SURELİ YAYINLAR

(İM H! I i l UN

APRIL 1997

37. Option pricing: A new approach to valuing mining projects.
M. Armstrong and A.Gal I i

45. A. comparative analysis of income-based taxes on mining
D. Gladwin, B.Konda, R. Lauer. and D.Camilucci

49. Potential problem analyses: A practical risk assessment technique for the mining industry
M.P. Davies

53. Sheerness - a new coal mine for Alberta
K. Haddock

57. Engineering design for a ferric chloride leaching plant to leach complex base metal sulphides
WM. Smith, P.J.,Books, and R.A. May

64. Essais de la diminution des rejets miniers par la separation du sterile en milieu dense
S.PIaneta

67. Rapid determination of corrosion rates of permanent-mold cast copper-base alloys
M. Elboujdaini and V. Sastri

MAY 1997

35. The role of environmental management in obtaining financing in the mining industry
Mary Ann E. Crichton and David G.C. Clarry

39. Synerude's tailings management practices from research to implementation
B.R. List and E.R.F Lord

45. Health, safety and mine environments research in the mining laboratories of CANMET, Natural Resources Canada
J.E. Udd and M.C. Betounay

52. Addressing Canada's mining legacy -
How government uses modern technology to evaluate and monitor long-term stability and land use in Canada's historic mining districts
'M.C. Betournay and J.E. Udd

58. Glassfill - An environmental alternative for waste glass ; disposal
E De .Souza. J.F Archibald and D. DeGagne

65. Experimental characterization of the noise generation mechanism of percussion drill rods
C. Lesage, R. Odo, Y. Champoux and N. Atalla

JUNE **1997**

81. The mineralogy, corrosion resistance, and properties of six commercial rebtfnded fused grain magnesite-ehrome bricks
C, Doyle, K. Cushnie. C. Diaz, J. Hrepic and J. Brennan

87. The effect of slag composition control on the performance of magnesite-ehrome refractory linings in top-blown rotary converters
G. Cuthbert, R. White, B. Martin. C. Doyle, J. Hrepic and C. Diaz

91. Extending the life of INMETCO's submerged are furnace lining
D.M. Hoffman, R.H. Hanewald, WJ. Koshut. C. Doyle, J. Hrepic and C.Diaz

96. Applications of microwave energy in extractive metallurgy: A review
D.K. Xia and C.A. Pickles

108. Airborne radar data: Utility for geological mapping in tropical environments, Serra Pelada, Para, Brazil
D.F Graham and J.S. Moretzsohn

114. Applications of GPS-based navigation systems on mobile mining equipment in open-pit mine
J Peck and C. Hendricks

JULY-AUGUST **1997**

63. Economics of wear and corrosion, in the mining industry
VS. Sastri and M. Elboujdaini

66. Material testing and evaluation for wear, application
W Pascheto and'N. Behnood

71. An overview of wear resistant alloys for the mining industry
B.Mc.Kee and JBC. Wu

75. Resisting wear attack in oil sands mining and processing
R. Llewellyn

83. Utilization of gold mill tailings as a secondary resource in the production of a high strength total tailings ,paste, fill
L.M. Amaratunga, G.G. Hein and D.N. Yaschyshyn

89. High-resolution magnetic anomaly maps from ERLIS compilation: An example from Kirkland Lake
S. Manning and W Morris

94. Investigation of an active noise control system to reduce the noise emitted by an industrial stack
A. L'Espérance, M. Bouchard, B. Paillard and J.-C. Dube.

SEPTEMBER 1997

45. Interaction between stress, mine geometry and rock mass behaviour at a Canadian shield mine
M.VV Grabinsky, J.H. Curran and WF Bawden

51. Determination of the strength of hard-rock mine pillars
PJ. Lunder and R.C. Pakalnis

56. Convergence behaviour - packing relations of full extraction gate roadways at OAL lignite mine
Y.S. tstanbulluoğlu and C. Karpuz

62. Characterization of rock mass oehaviour using mining induced microseismicity
C-l. Trifii and T.I. Urbancic

69. An experimental study of the interactions between liquid steel and a MgO-based tundish refractory
J.Lehmann, M. Boher and M.C. Kaerle

75. Integrated seismic reflection and borehole geophysical studies at Les Mines Selbaie, Quebec
G. Perron, B. Milkereit, L.E. Reed, M. 5alishury, L. E. Adam and J. Wu

83. Drill monitoring for geological mine planning in the Viscaria copper mine, Sweden
H. Schunnesson and K. Holme

lipi KNMIOWI MM lot i ^Wmm^t
HUH ISs|\.. ' ™- '• s'A

AUGUST 1997

127. Cyanidation of copper-gold ore
G. Deschenes and P.J.H. Prud'homme

143. The benefication of minerals by magnetic jigging, Part 1 .Theoretical aspects
I.J. Lin, M. Krush-Bram and G. Roserhouse

161. Sedimentation of homogeneous suspensions at intermediate particle Reynolds numbers
M.H. Abu-Ali..

177. Studies on selective flocculation of complex sulphides using cellulose xanthate
N.R. Mandre and D. Panigrahi

187. Pyrite recovery mechanisms in coal flotation
S.K. Kawatra and T.C. Eisele

203. Growth and attachment of Thiobacillus ferrooxidans during sulfide mineral leaching
Y.R.K. Mirajkar, K.A. Natarajan and P. Somasundaran

211. The behaviour of silica in gold cyanide solutions
• F.W. Petersen and J.S.J. Van Deventer

SEPTEMBER 1997

227. Interaction of thionocarbamate and thiourea collectors with sulphide minerals: a flotation and adsorption study
G. Fairthorne, D. Fornasiero and J. Ralston.

243. Effect of hydrolysed aluminum(III) and chromium(III) cations on the lipophilicity of talc
E. Kusaka, N. Arnano and Y. Nakahiro

255. Batch and semi-continuous tests in the bioleaching of manganiferous minerals by heterotrophic mixed microorganisms
F. Vegliö, F. Beolchini, A. Gasbarro. L. Toro, S. Ubaldini and C. Abbruzzese

275. Flotation of oxidized minerals of copper using a new synthetic chelating reagent as collector
M. Barbara, R. Herrera Urbina. C. Cozza, D. Fuerstenau and A. Marabini

289. A lumped discrete population balance model for shear flocculation-model development
D.P. Patil, J.R.G. Andrews : and P.H.T. Uhlherr

307. Value addition of paper coating grade kaolins by the removal of ultrafine coloring impurities
P. Raghavan. S. Chandrasekhar and A.D. Damodaran

INTERNATIONAL JOURNAL GF ROCK MECHANICS AND MINING SCIENCES

APRIL/JUNE 1997

347. On the rate of frictional healing and the constitutive law for time- and slip-dependent friction
C. Marone

348. Scaling properties of faults and their populations
C H.Scholz

349. Modelling of earthquake fault by a new computer controlled direct-shear apparatus
D. Sari, A. G. Paşamehmetoğlu and T. Bozdağ

350. Strain localization in Fontainebleau sandstone: Macroscopic and microscopic investigations
A. Haied and D. Kondo

351. Predicting fracture localization in folded strata from mechanical stratigraphy and fold shape: Case study of East Kaibab Monocline, Utah
M. L. Cooke

352. The mechanism of 3D crack growth in compression: The role of non-singular terms
E. Sahouryeh and A. V. Dyskin

355. Determination and prediction of thermodynamically controlled microfracture zones in organic matter-rich rocks
Y. Luo and M. B. Dusseault

356. A comparison between random mesh schemes and explicit growth rules for rock fracture simulation
J. A. L. Napier and T. Dede

357. Testing a thermal-stress origin of fractures in a pluton
S. J. Martel and S. Bergbauer

358. High resolution CAT imaging of fractures in consolidated materials
A. A. Keller

359. Mapping fracture aperture as a function of normal stress using a combination of casting, image analysis and modeling techniques
S. S. Gentier and D. L. Hopkins

360. Object-oriented analysis of network flows at pore and reservoir scales
G. Yang and L. R. Myer

363. Micromechanical modeling of sand production and arching effects around a cavity
A- Dorfmann, L. Rothenburg and M S. Bruno

364. The influence of swelling clays on the deformation of mudrocks
D. L. Olgaard, J. Urai, L. N. Dell'Angelo, R. Nüesch and G. Ingram

365. New method for true-triaxial rock testing
W. R. Wawersik, L. W. Carlson, D. J. Holcomb and R. J. Williams

366. The coalescence of frictional cracks and the shear zone formation in brittle solids under compressive stresses
R. H. C. Wong and K. T. Chau

367. An elasto-plastic constitutive model for brittle-ductile transition in porous rocks
K. R. Shah

368. Statistical characterization of the three-dimensional microgeometry of porous media and correlation with macroscopic transport properties
J. T. Fredrich and W. B. Lindquist

371. Damage accumulation during triaxial creep of Darley Dale sandstone from pore volumometiy and acoustic,emission
P. Baud and P. G. Meredith

372. Shear-enhanced compaction in sandstone under nominally dry and water-saturated conditions
W. Zhu and T.-F. Wong

373. Discrete element modeling of sand production
R. M. O'Connor, J. R. Torczynski, D. S. Preece, J. T. Klosek and J. R. Williams

374. Microstructural analysis of a uniaxially deformed sandstone-evidence of intergranular microcrack growth
B. J. Pestman and J. G. van Munster

375. The observations of faulting in Westerly granite under triaxial compression by X-ray CT scan
H. Kawakata, A. Cho, T. Yanagidani and M. Shimada

