



तकनीकी पत्रिका विषय-सूची

CURRENT CONTENT

(Technical Journals)

(A Monthly Current Awareness Service from technical journals)

Vol.2, No.7, July, 2018

The Central Library, IBM, Nagpur is subscribing the technical journals and also receiving them on complimentary basis on various subjects like Geology, Mining, Mineral Economics etc. These Technical Journals make up an important collection of latest scientific information. The library is rendering Reference Service to its users from these technical Journals (Article Indexing is one of them). Central Library, IBM provides Current Content Service from these technical journals in the name of "GEM" since 2006 on half yearly basis in print form. To expand this service to the IBM Offices all over India i.e. H.Q., Zonal & Regional Offices and to take a call of time, the Controller General, IBM desired to make this service online on monthly basis. The library staff made efforts to make it successful. This is the 7th issue of Volume-2 for this service named **"Current Content- a monthly current awareness service from technical journals", Vol.2, No.7, July 2018.**

It will be highly appreciated if the valuable feedback is reciprocated. If some article as per content list is found to be of use by the reader the same may be requested and the library will send the scanned copy of the article to the interested reader.

Mrs.D.H.Vairagare

Assistant Library & Information Officer



I N D E X

<u>S.No</u>	<u>Title</u>	<u>Page No</u>
1)	American Mineralogist	4-7
2)	Engineering & Mining Journal	8-10
3)	Economic Geology	11-12
4)	Industrial Minerals	13-14
5)	International Journal of Mining Reclamation & Environment	15-19
6)	Iron & Steel Review	20-23
7)	Journal of the Geological Society of India	24-27
8)	JPC Bulletin	28
9)	Mineral Economics	29
10)	Mineralogical Magazine	30-31
11)	Minerals & Metals review	32-33
12)	Metal Market Magazine	34-39
13)	Mineral processing & Extractive metallurgy	40-41
14)	Mining Engineers Journal	42
15)	The Indian Mining & Engineering Journal	43



American Mineralogist

Journal of Earth and Planetary Materials

Vol. 103, No. 1 January 2018

LETTERS

- 171 **A novel carbon bonding environment in deep mantle high-pressure dolomite**
Cara E. Vennari and Quentin Williams

SPECIAL COLLECTION: MICROPOROUS MATERIALS: CRYSTAL-CHEMISTRY, PROPERTIES, AND UTILIZATIONS

- 175 **Structuration under pressure: Spatial separation of inserted water during pressure-induced hydration in mesolite**
Yonghui Kim, Jinhyuk Choi, Thomas Vogt, and Yongjae Lee

INVITED CENTENNIAL ARTICLE

- 1 **The third isotope of the third element on the third planet**
Douglas Rumble

SPECIAL COLLECTION: EARTH ANALOGS FOR MARTIAN GEOLOGICAL MATERIALS AND PROCESSES

- 11 **Visible, near-infrared, and mid-infrared spectral characterization of Hawaiian fumarolic alteration near Kilauea's December 1974 flow: Implications for spectral discrimination of alteration environments on Mars**
Marcella Yant, Kelsey E. Young, A. Deanne Rogers, Amy C. McAdam, Jacob E. Bleacher, Janice L. Bishop, and Stanley A. Mertzman

SPECIAL COLLECTION: FROM MAGMAS TO ORE DEPOSITS

- 26 **Magnetite-apatite deposit from Sri Lanka: Implications on Kiruna-type mineralization associated with ultramafic intrusion and mantle metasomatism**
Xiao-Fang He, M. Santosh, T. Tsunogae, and Sanjeeva P.K. Malaviarachchi
- 39 **The ore-forming magmatic-hydrothermal system of the Piaotang W-Sn deposit (Jiangxi, China) as seen from Li-mica geochemistry**
Hélène Legros, Christian Marignac, Thomas Tabary, Julien Mercadier, Antonin Richard, Michel Cuney, Ru-Cheng Wang, Nicolas Charles, and Marc-Yves Lespinasse

ARTICLES

- 55 **Chlorine incorporation into amphibole and biotite in high-grade iron-formations: Interplay between crystallography and metamorphic fluids**
Darrell J. Henry and Nicholas M. Daigle
- 69 **Depth of formation of super-deep diamonds: Raman barometry of CaSiO₃-walsstromite inclusions**
Chiara Anzolini, Mauro Prencipe, Matteo Alvaro, Claudia Romano, Alessandro Vona, Sofia Lorenzon, Evan M. Smith, Frank E. Brenker, and Fabrizio Nestola

Vol. 103, No. 2 February 2018

LETTERS

- 326 **Macroscopic electrostatic effects in ATR-FTIR spectra of modern and archeological bones**
Julie Aumont, Matthieu Lebon, Xavier Gallet, Loïc Ségalen, Christel Gervais, Christian Brouder, and Etienne Balan

INVITED CENTENNIAL ARTICLE

- 181 **Secular change in metamorphism and the onset of global plate tectonics**
Michael Brown and Tim Johnson

SPECIAL COLLECTION: EARTH ANALOGS FOR MARTIAN GEOLOGICAL MATERIALS AND PROCESSES

- 197 **Laboratory and field characterization of visible to near-infrared spectral reflectance of nitrate minerals from the Atacama Desert, Chile, and implications for Mars**
Fan Wang, Brenda B. Bowen, Ji-Hye Seo, and Greg Michalski

SPECIAL COLLECTION: MICROPOROUS MATERIALS: CRYSTAL-CHEMISTRY, PROPERTIES, AND UTILIZATIONS

- 207 **Comparative compressional behavior of chabazite with Li⁺, Na⁺, Ag⁺, K⁺, Rb⁺, and Cs⁺ as extra-framework cations**
Mihae Kong, Yongmoon Lee, G. Diego Gatta, and Yongjae Lee

