy and Market Committees
17-19/1/2015	Belgium, Brussels	EURACOAL Steering Committee
20-23/6/2015	Hungary, Budapest	EURACOAL General Assembly
24/4/2016	Poland, Belchatow	Lignite mine visit
15/9/2016	Serbia, Lazarevac	Field "B" lignite mine. Proposal for the internal dump failure stabilization