376. Compressive failure of rocks
V. Gupta and J. S. Bergström

379. Experimental characterization of the nonlinear rheology of rock
G. N. Boitnott

380. Time-dependent compressive failure around an opening
T. M. Tharp

381. Time-dependent effects on the tensile strength of saturated granite at Three Gorges Project in China
J. Sun and Y. Y. Hu

382. Creep and static fatigue of welded tuff from Yucca Mountain, Nevada
R. J. Martin, J. S. Noel, P. J. Boyd and R. H. Pricei

383. Temperature effects on creep of tuff and its time-dependent damage analysis
C. Yang and J. J. K. Daemen

385. Time dependent continuous damage model for deformation and failure of brittle rock
J. F. Shao, G. Duveau, N. Hoteit, M. Sibai and M. Bart

389. Scale effects in natural fracture networks
C. Castaing, A. Genter, J. P. Chiles, B. Bourgine and G. Ouillon

390. Flow compartmentalization and effective permeability in 3D fractal fracture networks
P. R. La Pointe

391. Natural fracture pattern characterization using a mechanically-based model constrained by geologic data-moving closer to a predictive tool
J. E. Olson

392. Requirements for accurate quantification of self affine roughness using the roughness-length method
P. H. S. W. Kulatilake and J. Urn

394. Fractals for fragmentations and unfolding functions
D. S Young

395. Fractal analysis of shear joint roughness
T. Belem, F. Homand-Etienne and M. Souley

399. Stress dependent wave velocities in sedimentary rock cores: Why and why not?
R. M. Holt, A.-K. Furre and P. Horsrud

400. Frequency-dependent seismic anisotropy in fractured rock
W. Yi, K. T. Nihei, J. W, Rector, S. Nakagawa, L. R. Myer and N. G. W. Cook.

401. Determination of rock elastic properties from acoustic measurements of rock fragments
R. Suârez-Rivera, S. Nakagawa and L. R. Myer

402. Anelasticity and dispersion in dry unconsolidated sands
C. Chang, D. Moos and M. D. Zoback

403. Compressional wave anisotropy in fractured rock
L. J. Pyrak-Nolte and M. Kowalsky

404. Influence of cementation and permeability on wave velocities in poorly consolidated sands
A. N. Tutuncu, J. Dvorkin and A. Nur

405. Laboratory tests on artificial rocks with controlled crack parameters
E. Fjaer

409. Diagenêtic controls on ftaetw&p«wieability and sealing
R. Marrett and S. E. Laubach

410. Borehole sampling of fracture populations-compensating for borehole sampling bias in crystalline bedrock aquifers, Mirror Lake, Grafton County, New Hampshire
G. D. McDonald, F. L. Paillet, C. C. Barton and C. D. Johnson

411. Hydraulic field measurements of incompletely closed fractures in granite
J. Rutqvist, C.-F. Tsang and O. Stephansson

412. Anisotropy of flow in a fracture undergoing shear and its relationship to the direction of shearing and injection pressure
S. Gentier, E. Lamontagne, G. Archambault and J. Riss

413. Experimental study of monophasic permeability changes under various stress paths
F. M. R. Ferfera, J. P. Sarda, M. Bouteca and O. Vincke

414. In situ stress and fracture permeability along the Stillwater fault zone, Dixie Valley, Nevada
S. H. Hickman, C. A. Barton, M. D. Zoback, R. Morin, J. Sass and R. Benoit

417. Constraining the full stress tensor from observations of drilling-induced tensile fractures and leak-off tests: Application to borehole stability and sand production on the Norwegian margin
D. Wiprut, M. Zoback, T.-H. Hanssen and P. Peska

418. Guidelines for efficient wellbore stability analysis
X. Chen, C. P. Tan and C. M. Haberfield

419. Modeling wellbore breakouts
D. Elata

420. Acoustic detection of stress-induced effects arou..d a borehole
T. J. Plona, K. Winkler, R. D'Angelo, B. Sinha, P. Papanastasiou and J. M. Cook

421. Applications of time-dependent pseudo-3D stress analysis in evaluating wellbore stability
Y. Abousleiman, L. Cui, S. Ekbote, M Zaman, J.-C. Roegiers and A. H.-D. Cheng

423. Reservoir depletion and its effect on wellbore stability evaluation
M. A. Addis

424. A finite element poro-inelastic analysis of borehole problems
G. Xu, Q. Guo, Z. Zheng, J.- McLennan and S. Green

427. Evaluation of hydromechanical coupling in a granite rock mass from a high-volume, high-pressure injection experiment: Le Mayet de Montagne, France
F. H. Comet and R. H. Morin

428. Numerical modelling of the hydro-mechanical behaviour of fractured rock masses
Q. H. Liao and S. R. Hencher

429. Coupled HTM modelling of cold water injection in fractured hydrocarbon reservoirs
M. Gutierrez and A. Makurat

430. A poroelastic solution of the oscillating pore pressure method to measure permeabilities of "tight" rocks
J. 1. Adachi and E. Detournay

431. A coupled elastoplastic hydraulic fracturing model
P. C. Papanastasiou

432. Effect of confining pressure, pore pressure and specimen dimension on permeability of Yinzhuang sandstone
Li Shi-Ping, Wu Da-Xin, Xie Wei-Hong, Li Yu-Shou, Wu Zhen-Ye, Zhou Gang and Zhao Hai-Yun

435. Deep hydraulic fracture imaging Recent advances in tiltmeter technologies
D. Castillo, S. Hunter, P. Harben, C. Wright, R. Conant and E. Davis

436. Tiltmeter data inversion with continuous, non-uniform opening distributions; A new method for detecting hydraulic fracture geometry
J. E.Olson, Y. Du and J. Du

437. Can hydraulic fracture-induced microearthquakes show where the fluid went?
L. House, W. S. Phillips, M. Fehler and J. Rutledge

438. Evaluation of a downhole tiltmeter array for monitoring hydraulic fractures
N. R. Warpinski, P. T. Branagan, B. P. Engler, R. Wilmer and S. L. Wolhart

439. Experimental study of the impact of plastic rock deformation on hydraulic fracture geometry
D. B. van Dam, C. J. de Pater and R. Romijn

440. Formation mechanical property characterization for engineering and earth science modeling applications using'the Rock Mechanics Algorithm (RMA)
H. Goodman

445. The effects of thermal deformation on flow in a jointed geothermal reservoir
D. Swenson and B. Hardeman

446. Numerical modeling of stress-dependent permeability
M. Bai, F. Meng, D. Elsworth, Z. Zaman and J.-C. Roegiers

447. Simulation of capillary pressure hysteresis in drainage and imbibition process
P. Huang, G. Yang, L. Myen, N. Cook and P. Witherspoon

448. An attempt to simulate fracture systems from well data in reservoirs
A. Genter, C. Castaing, B. Bourgine and J. P. Chiles

449. Continuous and discontinuous deformations above a compacting reservoir: Consequences upon the lateral extension of the subsidence bowl
M. Brignoli, A. Pellegrino, F, J. Santarelli, G. Musso and G. Barla

450. Application of poroelasticity theory in subsidence prediction
H. Zhang, M. Bai, Y. Abousleiman and J.-C. Roegiers

451. Field observations and analytical modeling of fracture network permeability in hydrocarbon reservoirs

R. L. Bruhn, D. Bering, S. R. Bereskin, C. Magnus and A. Fritsen

455. The activity concept applied to shales: Consequences for oil, tunnelling and civil engineering oaerations
S. Carminati, M. Brignoli, A. Di Marco and F. J. Santarelli

456. The settlement and degradation of nondurable shales associated with coal mine waste embankments
D. M. Pappas and L. E. Vallejo

457. Shale reactivity test: A novel approach to evaluate shale fluid interaction
H. Santos, A. Diek, S. Da Fontoura and J.-C. Roegiers

458. Specially designed techniques for conducting consolidated undrained triaxial tesis on low permeability shales
B. Wu, C. P. Tan and T. Aoki

459. Experimental investigation on the influence of temperature on the mechanical properties of reservoir rocks
R. G. S. Araiijo, J. L. A. O. Sousa and M. Bloch

460. Failure mechanism in schistose rocks
M. H. Nasseri, K. S. Rao and T. Ramsmurthy

463. Hydrodynamic erosion: A potential mechanism of sand production in weak sandstones
A. Skjaerstein, M. Stavropoulou, I. Vardoulakis and J. Tronvoll

464. Flow geometry effects on sand production from an oil producing perforation cavity
T. E. Unander, E. Papamichos,
J. Tronvoll and A. Skjaerstein

465. Sand production: Mechanical failure or hydrodynamic erosion?
J. Tronvoll, A. Skjaerstein and E. Papamichos

466. Physical modelling of sand production
H. H. Vaziri, R. Phillips and S. Hurley

467. An investigation of mechanical, acoustic and failure properties in unconsolidated sands
A. L. Mese and A. N. Tutunca

468. A field demonstration of hydraulic fracturing for solids waste disposal-injection pressure analysis
X. Weng, A. Settari and R. G. Keck

471. Hydraulic fracture with multiple segments I. Observations and model formulation
L. N. Germanovich, D. K. Astakhov, M. J. Mayerhofer, J. Shlyapobersky and L. M. Ring

472. Hydraulic fracture with multiple segments II. Effect of interaction
L. N. Germanovich, L. Ring, D. K. Astakhov, J. Shlyapobersky and M. M. J. Mayerhofer

473. A new approach to fracturing test interpretation using the PKN model
O. P. Alekseenko, A. M. Vaisman and A. F. Zazovsky

474. Hydraulic fracturing simulation in parallel computing environments •
K. R. Shah, B. J. Carter and A. R Jngraftea

475. A quasi-analytical model for three-dimensional analysis of hydraulic fracture propagation in reservoir rocks
J. E. L. Garcia and J. *b. A.* O. Sousa