SPECIAL COLLECTION: NEW ADVANCES IN SUBDUCTION ZONE MAGMA GENESIS

- 216 **Petrology of "Mt. Shasta" high-magnesian andesite (HMA): A product of multi-stage crustal assembly**
Martin J. Streck and William P. Leeman

ARTICLES

- 241 **Conversion of serpentine to smectite under hydrothermal condition: Implication for solid-state transformation**
Shichao Ji, Jianxi Zhu, Hongping He, Qi Tao, Runliang Zhu, Lingya Ma, Meng Chen, Shangying Li, and Junming Zhou
- 252 **On the growth of witherite and its replacement by the Mg-bearing double carbonate norsethite: Implications for the dolomite problem**
Michael Lindner and Guntram Jordan
- 260 **First measurements of OH-C exchange and temperature-dependent partitioning of OH and halogens in the system apatite-silicate melt**
Jenny Riker, Madeleine C.S. Humphreys, Richard A. Brooker, Jan C.M. De Hoog, and EIMF

American Mineralogist, Vol.103 No's 1&2, Jan & Feb 2018

Vol. 103, No. 1 January 2018, continued

- 75 **Microtexture investigation of amblygonite-montebasite series with lauroxite: Characteristics and formation process in pegmatites**
Yohei Shiroye and Seichiro Uehara
- 85 **Sound velocity measurements of hcp Fe-Si alloy at high pressure and high temperature by inelastic X-ray scattering**
Takanori Sakai, Tatsuya Sakamaki, Eiji Ohtani, Hiroshi Fukui, Seiji Kamada, Satoshi Tsutsui, Hiroshi Uchiyama, and Alfred Q.R. Baron
- 91 **New insights into the metallogeny of MVT Zn-Pb deposits: A case study from the Nayongzhi in South China, using field data, fluid compositions, and in situ S-Pb isotopes**
Jia-Xi Zhou, Xuan-Ce Wang, Simon A. Wilde, Kai Luo, Zhi-Long Huang, Tao Wu, and Zhong-Guo Jin
- 109 **Slow weathering of a sandstone-derived Podzol (Falkland Islands) resulting in high content of a non-crystalline silicate**
Javier Cuadros, Mara Cesarano, William Dubbin, Stuart W. Smith, Alexandra Davey, Baruch Spiro, Rodney G.O. Burton, and Anne D. Jungblut
- 125 **Mineralogy, paragenesis, and mineral chemistry of REEs in the Olserum-Djupedal REE-phosphate mineralization, SE Sweden**
Stefan S. Andersson, Thomas Wagner, Erik Jonsson, and Radoslaw M. Michalik
- 143 **Leesite, $K(H_2O)_2[(UO_2)_2O_2(OH)_2] \cdot 3H_2O$, a new K-bearing schoepite-family mineral from the Jomac mine, San Juan County, Utah, U.S.A.**
Travis A. Olds, Jakub Plášil, Anthony R. Kampf, Tyler Spano, Patrick Haynes, Shawn M. Carlson, Peter C. Burns, Antonio Simonetti, and Owen P. Mills
- 151 **Chromium-bearing phases in the Earth's mantle: Evidence from experiments in the Mg_2SiO_4 - $MgCr_2O_4$ system at 10–24 GPa and 1600 °C**
Ekaterina A. Sirotkina, Andrey V. Bobrov, Luca Bindi, and Tetsuo Irifune

CROSSROADS IN EARTH AND PLANETARY MATERIALS

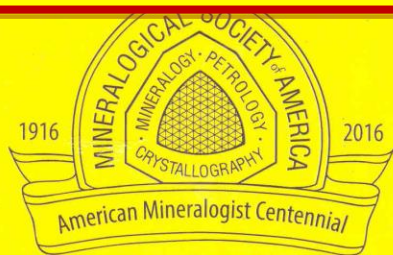
- 161 **High-pressure phase transitions in $MgCr_2O_4$ - Mg_2SiO_4 composition: Reactions between olivine and chromite with implications for ultrahigh-pressure chromitites**
Masaki Akaogi, Airi Kawahara, Hiroshi Kojitani, Kazuaki Yoshida, Yuki Anegawa, and Takayuki Ishii
- 179 **BOOK REVIEW**

Vol. 103, No. 2 February 2018, continued

- 271 **Dissolution mechanisms of chromitite: Understanding the release and fate of chromium in the environment**
Michael Schindler, Aaron J. Lussier, Emilia Principe, and Nadia Mykyteczuk
- 284 **Textural and mineral chemical evidence for the cumulate origin and evolution of high-titanium basalt fragment 71597**
Patrick H. Donohue and Clive R. Neal
- 298 **Tourmaline crystal chemistry**
Ferdinando Bosi
- 307 **(Ca-Y)-phosphate inclusions in apatite crystals from Archean rocks from the Barberton Greenstone Belt and Pilbara Craton: First report of natural occurrence**
Łukasz Birska, Richard Wirth, Ewa Slaby, Alicja Wudarska, Aivo Lepland, Axel Hofmann, and Anja Schreiber
- 314 **A siltstone reaction front related to CO_2 - and sulfur-bearing fluids: Integrating quantitative elemental mapping with reactive transport modeling**
Alexandra Maskell, Peter M. Scott, Iris Buisman, and Mike Bickle

MINERALS MATTER

- 324 **Apatite: Following the movements of ancient humans and mastodons**
Matthew J. Kohn
- 330 **NEW MINERAL NAMES**
- 338 **2017 REVIEWERS**



American Mineralogist

Journal of Earth and Planetary Materials

Vol. 103, No. 3 March 2018

HIGHLIGHTS AND BREAKTHROUGHS

- 341 Titan mineralogy: A window on organic mineral evolution
Robert M. Hazen

OUTLOOKS IN EARTH AND PLANETARY MATERIALS

- 343 Prospects for mineralogy on Titan
Helen E. Maynard-Casely, Morgan L. Cable, Michael J. Malaska,
Tuan H. Vu, Mathieu Choukroun, and Robert Hodyss