476. Rate sensitivity of fracture trajectory
A. Chudnovsky, J. Ma, E. Ivanova, Yu Shulkin and J. Shlyapobersky

478. Effects of packer on hydraulic fractures initiated from highly-deviated and horizontal boreholes
X. Li, C. P. Tan and J.j-C. Roegiers

481. Thermal-mechanical-hydrologjeal-chemical responses in the Single Heater Test at the ESF
W. Lin, S. Blair, M. Buettner, T. Buscheck, W. Daily, G. Gdowski, W. Glassley, K. Lee, A. Ramirez, D. Ruddle, J. Roberts, S. Trettenero, D. Watwood and R. Carlson

482. X-ray radiography of fracture flow and matrix imbibition in Topopah Spring tuff under a thermal gradient
J. J. Roberts and W. Lin

483. Preliminary thermomechanical results of a heater test in welded tuff
R. E. Finley, S. R. Sobolik, N. D. Francis, S. Ballard, J. T. George and L. S. Costitj

484. Effect of seismic load on a proposed nuclear waste repository at Yucca Mountain "
M. P. Ahola and A. H. Chowdhury

485. Thermal expansion, thermal conductivity, and heat capacity measurements at Yucca Mountain, Nevada
N. S. Brodsky, M. Riggins J. Corinofly

486. Dual-porosity analysis of conservative tracer testing in saturated volcanic rocks at Yucca Mountain in NYE County, Nevada
M. F. Fahy

489. Uncertainties in earthquake magnitudes from surface fault displacement based on finite element modeling
G. I. Ofoegbu, D. A. Ferrill, K. J. Smart and J. A. Stamatakos

490. Numerical studies of groundwater flow, grouting and solute transport in jointed rock mass
H. K. Moon and M. K. Song

491. A study on experimental modal analysis for seismic response assessment of underground facilities
Xiaoqing Sun and J. Philip

492. Reconsolidating salt; Compaction, constitutive modeling and physical processes
F. D. Hansen

493. Prediction of long-term closure and stability of underground workings in the Waste Isolation Pilot Plant
" H. Maleki and L. Chaturvedi

494. An in situ test on near field of waste repositories. Experimentation, results and interpretation
Y. Kazan and M. Ghoreychi

497. Complete stress determination with the HTPF tool in a mountainous region
F. H. Cornet, Y. Wileveau, B. Bert and J. Darcy

498. Polyaxial strength criteria and their use in estimating in situ stress magnitudes from borehole breakout dimensions
I. Song and B.C. Haimson

499. Two methods for hydraulic fracturing stress measurements without the ambiguous reopening pressure
T. Ito, A. Sato and K. Hayashi

500. Hydraulic fracturing stress measurement using a true triaxial apparatus
M. Sibai, J. P. Henry and J. C. Gros

501. Estimation of initial stress by deformation rate analysis (DRA)
M. Utagawa, M. Seto and K. Katsuyaina

502. Numerical modeling of borehole pressurization
M. Frydman, S. Da Fontoura

505. Effects of joint attributes on tunnel stability
M. R. Yeung and L. L. Leong

506. DEM modelling of laboratory tests of block toppling
F. Lanaro, L. Jing, O. Stephansson and O. Barla

508. Consideration of secondary blocks in key-block analysis
J. L. Wibowo

509. A two-dimensional displacement discontinuity method for multi-layered elastic media
Keh-Jian Shou

510. Limit analysis of 2-D tunnel keyblocks
M. Mauidon, K. C. Chou and Y. Wu

511. Stochastic block theory for initial support decision of large slope
Y. Mito, K. Kikuchi, I. Hirano and T. Sàdahiro

515. New back analysis method of slope stability by using and field measurements
Y. Okui, A. Tokunaga, M. Shinji S. Mori

516. Stability analysis of rock slopes with the direct sliding blocks method
O. Nawari, R. Hartmann and R. Lackner

517. A two-stage system for highway rock slope risk assessment
P. McMillan and G. D. Matheson

518. Evaluation of previous remedial construction along the Duquesne Bluff
J. W. Kovacs and W. R. Adams, Jr

519. A study of the mechanism of slope failure at Toyohama tunnel, 10 February 1996
•Y. Ishijima and Y. Fujii

520. Mine slope stability analysis by coupled finite element modeling
W. G. Pariseau, S. C. Schmelter and A. K. Sheik

523. Study on new formulation of shear strength for irregula rock joints
H. Kusumi, K. Teraoka and K. Nishida

525. The evolution of void spaces (permeability) in relation with rock joint shear behavior
G. Archambault, S. Gentier, J. Riss and R. Flamand

526. Variations in contact areas of rock joint surfaces as a function of scale
F. Re, C. Scavia and A. Zaninetti

527. Rolling friction and shear behaviour of rock discontinuities filled with sand
J. P. Pereira

528. Relationship between grain size and some surface roughness parameters of rock joints
K. K. Kabeya and T. F. H. Legge

529. The structure of various scale natural rock discontinuities and their deformation properties. Preliminary results
G. G. Kocharyan, V. N. Kostyuchenko and D. V. Pavlov

533. Numerical analysis of an extended arrangement of periodic discrete fractures
M. W. Grabinsky and F. F. Kamaleddine

534. Experimental study of shear behavior of rock joints under constant normal stiffness conditions
B. Indraratna and A. Haque

535. Automated tracing of rock mass discontinuities from digital images
T. R. Reid and J. P. Harrison

536. Studied under physical modeling at 1 -g
K.Bakhtar

537. Sheared rock Joints: Dependence of damage zones on morphological anisotropy
J. Riss, S. Gentier, G. Archambault and R. Flamand

538. A theoretical approach for estimating the surface area of a rough-walled fracture from well logging dafa
S. Akibayashi, K. Sasaki, F. Sugimotö, S. Yamaguchi, J. Yamatomi and K. Kim

539. Deformation and velocity measurements at elevated temperature in a fractured 0.5 m block of tuff
S. C. Blair and P. A. Berge

543. Mechanical characterization of pink Lac du Bonnet granite: Evidence of nonlinearity and anisotropy
B. Duevel and B. Haimson

544. Tensile test using hollow cylindrical specimen
M. Ohoka, A. Funato and Y. Takahashi

545. Characterization of the geotechnical properties of rock material for construction purposes
Ir. A. R. G. Van De Wall and J. S. Ajalu

546. Development of a numerical tool for the treatment of the data supplied by compression tests
J. P. Tshibangu Katshidikaya

547. CMS (Constant Mean Stress) vs UCS (Unconfmed Strength) tests: A tool to reduce core damage effect
C. J. Renter, M. Brignoli and R. M. Holt

548. Measurements of effective elastic modulus and microcrack density
F. C. S. Carvalho, Chee-Nan Chen and J. F. Labuz

551. Adaptive simulation of fracture processes based on spatial enumeration techniques
T. D. P. De Araüjo, J. B. Cavalcaıte Neto, M. T. M. De Carvalho, T. N. Bittencourt and L. F. Martha

552. Numerical simulation of fracturing in concrete structures using a combination of smeared and discrete approaches
R. A. Einsfeld, A. E. Elwi, T. N. Bittencourt and L. F. Martha

553. Condition insensitive damage indicator for brittle rock
Y. Fujii, T. Kiyama and Y. Ishijima

554. A damage initiation criterion for low porosity rocks
M. Aubertin and R. Simon

555. Interaction between water and eocene limestone
C. Tanimoto, K. Kishida, E. Onuma and K. Mori

556. Analysis of mudstone deterioration and its effect on tunnel performance
N. Yoshida, M. Nishi, M. Kitamura and T. Adachi

557. Damage initiation through extension fracturing in a moderately jointed brittle rock mass
L. A. M. Castro, M. W. Grabinsky and D. R. McCreath

561. Evaluation of formation damage from a constant-head borehole test
L. Zhang and M. B. Dusseault

562. Analysis of heterogeneously connected rock masses by forward modeling of fractional dimension flow behavior
W. Dershowitz and T. Doe

563. In situ study of fluid flow through the discontinuities by liquid tracer test
Y. Ikegawa, K. Nakagawa and T. Shiclahara

564. Permeability evaluation of jointed rock masses using high viscosity fluid tests
Y. Yamaguchi, H. Shibuichi and N. Matsumoto

565. Simulation of heterogeneous flow in a natural fracture under varying normal stress
A. P. Niemi, T. A. Vaittinen, J. A. Vuopio and J. P. Pölla

566. Analytical evaluation of post-excavation hydraulic conductivity field around a tunnel
J. Liu, D. Elsworth and B. H. Brady

569. Excavation analysis of a large-scale underground power house cavern by micromechanics-based continuum model of jointed rock mass
H. Yoshida and H. Horii

570. Back analysis of non-elastic .strains within a discontinuous rock mass around a large underground power house cavern
A. Hojo, M. Nakamura, S. Sakurai anıl S. Akutagawa

571. A new design for a large cavern in the Alps
A. R. Fava and A. Ricca

572. Design criteria for the Brooklyn union gas storage caverns at JFK airport, New York
U. E. Lindblom

573. Stress and deformation behaviour of oil storage caverns during excavation
Y. N. Lee, Y. H. Şuh, D. Y. Kim and K. S. Jue

574. Influence of the leaching phase on the mechanical behavior of salt caverns
P. Berest, J. Couteau and B. Brouard

577. Integrated structural geology and engineering rock mechanics approach to site characterization
J. A. Hudson and J. W. Cosgrove

578. Block theory techniques used in arch dam foundations stability analysis
J. T. Kottenstette

579. Foundation studies for Theodore Roosevelt Dam
G. A. Scott

580. Design aspects of the underground structures of the Serra da Mesa hydroelectric power plant
J. A. Mello Franco, A. P. Assis. W. J. Mansur, J. C. F. Telles and A. F. Santiago

581. Possibility of reservoir induced seismicity round Three Gorges dam on Yangtze River
Fangquan Li and Bochong Zhang

582. Application of nondestructive evaluation techniques on concrete dams
F. P. Hassani, P. Guevremont, M. Momayez, A. Sadri and K. Saleh

585. On the stability of tunnels under gravity loading, with post-peak softening of the ground '
C. Carranza-Torres and C. Fairhurst

586. Assessment of geological overbreak for tunnel design and contractual claims
M. A. Mahtab, K. Rossler, G. S. Kalamaras and P. Grasso

587. Predicted behavior of a subway station in weathered rock
R. Kochen and J. C. O. Andrade

588. A computer-based system for supporting decisions for tunneling in rock under conditions of uncertainty
G. S. Kalamaras

589. Design and construction of Washington Park Station, Westside Light Rail Project, Portland, Oregon
P. M. Rice

590. Numerical simulation of fiber reinforced shotcrete in a tunnel using the discrete element method
P. Chryssanthakis, N. Barton, L. Lorig and M. Christiansen

593. Pressure sensitive grouting (PSG) using an artificial neural network combined with fuzzy logic
A. H. Zettler, R. Poisel, I. Reichl and G. Stadler

594. In situ experimental studies on improvement of rock masses by grouting treatment
K. Kikuchi, T. Igari, Y. Mito and S. Utsuki

595. Development of a polyester-based pumpable grout
J. C. Zelanko and M. G. Karfakis

596. Dynamic compaction properties of bentonite
C. Ran, J. J. K. Daemen, M. D. Schuhen and F. D. Hansen

597. Hydraulic fracturing of soil as an analogue to rock behaviour
A. C. Reed and M. B. Dusseault

601. Relationship between research on dam construction and public acceptance in Japan
K. Amemiya

602. Early rock mechanics/rock engineering education in the United States
D. Banks

603. Rock mechanics and the internet
J. A. Hudson and J. L. Hudson

607. Case history-excavation of the Brooklyn Tunnel
E. M. Schnock

608. Microstructural study of tonalitic gneisses exposed by TBM-mining of New York city's third water tunnel
S. C. Chesman, J. C. Steiner and L. Isaacs

609. Record TBM performance documents improved tunneling technology in Nevada at River Mountains Tunnel No. 2
K. Nishioka, R. A. Tudor, D.P. O' Connor, W. McCormick and E. Gilmore

610. Laboratory investigation into ripping
M. R. Jafari and G. Mostyn

611. Study on interaction between rocks and worn PDC's cutter
H. Geoffroy and D. Nguyen Minh

612. The mechanics of diamond core drilling of rocks
S. L. Huang and Z. W. Wang

613. Numerical modeling of normal wedge indentation in rocks with lateral confinement
H. Huang, B. Damjanac and E. Detoumay

617. A new reflective optical extensometer (ROX) system for geomechanical deformation measurements
S. C. Blair, D. Sweider, S. Trettenero and C. Boro

618. Time domain reflectometry (TDR): A comparison of field data to laboratory shear tests
C. T. Aimone-Martin and J. L. Francke

619. TDR monitoring as a component of subsidence risk assessment
K. M. O'Connor and E. W. Murphy

620. Two dimensional source location system for rock fall detection by using cable sensor and mobile multimedia network
M. Ujihira, K. Ogawa, S. Suzuki, S. Hosoya, H. Saeki and M. Komazaki

621. Integrated monitoring and modelling of ground subsidence in potash mines
A. Chrzanowski, C. Monahan, B. Roulston and A. Szostak-Chrzanowski

622. Ten years of continuous monitoring in a mining panel
E. De Souza, P. ottahed, A. Coode and B. Sellers

625. Enhancement of taconite crushing and grinding through primary blasting
K. Nielsen and C. Lownds

626. Gas pressurisation of blast-induced conical cracks
A. Daehnke, H. P. Rossmanith and A. L. Napier

627. Post-blast bench block stability assessment
H- P. Rossmanith and K. Uenishi

628 Influence of stope geometry and blasting patterns on recorded overbreak
P. Germain and J. Hadjigeorgioii

629. A study on the behavior of rock mass subjected to blasting using modified distinct element method
M. K. Kim, S. E. Kim, K. H. Oh and W, J, Kim

630. Effects of the geological parameters on rock blasting using the Hopkinson split bar
B. Bohloli

633. Changes in acoustic event properties with progressive fracture damage
E. Eberhardt, D. Stead, B. Stimpson and R. S. Read

634. Broadband acoustic emission observations during fracture propagation in rock-like material
M. M. Arasteh, A. Chudnovsky. J. W. Dudley II, S. Glaser and J. Ma

635. Laboratory study of acoustic emission and particle size distribution during rotary cutting
H. W. Shen, H. R. Hardy, Jr and A. W. Khair

637. Comparison of least squares and absolute value methods in AE/MS source location: A case study
M.Ge

638. In situ stress determination by acoustic emission technique
M. Seto, M. Utagawa, K. Katsuyama D. K. Nag and V. S. Vutukuri

639. Evaluation of reservoir crack based on equivalent effect of scattering waves due to crack-propagation
S.Han

643. Geotechnical studies associated with decommissioning the strategic petroleum reserve facility at Weeks Island, Louisiana: A case history
S. J. Bauer, B. L. Ehgartner and J. T. Neal

644. Detroit salt mine closure design
N. A. J. Bond and N. Uddin

645. Investigating fault slip in a model of ah underground gps storage facility
A. C. G. Nagelhout and J. P. A. Roest

646. Rock mechanical design of storage Caverns for natural gas in rock salt mass
K. Staudtmeister and R. B. Rokahr

647. Rock mechanics for gas storage in bedded salt caverns
J. A. Istvan, L. J. Evans, J. H. Weber and C, Devine

648. Conduct and interpretation of gas permeabiljty measurements in rock salt
J. C. Stormont

651. Development of a fiber optic stress senjsor
K. A. Heasley, H. Dubaniewicz and M. D. l)imartino

652. In situ ground stresses in the Canadian hardrock mines,: An update
B. Arjang and G. Herget

653. Relative stress conditions in an underground pillar, Homestake Mine, Lead, SD
D. F. Scott, T. J. Williams, M. J. Friedel and D. K. Denton

654. Laboratory investigation of core-based stress measurement using synthetic sandstone
D. F. Wang, N. Yassir, J. Enever and P. Davies

655. Damage mechanics around a tunnel due to incremental ground pressure
V. V. Nazimko, S. S. Peng, A. Lapteev, S. Alexandrov and V. Sazhnev

656. Characterization of in situ stress conditions at depth Homestake Mine, Lead, South Dakota
J. M. Girard, R. W. McKibbin, J. B. Seymour and F. M. Jones

657. Rock mass self-supporting effect utilization for enhancement stability of a tunnel
V, V. Nazimko, A. A. Lapteev and V. P. Sazhnev

661. Realizing the potential of accurate and realistic fracture modeling in mining
T. Kleine, P. La Pointe and B. Forsyth

662. Study of dynamic properties of rocks around an underground opening using seismic inverse techniques
C. X. Wu and M. B. Dusseault

663 Geomechanical study for the exploitation of an underground marble quarry
M. Cravero and G. labichino

664. Stability . evaluation of extended cut mining. in underground coal mines
E. R. Bauer, G. J. Chekan and L. J. Steiner

665. Probabilistic analysis of underground excavation stability
Gang Chen, Zhihong Jia and Jinchuan Ke

666. Structural effects on the strength of New Zealand coal
J. D. St George

669. Laboratory evaluation of a new cable bolt tension measuring device
M. Chekirèd, B. Benmokrane and H. S. Mitri

670. A case study of undermining impoundment embankments by the longwall mining method
D. S. Choi, G. J. Hasenfus and P. S. Carter

671. Characterization of strata behaviour around mine road-ways ,
I. Özkan, E. Ünal and G. Cakmakci

673. Progressive failure analysis of highwalls in oil sand mines
M. Mathioudakis, N. R. Morgenstern and D. H. Chan

674. Room-and-pillar stope design in highly fractured area
H. Bogert, S. J. Jung and H. W. Lim

675. Closed intelligent system for optimal support design of underground excavations
Y. M. Lin, L. Wang and X. T. Feng

679. Stratigraphie subunits and control of ground in the Revett Formation, Coeur d'Alêne mining district, Idaho
J. K. Whyatt and B. G. White

680. The use of a multipole expansion technique to analyse large scale fracture processes and seismic recurrence effects in deep level mines
J. A. L. Napier and A. P. Peirce

681. Integrated seismicity around deep-level stopes in South Africa
A. M. Milev and S. M. Spottiswoode

682. A model of mining-induced fault sliding
A. N. Galybin

683. Mieroseismicity induced by a controlled, mine collapse at White Pine, Michigan
W. S. Phillips, D. C. Pearson, C. L. Edwards and B. W. Stump

684. Progressive failure of hanging wall and footwall Kiirunavaara Mine, Sweden
J. F. Lupo

687. Numerical examination of empirical rock-mass classification systems
K. L. Holland and L. J. Lorig

688. Strength and deformation characteristics of rocks after undergoing thermal hysteresis of high and low temperatures
Y. Inada, N. Kihoshita, A. Ebisawa and S. Gomi