SPECIAL COLLECTION: BIOMATERIALS—MINERALOGY MEETS MEDICINE

- 350 Biodegradability of spherical mesoporous silica particles (MCM-41) in simulated body fluid (SBF)
Elena Boccardi, Anahi Philippart, Ana M. Beltrán, Jochen Schmidt,
Liliana Liverani, Wolfgang Peukert, and Aldo R. Boccacini

SPECIAL COLLECTION: RATES AND DEPTHS OF MAGMA ASCENT ON EARTH

- 355 Modeling of trace elemental zoning patterns in accessory minerals with emphasis on the origin of micrometer-scale oscillatory zoning in zircon
Oleg E. Melnik and Ilya N. Bindeman

SPECIAL COLLECTION: NEW ADVANCES IN SUBDUCTION ZONE MAGMA GENESIS

- 369 Experimental calibration and implications of olivine-melt vanadium oxybarometry for hydrous basaltic arc magmas
Tatiana A. Shishkina, Maxim V. Portnyagin, Roman E. Botcharnikov,
Renat R. Almeev, Anna V. Simonyan, Dieter Garbe-Schönberg,
Stephan Schuth, Martin Oeser, and Francois Holtz

SPECIAL COLLECTION: WATER IN NOMINALLY HYDROUS AND ANHYDROUS MINERALS

- 384 IR spectroscopy and OH⁻ in silicate garnet: The long quest to document the hydrogarnet substitution
Charles A. Geiger and George R. Rossman

ARTICLES

- 394 A mineralogical archive of the biogeochemical sulfur cycle preserved in the subsurface of the Rio Tinto system
David C. Fernández-Remolar, Neil Banerjee, David Gómez-Ortiz,
Matthew Izawa, and Ricardo Amils
- 412 Water diffusion in silica glass through pathways formed by hydroxyls
Minami Kuroda, Shogo Tachibana, Naoya Sakamoto, Satoshi Okumura,
Michihiko Nakamura, and Hisayoshi Yurimoto
- 418 A new optical cell for in situ Raman spectroscopy, and its application to study sulfur-bearing fluids at elevated pressures and temperatures
Marcel Dietrich, Harald Behrens, and Max Wilke

Vol. 103, No. 4 April 2018

INVITED CENTENNIAL ARTICLE

- 489 A Mössbauer-based XANES calibration for hydrous basalt glasses reveals radiation-induced oxidation of Fe
Elizabeth Cottrell, Antonio Lanzirotti, Bjorn Mysen, Suzanne Birner,
Katherine A. Kelley, Roman Botcharnikov, Fred A. Davis, and
Matthew Newville

SPECIAL COLLECTION: EARTH ANALOGS FOR MARTIAN GEOLOGICAL MATERIALS AND PROCESSES

- 502 Craters of the Moon National Monument basalts as unshocked compositional and weathering analogs for martian rocks and meteorites
Christopher T. Adcock, Arya Udry, Elisabeth M. Hausrath, and
Oliver Tschauer

MINERALS IN THE HUMAN BODY

- 517 Characterizing the source of potentially asbestos-bearing commercial vermiculite insulation using in situ IR spectroscopy
Gregg A. Swayze, Heather A. Lowers, William M. Benzel, Roger N. Clark,
Rhonda L. Driscoll, Zac S. Perlman, Todd M. Hoefen, and M. Darby Dyar

SPECIAL COLLECTION: BIOMATERIALS—MINERALOGY MEETS MEDICINE

- 550 Nanocrystalline apatites: The fundamental role of water
Christophe Drouet, Maëlen Aufray, Sabrina Rollin-Martinot,
Nicolas Vandecastelle, David Grossin, Fabrice Rossignol,
Eric Champion, Alexandra Navrotsky, and Christian Rey

SPECIAL COLLECTION: DYNAMICS OF MAGMATIC PROCESSES

- 565 New petrological, geochemical, and geochronological perspectives on andesite-dacite magma genesis at Ruapehu volcano, New Zealand
Chris E. Conway, John A. Gamble, Colin J.N. Wilson, Graham S. Leonard,
Dougal B. Townsend, and Andrew T. Calvert

SPECIAL COLLECTION: RATES AND DEPTHS OF MAGMA ASCENT ON EARTH

- 582 Combined Fe-Mg chemical and isotopic zoning in olivine constraining magma mixing-to-eruption timescales for the continental arc volcano Irazú (Costa Rica) and Cr diffusion in olivine
Martin Oeser, Philipp Ruprecht, and Stefan Weyer
- 600 Feldspar Raman shift and application as a magmatic thermobarometer
Kenneth S. Befus, Jung-Fu Lin, Miguel Cisneros, and Suyu Fu

American Mineralogist, Vol.103 No's 3 & 4, March & April 2018

Vol. 103, No. 3 March 2018, continued

- 430 Observations on three-dimensional measurement of confined fission track lengths in apatite using digital imagery
Qingyang Li, Andrew Gleadow, Christian Seiler, Barry Kohn, Pieter Vermeesch, Andrew Carter, and Anthony Hurford
- 441 Revision of the CaCO_3 - MgCO_3 phase diagram at 3 and 6 GPa
Anton Shatskiy, Ivan V. Podborodnikov, Anton V. Arefiev, Daniil A. Minin, Artem D. Chanyshv, and Konstantin D. Litasov
- 453 Redox-controlled dissolution of monazite in fluids and implications for phase stability in the lithosphere
Dustin Trail
- 462 Crystal structure of CaSiO_3 perovskite at 28–62 GPa and 300 K under quasi-hydrostatic stress conditions
Huawei Chen, Sang-Heon Shim, Kurt Leinenweber, Vitali Prakapenka, Yue Meng, and Clemens Prescher
- 469 A common origin for Thai/Cambodian rubies and blue and violet sapphires from Yogo Gulch, Montana, U.S.A.?
Aaron C. Palke, Jacqueline Wong, Charles Verdel, and Janaina N. Ávila
- 480 Submicrometer yttrian zircon coating and arborescent aeschynite microcrystals on truncated bipyramidal anatase: An electron microscopy study of miarolitic cavities in the Cuasso al Monte granophyre (Varese, Italy)
Giancarlo Capitani, Enrico Mugnaioli, and Paolo Gentile

Vol. 103, No. 4 April 2018, continued

SPECIAL COLLECTION: HIGH-GRADE METAMORPHISM, ANATEXIS, AND GRANITE MAGMATISM

- 610 Partial melting of ultramafic granulites from Dronning Maud Land, Antarctica: Constraints from melt inclusions and thermodynamic modeling
Silvio Ferrero, Gaston Godard, Rosaria Palmeri, Bernd Wunder, and Bernardo Cesare

ACTINIDES IN GEOLOGY, ENERGY, AND THE ENVIRONMENT

- 623 Cesium adsorption isotherm on swelling high-charged micas from aqueous solutions: Effect of temperature
Francisco J. Osuna, Agustín Cota, Esperanza Pavón, M. Carolina Pazos, and Maria D. Alba

ARTICLES

- 629 Ni-serpentine nanoflakes in the garnierite ore from Campello Monti (Strona Valley, Italy): Népouite with some pecoraite outlines and the processing of Ni-containing ore bodies
Gian Carlo Capitani and Gennaro Ventruti

MSA AWARD PRESENTATIONS

- 645 Presentation of the 2017 Roebling Medal of the Mineralogical Society of America to Edward Stolper
Harry Y. McSweeney Jr.
- 646 Acceptance of the 2017 Roebling Medal of the Mineralogical Society of America
Edward Stolper
- 648 Presentation of the Mineralogical Society of America Award for 2017 to Dustin Trail
E. Bruce Watson
- 650 Acceptance of the Mineralogical Society of America Award for 2017
Dustin Trail
- 651 Presentation of the Dana Medal of the Mineralogical Society of America for 2017 to Thomas W. Sisson
Charles R. Bacon
- 653 Acceptance of the Dana Medal of the Mineralogical Society of America for 2017
Thomas W. Sisson
- 654 Presentation of the Distinguished Public Service Award of the Mineralogical Society of America for 2017 to David W. Mogk
Mickey E. Gunter
- 655 Acceptance of the Distinguished Public Service Award of the Mineralogical Society of America for 2017
David W. Mogk

NEW MINERAL NAMES

BOOK REVIEW

 **GeoScienceWorld**
Participating Publisher

SPONSORING BENEFACTORS
Excalibur Mineral Corporation
Gemological Institute of America

Vulcan Materials—Corporate Office
W.R. Grace & Co.

CONTRIBUTING BENEFACTORS
Bruker AXS Inc. (WI)

Engineering & Mining Journal, Vol.219 No.2, Feb 2018

E&M^J
ENGINEERING AND
MINING JOURNAL®

03 JUL 2018
केंद्रीय पुस्तकालय
CENTRAL LIBRARY

FEATURES

Prospectors and Developers Beware

After reviewing a century of Canadian mining in his new book, Teck Chair Norman Keevil tells E&MJ two lawsuits shed light on the legal implications of seemingly mundane exploration contract negotiations.....24

A Simple Spin on Classification

In use as an essential classification and dewatering tool for the best part of 90 years, today hydrocyclones play a key role in maintaining concentrator flow. E&MJ looks at the technology fundamentals and how equipment optimization is still in progress.....28

Strategizing to Cut Wear Costs and Problems

Check out these new products, systems and tips to handle critical anti-wear applications.....34

Mine Worker Fatigue and Circadian Rhythms

How biological clocks respond to light and darkness.....38

Mining for America Becomes Local Politics

State bill to end moratorium on sulfide mining prompts effort to clone development-thwarting ordinances.....42

LEADING DEVELOPMENTS

Rio Tinto's Autonomous Haulage Achieves 1 Billion Tons.....	4
Leagold Makes Offer for Brio Gold.....	4
Centerra Completes AuRico Acquisition.....	4
Nutrien Emerges From Agrium, PotashCorp Merger.....	5
Oyu Tolgoi Finishes Sinking of Shaft 2.....	5

AROUND THE WORLD

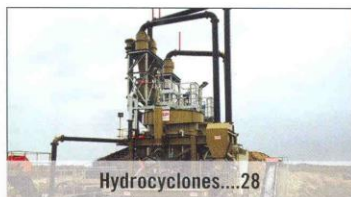
U.S. & Canada: Pretium Plans Major Mine Production Increase at Brucejack....	6
Latin America: Construction Advances at Cerro Moro.....	12
Australia/Oceania: St. Barbara Drills Deep for Gwalia Gold.....	14
Africa: Perseus Starts Up Sissingué.....	16
Asia: KAZ Minerals Building Second Concentrator at Aktogay.....	18
Exploration Roundup: Polyus Drilling 180,000 m at the Sukhoi Log Deposit....	20



In addition to reports related to exploration and mineral processing, this month's E&MJ also covers the ventilation challenges faced by deep mines (See Operating Strategies, p. 46). On the cover, a jumbo drill is lowered from a platform to the shaft bottom at the Oyu Tolgoi mine in Mongolia. (Photo: Turquoise Hill)

DEPARTMENTS

Calendar.....	23
Classified Advertisements.....	54
Equipment Gallery.....	52
From the Editor.....	2
Markets.....	56
Operating Strategies.....	46
People.....	10
Processing Solutions.....	50
Suppliers Report.....	48
This Month in Coal.....	22