689. Towards field bounds on rock mass failure criteria
G. Mostyn, M. D. Helgstedt and K. J. Douglas

690. Mechanical behaviour of soft rocks under triaxial cyclic loading conditions
R. Yoshinaka, T. V. Tran and M. Osada

691. Effect of chemical additives on the strength of sandstone
M. Seto, D. K. Nag, V. S. Vutukuri and *K.* Katsuyama

692. A physical model study of jointed rock mass strength under uniaxial compressive loading

P. H. S. W. Kulatilake, W. He, J. Um and H. Wang

697. High-definition in situ stress measurements in tunneling
P. Hartkorn

698. A photoelastic investigation on the effect of roughness on the stress field of fractal rock joint
Xie Wei-Hong, Li Han-Qiu, Zhang Yu-Zi and Li Shi-Ping

699. The influence of mechanical and geometrical variability in rock mass deformability
J. Muralha

700. Joint aperture and roughness in the prediction of flow and groutability of rock masses
N. Barton and E. F. De Quadros

701. Determination of rock fracture toughness and its relationship with acoustic velocity
Chen Zhixi, Chen Mian, Jin Yan and Huang Rongzun

702 The point load test for weak rock in dredging applications
H. J. Smith

703. Characterization of joint profiles and their roughness parameters
S. D. Lee, C. I. Lee and Y. Park

704. The buckling failure analysis of a cavern in jointed rock
Y. Hu

705. Assessment of rock mass strength for underground excavations
Ö. Aydan, R. Ulusay and T. Kawamoto

706. Evaluation of Korean pressuremeter modulus
D. M. Cregger, J. S. Lim, K. H. Cho and D. H. Kim

707. Forecasting of rock trencher performance using a fuzzy logic approach
M. Alvarez Grima and P. N. W. Verhoef

708. An elastic solution for stresses around tunnels with conventional shapes
H. Gerçek

709. Surface roughness evolution and mechanical behavior of rock joints under shear
M. A. Kwasniewski and J.-A. Wang

710. Bronx River diversion: Neoteçtonic implications
C. Merguerian and J. E. Sanders

711. Multiple interacting curvilinear crack problems: A method of solution and numerical results
A, M. Linkov, Ş. G. Mogitevskaya and J. A. L. Napier

712. Propagation of natural hydraulic fractures
I. Berchenko, E. Detournay and N. Chandler

713. Imaging pore structure and connectivity by high resolution N M R microscopy
D. A. Doughty and L. Tomutsa

714. Modelling the deformation of underground excavations
D. P. Adhikary and A. V. Dyskin

AUGUST 1997

715. .Pore pressure changes and strength mobilization of soft rocks in consolidated-undrained cyclic loading triaxial tests
R. Yoshinaka, T. V. Tran and M. Osada

727. Fracturing at contact surfaces subjected to normal and tangential loads
K. R. Shah and T.-F. Wong

741. A mathematical model and numerical investigation for B. Clennell determining the hydraulic conductivity of rocks
D. Les"nic, L. Elliott, D. B. Ingham, and R. J. Knipe

761. Effects of Poisson's ratio and core stub length on bottomhole stress concentrations
Yongyi Li and D. R. Schmitt

775. Ground movement due to longwall mining in high relief areas in New South Wales, Australia
L. Holla

789. Accuracy of the spectral method in estimating fractal spectral parameters for self-affine roughness profiles
T. Shirono and P. H. S. W. Kulatilake

805 The influence of grain size and porosity on crack initiation stress and critical flaw length in dolomites
Y. HJ Hatzor andlV. Palchik

817. A numerical study of the effects of accurate timing on rock fragmentation
Liqing Liu and P. D. Katsabanis

837. Direct tensile behavior of a transversely isotropic rock
Jyh Jong Liao, Ming-Tzung Yang and Huei-Yann Hsieh "

851. Estimation of mobilised cohesion around (underground openings
M. Verman, B. Singh, J. L. Jethwa and M. N. Viladkar

859. Use of rock mass classifications for dredging
A. Vervoort and K. De Wit

865. Photoelastic study of the contact mechanics of fractal joints
Heping Xie, Jin-Àn Wang and Wei-Hong Xie
I Announcement

SEPTEMBER

875 Slip zones around circular openings in a jointed Hoek-Brown medium
P. Kumar

885. Relating the hydraulic properties of a fractuted rock mass to seismic attributes: theory and numerical experiments
F. K. Boadu

897. Determination of in situ deformation njodulus: new approaches for plate-loading tests
E. Ünal

919. Rock reinforcement systems
1996 Schlumberger Lecture

Award Paper
C. R. Windsor

953. Finite element formulation and application of poroelastic generalized plane strain problems
L. Cui, V. N. Kaliakin, Y. Abousleiman, and A. H.-D. Cheng

963. Back analysis of coalbed strength properties from field measurements of wellbore cavitation and methane production
H. H. Vaziri, X. Wang, I. D. Palmer, M Khodaverdian and J. McLennan

979. Topography of natural and artificial fractures in granitic rocks: implications for studies of rock friction and fluid migration
W. L. Power and W. B. Durham

991. A double rock sample model for rockbursts
Z. H. Chen, C. A. Tang and R. Q. Huang

1001. Use of mining and seismological parameters as premonitors of rockbursts
C. Srinivasan, S. K. Arora and R. K. Yaji

1009. Deviation of hydraulic fractures through poroelastic stress changes induced by fluid injection and pumping
I. Berchenko and E. Detournay

1021. Rock sliding induced by seismic force
H. 1. Ling and A. H.-D. Cheng

1031. An index for describing the anisotropy of joint surfaces
Z. Y. Yang and S. C. Lo

NOVEMBER 1997

1045. Determination of dynamic elastic constants of transversely isotropic rocks using a single cylindrical specimen
Jyh Jong Liao, Ting-Bin Hu and Chunn-Wei Chang

1055. In situ gas permeability measurements to delineate damage in rock salt
J. C. Stormont

1065. Observations of brittle failure around a circular test tunnel
C. D. Martin, R. S. Read and J. B. Martino

1075. A viscoplastic discontinuum model of time-dependent fracture and seismicity effects in brittle rock
J. A. L. Napier and D. F. Malan

1091. Modelling natural stresses in the arc syncline and comparison with *in situ* measurements
F. Homand, M. Souiey, P. Gaviglio and I. Mamane

1109. Drilling detritus and the operating parameters of thermally stable PDC core bits
A. Ersoy and M. D. Waller

1125. Parameter optimization of influence functions in mining subsidence
A.Bello Garcia and J.Ordieres Mere

1133. Estimates of equivalent aperture for non-Newtonian flow in a rough-walled fracture
V. Di Federico

JANUARY 1998

1139. Three-dimensional effects of hydraulic conductivity enhancement and desaturation around mined panels
J. Liu and D. Eisworth

1153. Modeling fractures in rock blasting
F. V. Donze, J. Bouchez and S. A. Magnier

1165. Practical estimates of rock mass strength
E. Hoek and E. T. Brown

1187. Evaluation of fully-coupled strata deformation and groundwater flow in response to longwall mining
J.-M. Kim, R. R. Parizek and D. Eisworth

1201. A numerical model tor thermo-hydro-mechanical coupling in fractured rock
K. M. Bower and G. Zyvoloski

1213. Seismic parameters and rockburst hazard at Mt Charlotte mine
R. F. Popiawski

1229. Development of radial strains in hollow cylinders of rock subjected to radial compression
M. L. Talesnick, B. C. Haimson and M. Y. Lee

FEBRUARY 1998

3. The influence of steam pressure on thermal spalling of sedimentary rock: theory and experiments
M, H. H. Hettema, K-H. A. A. Wolf and C. J. De Pater

17. Parametric study for a large cavern in jointed rock using a distinct element model (UDEC-BB)
R. Bhasin and K. Hoeg

31. Factoring anisotropy into iterative geometric reconstruction algorithms for seismic tomography
O. Abraham, K. B. Slimane and Ph. Cote

43. Determination of deformabiiity and tensile strength of anisotropic rock using Brazilian tests
C.-S. Chen, t. Nan and B. Amadei

63. Reliability of Hoek-Brown estimates of rock mass properties and their impact on design
E. Hoek

69. 2-D BEM analysis of anisotropic half-plane problems-application to rock mechanics
E. Pan, B. Amadei and Y. 1. Kim

75. Effect of joint sets on the strength and deformation of rock mass models
Z. Y. Yang, J. M. Chen and T. H. Huang

85. Use of the D-762 shore hardness scleroscope for testing small rock volumes
Th. Hölmgeirsdöttir and P. R. Thomas

93 ,A study of UDEC modelling for blast wave propagation in jointed rock masses
S. G. Chen and J. Zhao

101. Discussion
T. Y. İrfan and L. S. Cheung

103. Authors' reply to discussion
K. T. Chau and R. H. C. Wong

IMM SIKP'.i \îl\Hİ\|s

MAY 1997

25. Delhi meeting report
The talk of the Taj Brief summaries of the presentations at the successful Indian Industrial Minerals meeting in Delhi in March.

29. Refractories industry Status and trends A general overview of the state of the refractories industry and the trends within it, along with some projections for the future.

39. Talc markets A world of regional diversity A review of the applications talc is used; in regional variations and the main treats to each market.

55. Kaolinite & halloysite
ASEAN resources & trade The patterns of trade and end use for kaolinite and halloysite are examined in 'this article along with forecasts for future market growth.

61. Plastic fillers
A maturing market in Europe A short review highlighting the dominant trends in mineral fillers' consumption in thermoplastics.

JUNE 1997

25. Hong Kong handover
Sino' the times in the Orient. IM examines Hong Kong's changing role in the minerals business.

31. Processing for Profit
A review of IM' s 2"[d] Processing for Profit conference, held this year in New Orleans,

35. European refractory industry update An overview of the major refractory players and some of the trends affecting the industry.