Hydrocyclones....28



Wear Protection....34



Processing Solutions....50

Engineering & Mining Journal, Vol.219 No.3, March 2018

E&MJ
ENGINEERING AND
MINING JOURNAL®

INDIAN BUREAU OF MINES

03 JUL 2018

केंद्रीय पुस्तकालय
CENTRAL LIBRARY

FEATURES

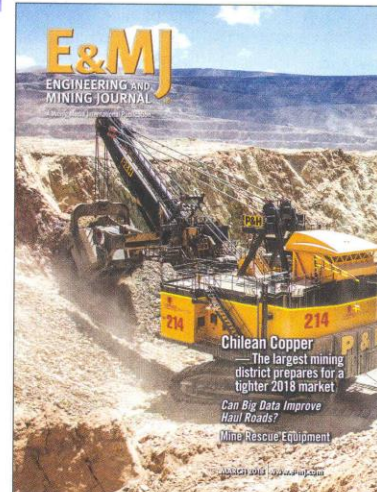
- Tracing Copper's Future: Chile's Changing Priorities**
Price bull commentary steals the limelight from real growth challenges and responses..... 28
- Using Big Data to Predict Haul Road Performance**
Knowing which parts of the haulage network require attention, miners can dispatch maintenance resources more effectively..... 34
- Lightening the Load**
Studies and technologies focus on making mine rescue physically and mentally less stressful..... 38
- Despite Water Woes, Mining Indaba 2018 Sees Signs of Optimism**
Mining leaders and investors gather in Cape Town to discuss the industry's African prospects..... 42
- Writing Reflections**
After a mining-industry career spanning 50 years, E&MJ's European editor is pulling the plug on his keyboard. This is his personal review of events and technology during that time..... 46

LEADING DEVELOPMENTS

- Barrick Outlines Organic Investments.....4
- Mountain Province Diamonds Buys Kennady Diamonds4
- Rio Tinto Receives Offer for Aluminum Assets5
- Prospectors Are Feeling More Positive5
- Randgold Repeats Record Production6
- Rio Tinto Chief Executive, Australia Prime Minister Visit White House6
- Santa Rosa Mill Ramps Up in Colombia.....6

AROUND THE WORLD

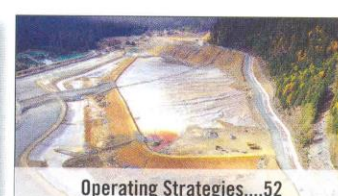
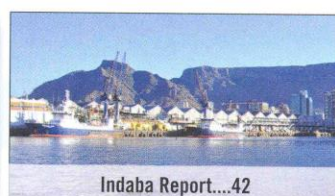
- U.S. & Canada:** PFS Supports Expansion of Atlantic's Moose River Project.....8
- Latin America:** Hecla Secures Second San Sebastian Mill.....14
- Australia/Oceania:** Heron Grants Woodlawn Mining Contract to PYBAR.....16
- Africa:** Golden Star Achieves Commercial Production at Prestea Underground.....18
- Asia:** Polyus Increases Gold Production.....20
- Exploration Roundup:** OZ Minerals Joins Woomera in South Australia Joint Venture22



This month, E&MJ reports on development within Chile's copper mining sector. On the cover, an electric shovel loads ore at the Radomiro Tomic copper mine in Chile. (Photo: Codelco)

DEPARTMENTS

- Calendar.....26
- Classified Advertisements.....62
- Equipment Gallery.....58
- From the Editor.....2
- Markets.....64
- Operating Strategies.....52
- People.....12
- Processing Solutions.....56
- Suppliers Report.....54
- This Month in Coal.....24



Engineering & Mining Journal, Vol.219 No.4, April 2018

E&MJ
ENGINEERING AND
MINING JOURNAL®

INDIAN BUREAU OF
16 JUL 2018
केंद्रीय पुस्तकालय
CENTRAL LIBRARY

FEATURES

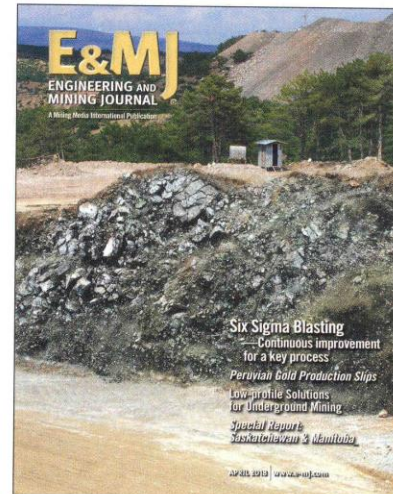
Peru's Biggest Gold Mines Seek Life Extensions <i>As grades fall and costs rise, the majors act on plans to goose production in the near term.....</i>	40
Six Sigma Blasting <i>Implementing a process improvement plan for blasting can improve downstream operations.....</i>	46
Get Better Recovery From Heap-leach Systems <i>From comminution to pad design, miners are reviewing options for precious metals.....</i>	52
Advanced Systems Offer Consistent Low-cost Material Handling Solutions <i>TAKRAF discusses three recent projects.....</i>	56
Low-profile Mechanized Mining <i>Leading local innovation at the heart of gold and PGM miner's mechanization drive.....</i>	60
Maximizing Motor Skills <i>Miners are moving toward 'intelligent mining,' 'the connected mine,' and IoT. Electric motor suppliers are intent upon expanding their market. Consequently, motors, drives and couplings are getting smarter — and easier to install, control and monitor.</i>	64
Special Report: Mining in Saskatchewan & Manitoba	69

LEADING DEVELOPMENTS

Hecla Buys Klondex Mines.....	4
Anglo Suspends Production at Minas-Rio for 90 Days.....	4
Leagold Acquiring Brio Gold.....	4
Production Resumes at Cadia.....	5
Cleveland-Cliffs Breaks Ground on HBI Plant in Ohio.....	5
Finland Tops Fraser's 2017 Mining Survey.....	6
Anglo Commits to Ambitious Sustainability Strategy.....	6

AROUND THE WORLD

U.S. & Canada: Production Begins at Silvertip Mine.....	8
Latin America: Newcrest Investing in Lundin Gold, Fruta del Norte Project.....	16
Australia/Oceania: Dacian Pours First Gold at Mount Morgans.....	20
Africa: Mining Industry Submits Code Proposal to DRC Government.....	24
Asia: Earthquakes Ravage PNG Highlands.....	28
Europe: KGHM Posts Loss as Copper Prices Rise.....	30
Exploration Roundup: Minerals Exploration Spending Turns Up in 2017.....	32