49. Industrial mineral developments in Israel
This article, contributed by Harben and Tsevi, outlines mineral resources of Israel.

67. Investment casting R.F Smart's article discusses the applications and future trends in investment casting.

73. Turkish Perlite This contributed article by YK. Özgür discusses the future of the perlite industry in Turkey

76. Euromin '97 Abstracts biographies of papers at Euromin '97.

89. Advanced Ceramics Stewart Hart contributes a review of developments in advanced ceramics, their markets and a look to the future.

JULY 1997

21. Caustic magnesia
An industry divided The markets for caustic magnesia are varied and specialised, and at the commodity end competition is fierce. This article examines how the industry has evolved over the last three years.

34. Euromin' 97
Buenos dias from Barcelona - a report on IM's first ever European minerals and markets conference.

37. Asian feldspar sources
Strong growth in ceramics C. Toye focuses on the Asian feldspar market, looking at both production, and 'consumption of feldspar in ceramics.

43. Salts of the Atacama
NO, I, KCI + $Li_2CO_{,=}$ SQM This article by Harben and Edwards details the operations and markets of one of the world's largest sources of mineral salts.

52. Greek bauxite
Mines and markets D. Spoudeas looks at the mining. applications, and markets of Greece's non-metallurgical bauxite

AUGUST 1997

23. Euromin field trip report
A report from the post Euromin '97 field trip to the tale operation Talc de Luzenac

25. East Asian refractories
Thai-ed up with steel A brief outline of East Asia's refractory supply market including a summary of foreign joint ventures.

43. Indian bentonite
Focus on the Kutch region Navnitlal Shah reviews
the bentonite deposits in part of the Gujarat State of India.

49. Boron in the CIS
An overview of deposits & production
VP.Alexeev and A.V Chernyshov highlight the geology, mineralogy and extraction of the major boron-bearing deposits in the CIS.

55.European industrial minerals World class but under threat
A review by Brian Coope of industrial minerals production in Europe and the main threats to the industry.

SEPTEMBER 1997

37. East Asian foreign mineral ventures
In a follow-up to last month's review of East Asian joint ventures in the refractories industry, the foreign activities in industrial minerals processing and production are highlighted.

47. Minerals of the Middle Kingdom abstracts

57. Fluorspar 1997 abstracts

61. Minerals in paper
This article gives an overview of minerals utilised in all aspects of paper production, and examines the role of the mineral producer in the paper industry.

81. Montevive revives This contributed article by Brian Coope outlines the rejuvenation of Spain's largest and most established celestite company.

85. African fluorspar Since its nadir in 1994, when production slid under 0.4m. tpa, the African fluorspar industry has made a very, positive recovery, This feature reviews the activities of the surviving producers.

93. Chinese bauxite and fused alumina
Increasing market demand in China has led to an increase the production of bauxite and fused alumina. This article by Yuan Zhilun reviews the sources, manufacture and development of these product's in China.

101. Lafarge Réfractaires Monolithiques A profile of one of Europe's foremost monolithic refractories producers.

OCTOBER 1997

39. Refractory bauxite
A review of the supply of refractory grade bauxite.

45. CIS magnesite
Vladimir Trortsky addresses the status of mining and refractory production in the CIS.

51. High alumina refractory aggregates Ken Moody discusses castable, insulating refractory products:

61. Red ceramics in Spain
M. Regueiro,. P Dâmaso Padrös & E Sanchez review current market conditions for Spanish red ceramics.

71. Sodium sulphate at Lake Quarun |Dr Ahmed A. Dadir examines Lake Quarun's commercial mineral salt potential.

79. Superconducting magnetic separation Carpco examines the installation of superconducting separation units.

87. Filtration with ceramic membranes Bjarne Ekberg reviews Outokumpu's new Ceramec filter plate.

91. Processing of ultra-fine minerals Ben Schneider investigates the criteria for selecting a processing system.

NOVEMBER 1997

7. Comment This month IM looks at the current state of the titanium pigment industry, a sector undergoing radical restructuring.

8. World of Minerals

25. The Americas - Minerals into the millennium
Abstracts and biographies of papers to be presented at the North America Minerals Annual Meeting in Cancun, Mexico.

29. Flake graphite
This article discusses the cur state of the graphite market takes a look at the success of newcomers to the industry.

39. Premium minerals for high value markets
Abstracts and biographies of papers to be presented at this year's Industrial Minerals Forum and Annual Dinner.

43. European markets for US bentonites In this contributed article Paul Baxter examines the production and exports of US bentonites, and the market for these materials in Europe. ,

51. Borate supply and demand This article reviews the supply and demand of borate minerals.

71. EU anti-dumping and other trade instruments
Ewoud Sakkers of the European Commission discusses the procedures of the EU, and highlights the part played by tfje' importers, exporters and consumers of industrial minerals.

DECEMBER 1997

7. Comment

8. World of Minerals

20. On a high in Shanghai:
Minerals of the Middle Kingdom .
A meeting report from IM's 2"'' Cpiinese Industrial Minerals Conference.

25. Fluorspar 1997: Optimistic-output overall
A meeting report from IM's 5th Fluorspar conference.

29. Fillers & extenders European market trends In this contributed paper, Mark de Decker discusses the current market, historical growth, and interelationsfaips for kaolin, talc, OCC and PCC in Western Europe.

37. European flat glass: Recovery mirrors markets This article looks at the flat glass industry in Europe, and discusses how it is influenced by the construction and automotive industries.

55. Barytes production: Well set for the future
This article discusses the current state of the barytes industry and the status of producers worldwide.

62. Thailand's minerals:
This contributed article by Thailand's Dept. of Mineral Resources summarises the country's industrial minerals and their production.

JANUARY **1998**

7. Comment
8. World of Minerals

19. Fused minerals Where are they heading? This article summarises the history of fused minerals production technology, takes a look at the North American output of fused alumina, and highlights shifts in worldwide production capacity

27. Gypsum supply Building on firm foundations Providing a detailed review of the world gypsum industry, this feature also discusses how technological innovations and economic conditions are likely to shape the industry in the next millennium.

45. Flame retardants Minerals' growtl. in plastics Roland Mureinik describes the use of the leading flame retardant

minerals, focuses on the halogen vs non- halogen retardant market and gives his view on the future trends in the industry.

FEBRUARY 1998

7. Comment
Asia Crisis: IM reviews the Cause and effects of the recent economic turmoil in Asia.

8.World of Minerals

27. European sanitaryware
Production moves east This article provides an insight the structure of the sanitaryware industry, markets technology and legislation.

39. Shanxi bauxite
Fired up for world mark China is one of only three primary sources of refractory bauxite in the world. Last October, IM made a whistle-stop tour of Shanxi province, host to China's leading refractory bauxite producing districts.

47..Bentonite in Mexico A changing & rising market Rob Nebergall reviews Mexican bentonite resources and compares • their characteristics with US alternatives.

57. Feldspar in Sardinia In pole position for ceramic markets Sardinia is positioned between the ceramic districts of Italy and Spain. This article looks at the geology of Sardinia's feldspar deposits and ceramic markets.

61. European lime Structure and outlook.A look at the major players in the European lime industry together with the market prospects,

69. Indian white minerals
This contributed article reviews the current status of markets for white minerals in paint, paper and plastics.

M1M.K Vf S ÏAGIYEERWG

JUNE 1997

557. Gold recovery from a refractory arsenopyrite (FeAsS) concentrate by irt-situ slurry oxidation
H. G. Linge and N. J. Welham

567. Gold recovery enhancement from complex sulphide ores through combined bioleaching and cyanidation
L. Curreli, G. Loi, R. Peretti, G. Rossi, P. Trois and A. Zucca

577. Semi-continuous biooxidation of the Chongyang refractory gold ore
Y. Wei, K. Zhong, E. V. Adamov and R. W. Smith

585. The impact of data correlation on the material balance problem
R. Perry

603. Rock abrasion in autogenous milling
B. K. Loveday and D. Naidoo

613. Diagnosis of concentrate grade and mass flowrate in tin flotation from colour and surface texture analysis
J. M. Hargrave and S. T. Hall

623. A study of interactions and flotation of wolframite with octyl hydroxamate
Y. Hu, D. Wang and Z. Xu

JULY 1997

659. The potential use of g<-.opolymeric materials to, immobilise toxic metals: Part I. Theory ano ^plications
J. G. S. Van Jaarsveld, J. S. J. Van Deventer and L. Lorenzen

671. Removal . of heavy metal ions by adsorptive particulate flotation
J. Rubio and F. Tessele

681. Finexoarse particle interactions a;id aggregation in and sphalerite flotation
A. G. Lange, W. M. Skinner and R. Sï. C. Smart

695. Particle-bubble attachment in flotation froths
V. E. Ross

707. Identification and optimizing control of a rougher flotation circuit using an adaptable hybrid-neural model
F. A. Cubillos and E. L. Lima

723. 0K100 tank cell operation at Pasminco-Broken Hill
F. L. Burgess

743. Studies on multi-metal ion tolerance of thiobacillus ferrooxidans
A. Das. J. M. Modak and K. A. Natarajan

AUGUST 1997

757. Invention and innovation in mineral processing
T. J. Napier-Munn

775. Recovery mechanisms for pentlandite and MgO bearing gangue minerals in nickel ores from Western Australia
M. C. Pietrobon, S. R. Grano, S. Sobieraj and J. Ralston ,

787. Sphalerite activation: flotation and electrokinetic and studies
J. S. Laskowski, Q. Liu andY. Zhan

803. Removal of mercury from gold cyanide solution by dissolved air flotation
F. Tassel, J. Rubio, M. Misra and B. C. Jena

813. The effect of biopretreatment on the flotation recovery of magnesite tailings
J. Gawel, I. Maliszewska and Z. Sadowski

825. SEM and AES studies of chalcopyrite bioleaching in the presence of catalytic ions
C. Gomez, E. Roman, M. L. Blazquez and A. Ballester

837. An investigation into alternative eluants from activated carbon at atmospheric pressure
P. D. Pyke, C. Swaminathan and R. F. Johnston

851. Pilot and full scale plant trials using thiourea enhanced zadra stripping of activated carbon
P. D. Pyke, R. F. Johnston and C. Swaminathan

859. Batch leaching data analysis: eradication of time dependency prior to statistical analysis
N. Powell and M. Â. Jordan

871. Autogenous dense medium separation using an inclined counterflow settler
D. Nelson, J. Liu and K. P. Galvin

SEPTEMBER J 997

895. Flotation behaviour of gold during processing of porphyry copper-gold ores and refractory gold-bearing sulphides
S. M. Bulatovic

909. The effect of jet reactors on the leaching of gold from ores
L. Lorenzen, B. M Loftus, K7R. P. Petersen and J. S. J. Van Deventer

919. The recovery of gold from refractory arsenopyrite concentrates by pyrolysis-oxidation
J. O. Dunn and A. C. Chamberlain

929. The use of ion-exchange resins for the recovery of valuable species from slurries of sparingly soluble soilds
P. G. R. De Villiers, J. S. J. Van Deventer and L. Lorenzen

947. Biosorption of lead (II) from aqueous solutions by Phellinus badius
J. T Matheickal and Q. Yu

959. The dynamic simulation of in-pulp sorption processes using the lumping of competitive and fouling phenomena
S. P. Liebenberg and J. S. J. Van Deventer

973. High capacity gravity separators: a review of current status
R. G. Richards and M. K. Palmer

983. Challenging the '.'Crago" double float process II. Amine-fatty acid flotation of siliceous phosphates
P. Zhang, Y. Yu and Bogan

995. The effect of size separation by cyclosizing and sédimentation/décantation on mineral surfaces
C. J. Greet and R. St. C. Smart

1013. Evaluating high pressure milling for liberation enhancement and energy saving
A. Apling and M. Bwalya

1023. A preliminary investigation of the ferric leaching of a pyrite / arsenopyrite flotation concentrate
A. W. Breed, S. T. L. Harrison and G. S. Hansford

MINfifG ENGINEERING

APRIL 1997

21. Process improvements at Samitri, Brazil
S.B. Valine, J.R.V. Futado, G. Martins, D.L.V. Policarpo and F.C. da Silva Quintao

26. Testing autoclave lining materials at Goldstrike
C E. Semler, H.J.H. Pieterse and R.A. Williams

30. Kelsey Lake: First diamond mine in North America
Howard G. Coopersmith

34. Hubaka: Arctic mining challenge in Russia - part two
Terry Owen

40. Colorado Mining Association celebrates its centennial

45. Geologist[1] s Gordian Knot: To cut or not to cut
I. S. Parrish

57. Minimizing the environmental impact of blast vibrations
N. Djordjevic

62. Geochemistry of abandoned fluids associated with the proposed underground solution-mining project at the White Pine'Mine
G.A. Doyle, D.C. Keith, D.D. Runnells and J. Tilk

68. Numerical simulation of bulkheads to reduce uncontrolled discharge from an underground copper mine
R.L. Lewis, I.R. McGowan, J.I. Hershman and J. Tilk

MAY 1997

33. Mining overview
W.C. Butterman, D.E. Morse, Zareh Mozian and S.F. Sibley

35. Exploration overview
D.R. Wilburn

43. Coal overview
B. D. Hong

50. Alabama
L.S. Dean

50. Alaska
R.C. Swainbank, T.K Bundtzen
A.H. Clough and M.W. Henning

53.California
S. Kohler-Antablin

55. Colorado
J.A. Cappa

56. Idaho
V.S. Gillerman..

59. Illinois
J.M. Masters, H.H. Damberger and R.E. Hughes

60. Indiana
K.R. Shaffer

61. Minnesota
K.A. Lewis

62. Missouri
C.Seeger

62. Montana
R.B. McCulloch

65. Nevada
J.V. Tingley and D.D.LaPointe

69. New Mexico
D.Bland, W. Hatchell and K.Hatton

71. North Carolina
J.C.Reid and R.H. Carpenter

72. Oklahoma
K.S. Johnson

73. South Dakota
T.Durkin, E.H. Holm and B.A. Regynski

74. Texas
L.E. Garner
74. Utah
R.L. Bon, R.W. Gloyn and D.E. Tabet

81. Virginia
P.C. Sweet

82.Washington
R.E.Derkey

83. West Virginia
G.H. McColloch

84. Wisconsin
T.J. Evans

85. Wyoming
R.E.. Harris, W.D. Hausel, A.J. Ver Ploeg and G.B. Glass

SEPTEMBER 1997

27. Surviving in the competitive and global mining industry - John E. Tilton

30. Risk mitigation in global mining development
Wayne W. Murdy and Ross R. Bhappu

35. Capital budgeting: forecasting the future
Daniel K. Dysinger

39. Climax Molybdenum: One of the world's great mines
Stephen M. Voynick

44. Pittsburgh hosts 6* International Mine Ventilation Congress
William R. Yernberg

50. O & K increases its presence in US excavator market
Steve Krai

52. TECHNOLOGY NEWS: Exhaust treatment lessens underground vehicle emissions

57. Effect of NAFTA on the economics of mineral production - *G.A. Davis*

62. Typological classification of gold deposits of thje Brazilian Shield
A. de Ferran

69. TECHNICAL NOTE: Alternative method of b(endin| for sulfur compliance
S. Hicks

71. DISCUSSION: Alkali¡silica reactivity: Mechanisms and management
M.L. Leming.

AUGUST **1997**

23. From surface to underground: Newmont Gold's ICarlin East Mine
Joseph M. Driscoll

28. Gold Road: Anatomy of a turnaround
D.B. Silver

33. Underground development at Getchell and Turquoise Ridge
R.M. Barker and T.R. Harter

42. Digital communication aids underground mi..mg
James Wm. White and Steven H. Vesterdal

47. Iron and steel making in the information age
William R. Yernberg

51. Minerals processing meeting focuses on commodities
Steve Krai

57. Conference explores African mining possibilities
Steve Krai

60. Six to be inducted to National Mining Hall oi Fame

65. Impact of high-cost Canadian sulfur production on the sulfur trade
N. Edmonson

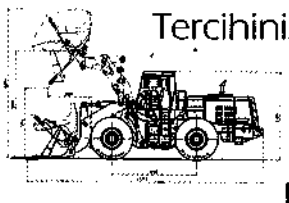
71. Real-time mine ventilation simulation
K.H. McDaniel and K.G. Wallace Jr,

76. Thiosulfate leaching following biooxidation pretreatment for gold recovery from refractory carbonaceous-sulfidic ore
R.Y. Wan and J.A. Brierley

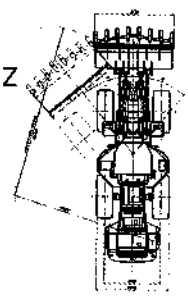
JULY 1997

25. Longwall control at Shoal Creek
Debasis Deb, Duk-Won Park,
Yong-Ming Jiang and Bill Wells

Şimdi **Kawasaki ZII serisi** olağanüstü gücü ile hizmetinizde.



Tercihinizi güvenden yana kullanın. Daha çok kazanacaksınız
Üstelik Enka Pazarlama yedek parça, satış sonrası
destek hizmeti **HazırGüç** ile sürekli.
KawasakiZII serisi ile işiniz dört dörtlük olsun.



Unutmayın! İş makinesi Enka Pazarlama'dan alınır.

enka

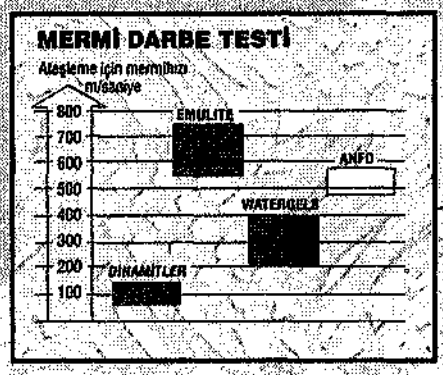
ENKA PAZARLAMA İHRACAT İTHALAT A.Ş.
İstanbul 0.212.272 98 90 Pbx • Ankara 0.312.440 84 85 - 0.312.441 30 90
Adana 0.322.428 96 00 - 0.322.428 30 35 • İzmir 0.232.343 05 10 (3 Hat)
E-mail : sales@enka.com.tr.

Kawasaki
EN SAĞLAMI

Dünyada Patlatma Sektöründeki En Son Teknoloji ve Gelişmeleri Türkiye'ye Taşıyan Kuruluş

NitroMak

MAKİNA KİMYA-NİTRO NOBEL KİMYA SANAYİİ A.Ş.