This month, E&MJ offers ideas on how to improve blasting operations. On the cover, a perfect launch with little or no flyrock and no colorful emissions. (Photo: Anthony Konya)

DEPARTMENTS

Calendar.....	38
Classified Advertisements.....	86
Equipment Gallery.....	84
From the Editor.....	2
Markets.....	88
Operating Strategies.....	78
People.....	14
Processing Solutions.....	82
Suppliers Report.....	80
This Month in Coal.....	34

Economic Geology, Vol.113 No.1, Jan-Feb 2018

CONTENTS

A Special Issue Devoted to Porphyry and Epithermal Deposits of the Southwest Pacific
Guest Editors: Pete Hollings, Michael J. Baker, Evan Orovan, and Marc Rinne

A Special Issue Devoted to Porphyry and Epithermal Deposits of the Southwest Pacific: An Introduction	Pete Hollings, Michael J. Baker, Evan Orovan, and Marc Rinne	1
Tectonics and Geology of Porphyry Cu-Au Deposits along the Eastern Sunda Magmatic Arc, Indonesia	Adi Maryono, Rachel L. Harrison, David R. Cooke, Iryanto Rompo, and Terence G. Hoshcke	7
Magma Evolution Leading to Porphyry Au-Cu Mineralization at the Ok Tedi Deposit, Papua New Guinea: Trace Element Geochemistry and High-Precision Geochronology of Igneous Zircon	Simon J.E. Large, Albrecht von Quadt, Jörn-Frederik Wotzlaw, Marcel Guillong, and Christoph A. Heinrich	39
Physicochemical Processes in the Magma Chamber under the Black Mountain Porphyry Cu-Au Deposit, Philippines: Insights from Mineral Chemistry and Implications for Mineralization	Mingjian Cao, Pete Hollings, David R. Cooke, Noreen J. Evans, Brent I.A. McInnes, KeZhang Qin, GuangMing Li, Gabe Sweet, and Mike Baker	63
Geology of the Boyongan and Bayugo Porphyry Cu-Au Deposits: An Emerging Porphyry District in Northeast Mindanao, Philippines	David P. Braxton, David R. Cooke, Allan M. Ignacio, and Patrick J. Waters	83
Geology and Isotope Geochemistry of the Wainaulo Cu-Au Porphyry Deposit, Namosi District, Fiji	Evan A. Orovan, David R. Cooke, Anthony C. Harris, Ben Ackerman, and Erin Lawlis	133
Geochronology of the Tumpangpitu Porphyry Au-Cu-Mo and High-Sulfidation Epithermal Au-Ag-Cu Deposit: Evidence for Pre- and Postmineralization Diatremes in the Tujuh Bukit District, Southeast Java, Indonesia	Rachel L. Harrison, Adi Maryono, Malcolm S. Norris, Bruce D. Rohrlach, David R. Cooke, Jay M. Thompson, Robert A. Creaser, and David S. Thiede	163
Evolution of Pyrite Trace Element Compositions from Porphyry-Style and Epithermal Conditions at the Lihir Gold Deposit: Implications for Ore Genesis and Mineral Processing	Stephanie Sykora, David R. Cooke, Sebastien Meffre, Aleksandr S. Stephanov, Karyn Gardner, Robert Scott, David Selley, and Anthony C. Harris	193
Vein Stratigraphy, Mineralogy, and Metal Zonation of the Kencana Low-Sulfidation Epithermal Au-Ag Deposit, Gosowong Goldfield, Halmahera Island, Indonesia	Lindsey V. Clark and J. Bruce Gemmell	209
The Structure and Significance of Anhydrite-Bearing Vein Arrays, Lienetz Orebody, Lihir Gold Deposit, Papua New Guinea	Stephanie Sykora, David Selley, David R. Cooke, and Anthony C. Harris	237
Geology and Geochronology of the Golpu Porphyry and Wafi Epithermal Deposit, Morobe Province, Papua New Guinea	Marc L. Rinne, David R. Cooke, Anthony C. Harris, David J. Finn, Charlotte M. Allen, Matthew T. Heizler, and Robert A. Creaser	271
Interesting Papers in Other Journals		295
Instructions to Authors, 2018		305

ELECTRONIC ACCESS TO ECONOMIC GEOLOGY
Contact subscriptions@segweb.org

Claims for non-receipt of *Economic Geology* must be made within 90 days of the cover date for replacement at no charge.

ECGLAL 113(1) 1-308

ISSN 0361-0128

Economic Geology, Vol.113 No.2, May 2018

CONTENTS

Papers

- 6** La Colosa Au Porphyry Deposit, Colombia: Mineralization Styles, Structural Controls, and Age Constraints
Andrés Naranjo, Johannes Horner, Rudolf Jahoda, Larry W. Diamond, Adriana Castro, Aura Uribe, Carolina Perez, Hermel Paz, Carlos Mejia, and Jonas Weil 553
- A Modified Placer Origin for Refractory Gold Mineralization Within the Archean Radioactive Quartz Pebble Conglomerates from the Eastern Part of the Singhbhum Craton, India
R. Chakravarti, S. Singh, A. S. Venkatesh, K. Patel, and P. R. Sahoo 579
- Hematite Breccia-Hosted Iron Oxide Copper-Gold Deposits Require Magmatic Fluid Components Exposed to Atmospheric Oxidation: Evidence from Prominent Hill, Gawler Craton, South Australia
Tobias U. Schlegel, Thomas Wagner, Markus Wälle, and Christoph A. Heinrich 597
- The Nature and Origin of Hydrothermal REE Mineralization in the Sin Quyen Deposit, Northwestern Vietnam
Xiao-Chun Li and Mei-Fu Zhou 645
- Petrogenesis and Ore Genesis of the Lengshuiqing Magmatic Sulfide Deposit in Southwest China: Constraints from Chalcophile Elements (PGE, Se) and Sr-Nd-Os-S Isotopes
Jun-Hua Yao, Wei-Guang Zhu, Chusi Li, Hong Zhong, Zhong-jie Bai, Edward M. Ripley, and Chao Li 675
- 6** The Lovisa Stratiform Zn-Pb Deposit, Bergslagen, Sweden: Structure, Stratigraphy, and Ore Genesis
N. F. Jansson, S. Sjöbom, R. L. Allen, K. Billström, and P. G. Spry 699
- Contrasting Styles of Pd-Rich Magmatic Sulfide Mineralization in the Lac des Iles Intrusive Complex, Ontario, Canada
M. L. Djon, D. C. Peck, G. R. Olivo, J. D. Miller, and B. Joy 741
- Scientific Communications**
- Andradite Garnet U-Pb Geochronology of the Big Gossan Skarn, Ertzberg-Grasberg Mining District, Indonesia
S. Wafforn, S. Seman, J. R. Kyle, D. Stockli, C. Leys, D. Sonbait, and M. Cloos 769
- Neoproterozoic Carbonate Lithofacies and Ore Distribution at the Kipushi Cu-Zn Deposit, Democratic Republic of Congo, and Gayna River Zn Camp, Northwest Territories, Canada
E. C. Turner, D. W. Broughton, and T. Brooks 779
- 6** Blade-Shaped Dikes and Nickel Sulfide Deposits: A Model for the Emplacement of Ore-Bearing Small Intrusions
Stephen J. Barnes and James E. Mungall 789
- Interesting Papers in Other Journals** 799

ELECTRONIC ACCESS TO ECONOMIC GEOLOGY

Contact subscriptions@segweb.org

Claims for non-receipt of *Economic Geology* must be made within 90 days of the cover date for replacement at no charge.

Industrial Minerals, No.599, February 2018

News & Analysis

Comment	7
Top Stories	8
People and Places	16
Bruce Griffin Senior VP, Strategic Development Lomon Billions	
Refractories Hotline	17
RHI restarts fused magnesia lines in Norway	
Moving Minerals	18
What next for freight rates in 2018?	
Market Monitor	19
Glass production: a global look at demand for 2018	
Regulation	20
Industrial minerals industry welcomes new EU anti-dumping rules	
Industrial Minerals Prices	50
IM analyses the latest pricing trends	
Diary Dates	56
Forthcoming industry events	
Index to Advertisers	57

भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
06 JUL 2018

Managing Editor: Barbara O'Donovan
bodonovan@indmin.com
General Manager: Peter Fitzmaurice
peter.fitzmaurice@indmin.com
Consultant Editor:
Siobhan Lismore-Scott
slismore@indmin.com
Deputy Editor: Davide Ghilotti
Davide.Ghilotti@indmin.com
Market Reporter: Martin Facada
martin.facada@indmin.com
Market Reporter: William Clarke
william.clarke@indmin.com
Market Reporter: Michael Greenfield
michael.greenfield@indmin.com
Correspondent: Cameron Perks
cameron.perks@indmin.com
Editorial Design: Paul Rackstraw
paul.rackstraw@btconnect.com

Advertising Production: Jane Crump
jane@forshawdesign.co.uk
Advertising Sales Director:
Anu Kurien
anu.kurien@indmin.com
Editorial
8 Bouverie Street,
London, EC4Y 8AX
T: +44 (0) 20 7827 9977
F: +44 (0) 20 7827 6441
E: edit@indmin.com
www.indmin.com

Advertising
8 Bouverie Street,
London, EC4Y 8AX
T: +44 (0) 20 7556 6019
F: +44 (0) 20 7827 6441
Marketing
Dominique Destree
PO Box 18083,
London EC4V 5JS
T: +44 (0) 20 7779 8172
F: +44 (0) 20 7827 6441
E: dominique.destree@indmin.com

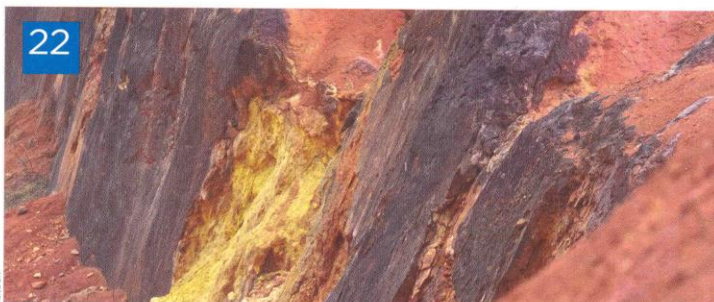
Sales
T: +44 (0) 207 779 8386

US office
1525 E. 53rd St. Suite 516-7
Chicago IL 60637
T: +1 (773) 643 1975
E: kpatel@indmin.com

Asia-Pacific Research Office
Room 305, 3/F, Azia Center, 1233
Lujiazui Ring Road, Shanghai,
China, 200120
T: +86- 21- 5877 0857
F: +86- 21- 5877 0856

Industrial Minerals is a part of
Euromoney Trading, 4 Bouverie
Street London, EC4Y 8AX

Directors: John Botts (Chairman),
Andrew Rashbass (CEO), Colin Jones,
David Pritchard, Sir Patrick Sergeant,
Andrew Ballingal, Tristan Hillgarth,
Imogen Joss, Tim Collier, Kevin Beatty,
Jan Babjak



Bauxite and alumina prices have risen dramatically because of the squeezed supply situation out of China.