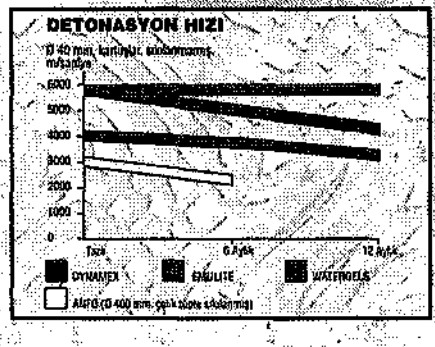


FAALİYETLERİMİZ

- Kapsülle Patlayan Emulite Üretimi
- Yemlemeyle Patlayan Emulite Üretimi
- Kamyon Şarjı (Emulite - Anfo)
- Anfo ve Emulite-500 Üretimi
- P.P.T.A. Nitrat Satışı
- Elektriksiz Nonel Kapsüller

MÜHENDİSLİK HİZMETLERİ

Temsilcilikler



Fabrika : Çakmakkaya/ARTVİN • Tel: 0.466. 721 21 80 • Fax: 721 21 93
Bölge Md. : Soma/MANİSA • Tel: 0.236. 612 16 83 • Fax: 613 94 33
Depo : Darıca - GEBZE / İSTANBUL • Tel: (0.262) 725 29 90/1419
Depo : Hasanoğlan/ANKARA

NitroMak
MAKİNA KİMYA-NİTRO NOBEL KİMYA SANAYİİ A.Ş.

Cimnah Cad. No: 72/14 • 06690 Çankaya - ANKARA
Tel: (0.312) 440 53 17 (Pbx) • Fax: 440 61 59

"Pehlivan gibi maşallah!"

"85 yılının 5. ayında ilk Kawasaki'mizi aldık.
İş makinesi almak öyle kolayca karar verilecek bir şey değildir.
Kawasaki'yi Enka Pazarlama satıyordu.
Enka ile her zaman
çok sıcak ilişkilerimiz olmuştur.
Hani aile gibi desem yeri var.
Onlara güvendik aldık.
Vallahi makine daha gık demedi.
Hem de bu ağır şartlarda...
Bu sene de ikinci Kawasaki'mizi aldık.
Bu kadar sağlam makine daha gelmemiştir.
Pehlivan gibi maşallah."

Modellere Göre Teknik Özellikler

MODEL	Büyük hacimde uzun ömürlü motor	Büyük hacimde güçlü motor (Net)	Üstün koparma gücü
70Z IV	6,485 cc	153 HP	14.3 ton
80Z IV	7,412 cc	177 HP	17.7 ton
85Z IV	11,670 cc	216 HP	20.1 ton
90Z IV	11,670 cc	256 HP	22.6 ton
95Z IV	14,010 cc	315 HP	26.8 ton
115Z IV	18,900 cc	409 HP	45.8 ton

En zor şartlara dayanıklı kaya tipi kepçesi ile, Kawasaki en sağlamı.

Yönetim Kurulu Başkan Vekili
(Bursa/Taşocağı)

Kawasaki

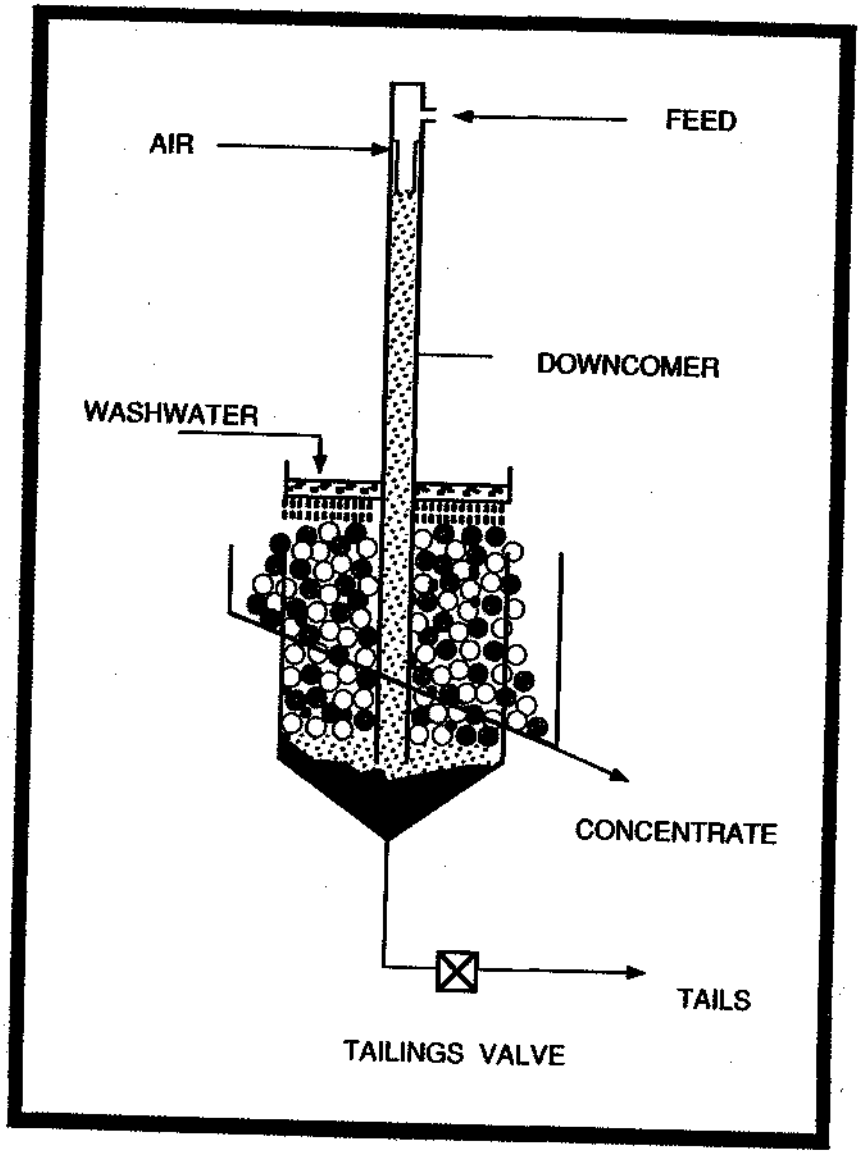
ENKA PAZARLAMA İHRACAT İTHALAT A.Ş.
İstanbul 0.212.272 98 90 Pbx **Göztepe** 0.216.350 08 15 - 0.216.478 09 67 (3 Hat)
Ankara 0.312.440 84 85 - 0.312.441 30 90 **Adana** 0.322.428 96 00 - 0.322.428 30 35 **İzmir** 0.232.343 05 10 (3 Hat)
http://www.enka.com.tr E-mail:sales@enka.com.tr

MADENCİLİK

TMMOB MADEN MÜHENDİSLERİ ODASI YAYIN ORGANI
A PUBLICATION OF THE CHAMBER OF MINING ENGINEERS OF TURKEY

ISSN : 0024-9416

ARALIK
DECEMBER
1997



TMMOB MADEN MÜHENDİSLERİ ODASI
Selanik Cad. 19/3 06650 Kızılay/ANKARA

İŞİN İÇİNDE KOMATSU VAR

TÜRKİYE'NİN EN BÜYÜK İŞ MAKİNASI ÜRETİCİSİ

TEMSA KOMATSU *YENİ DÜNYALAR KURAR*

TEMSA Güvencesiyle

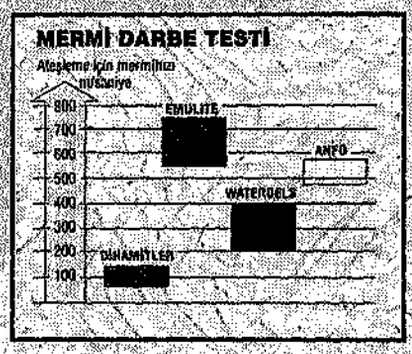
İstanbul	Tel: (0216) 377 49 50 pbx	**Samsun**	Tel: (0362) 266 80 70 (3 Hat)-266 68 69
Ankara	Tel: (0312) 397 22 20 (9 Hat)	**Antalya**	Tel: (0242) 343 27 48
İzmir	Tel: (0232) 435 31 79 - 435 01 95	**Kayseri**	Tel: (0352) 332 14 07
Adana	Tel: (0322) 346 15 90 (7 Hat)	**Bursa**	Tel: (0224) 267 07 69-69
Diyarbakır	Tel: (0412) 238 04 48		

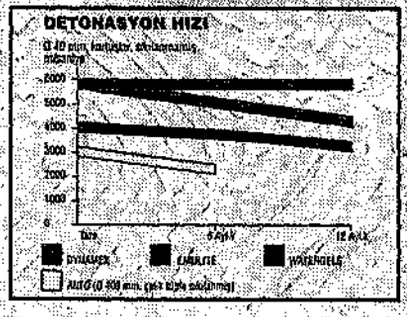
TEMSA bir H.Ö. SABANCI Holding Kuruluşudur.

Dünyada Patlatma Sektöründeki En Son Teknoloji ve Gelişmeleri Türkiye'ye Taşıyan Kuruluş

NitroMak

MAKİNA KİMYA-NİTRO NOBEL KİMYA SANAYİİ A.Ş.





FAALİYETLERİMİZ

- Kapsülle Patlayan Emulite Üretimi
- Yemlemeyle Patlayan Emulite Üretimi
- Kamyon Şarjı (Emulite - Anfo)
- Anfo ve Emulite-500 Üretimi
- P.P.T.A. Nitrat Satışı
- Elektriksiz Nonel Kapsüller

MÜHENDİSLİK HİZMETLERİ

Temsilcilikler

Fabrika : Çakmakkaya/ARTVİN • Tel: 0.466. 721 21 90 • Fax: 721 21 93
Bölge Md. : Soma/MANİSA • Tel: 0.236. 612 16 63 • Fax: 613 94 33
Depo : Darıca - GEBZE / İSTANBUL • Tel: (0.262) 725 29 90/1419
Depo : Hasanoğlan/ANKARA

NitroMak
MAKİNA KİMYA-NİTRO NOBEL KİMYA SANAYİİ A.Ş.

Cinnah Cad. No: 72/14 • 06690 Çankaya - ANKARA
Tel: (0.312) 440 53 17 (Pbx) • Fax: 440 61 59