Top Stories

- 10 Corfo confirms six lithium product investment proposals
SQM reopens conciliation talks with Chilean state body
- 11 SQM to close water extraction wells in the Salar de Llamara on environmental order
- 12 Lithium tightness to stay while Chile sets regulatory framework, says Wealth Minerals exec
- 13 Sheffield's Thunderbird mineral sand project faces legal setback
Tronox-Cristal merger faces further regulatory scrutiny
- 14 Arafura clears regulatory hurdle in race to sell magnet minerals
Baotou increases rare earth production
- 15 China's refractory materials output down 12% in Jan-Sep 2017
China's Gansu province sets minimum graphite mining capacity
Directa Plus to supply graphene for enhanced bicycle tyres

More online
www.indmin.com/news

Industrial Minerals, No.599, February 2018



28



30



34



43

Features

22 Feeling the heat: Bauxite and alumina under pressure

China's high-profile disruptions to industrial operations wreaked havoc in the bauxite and alumina supply chains serving refractories end markets, taking prices to new highs, *deputy editor Davide Ghilotti* reports.

28 Alteo: serving the speciality markets

As non-metallurgical alumina markets are facing a combination of tight supply, high demand and rising prices, Industrial Minerals caught up with Gildas Fontaine, marketing, business development and communication director at France-based speciality alumina supplier Alteo, to discuss what is in store for calcined alumina and the future prospects of global speciality markets.

30 Separation anxiety: Ceramic membranes seek commercial niche

While porous ceramic membranes for nanofiltration of liquids have been widely adopted, take-up of dense ceramic membranes for gas separation has been relatively slow to follow. *IM correspondent Rose Pengelly* looks into this lesser known corner of the technical ceramics industry and discovers some of its most promising applications.

34 The sands of time: TiO₂ feedstocks to 2020

The balance in the market for titanium dioxide (TiO₂) feedstock has been in constant flux throughout history, and 2017 was no exception. *IM correspondent*

Cameron Perks takes a look at supply, demand, and prices throughout 2017, as well as what we should look out for as we approach 2020.

43 Junior mining: Banking on bargains

As the mining sector looks forward to further recovery in 2018, *correspondent Rose Pengelly* looks at some of the businesses poised to gain from the expected upswing.

PROCESSING

39 Argex primed to pave the way in low-cost TiO₂ processing

Environmental regulations in China are adding further pressure on sulfate-route pigment producers in favor of chloride-route production. This paves the way for further process innovation and investment, as well as opening up potential new sources for feedstock, *IM correspondent Cameron Perks* discovers.

COMPANY PROFILE

58 Production starts up at non-Chinese rare earth site

Rainbow's project in Burundi is in commercial operation, with a target of 5,000 tpy rare earths.

Next issue

Talc
Abrasives
Batteries
Quartz
Personal care minerals

Publication

IM magazine, IM online weekly news, Friday of each week, by Industrial Minerals, Euromoney Trading Ltd.

For our editorial schedule and/or publication dates please mail to: edit@indmin.com

Printed by Buxton Press Ltd.

Subscriptions

Industrial Minerals Global Intelligence Service - online and in print. Subscribe now on www.indmin.com or contact enquiries@indmin.com

© Industrial Minerals 2014. All rights reserved. No part of this publication (text, data or graphic) may be reproduced, stored in a data retrieval system, or transmitted, in any form whatsoever or by any means (electronic, mechanical photocopying, recording or otherwise) without obtaining Industrial Minerals' prior written consent. Unauthorised and/or unlicensed copying of any part of this publication is in violation of copyright law. Violators may be subject to legal proceedings and liable for substantial monetary damages

per infringement as well as costs and legal fees. ISSN 00 19-8544

Member of the Audit Bureau of Circulation



February 2018

INDUSTRIAL MINERALS

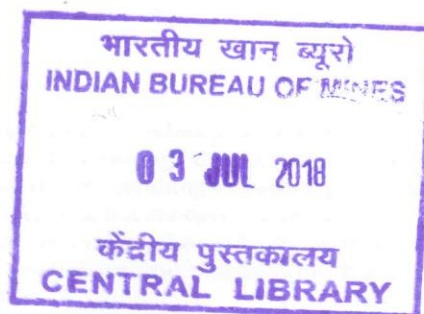
5

ENVIRONMENT

Volume 32 Number 1 February 2018

CONTENTS

- ✓ 1 Stochastic strategic planning of open-pit mines with ore selectivity recourse
A. Navarra, L. Montiel and R. Dimitrakopoulos
- 18 Contemporary sources and levels of heavy metal contamination in urban soil of Broken Hill, Australia after *ad hoc* land remediation
Kai Yang and Stephen R. Cattle
- ✓ 35 A heuristic approach for in-pit crusher and conveyor system's time and location problem in large open-pit mining
Morteza Paricheh, Morteza Osanloo and Mehdi Rahmanpour
- 56 Analysis of dust emission at coal train loading facility
Bisleshana B. Prakash, Vladislav Kecojevic and Ali Lashgari

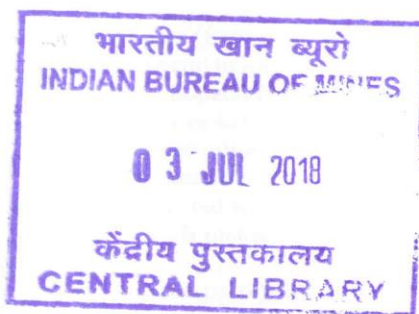


ENVIRONMENT

Volume 32 Number 2 March 2018

CONTENTS

- 75 Particulate matter pollution in opencast coal mining areas: a threat to human health and environment
Sneha Gautam, Aditya Kumar Patra, Satya Prakash Sahu and Michael Hitch
- ✓ 93 Comprehensive evaluation of land reclamation and utilisation schemes based on a modified VIKOR method for surface mines
Wei Zhou, Wenying Yin, Xiaoqing Peng, Fuming Liu and Fei Yang
- 109 Normalised availability importance measures for complex systems
Ali Nouri Gharahasanlou, Mohammad Ataei, Reza Khalokakaie and Abbas Barabadi
- 123 Mechanical, hydrological and microstructural assessment of the durability of cemented paste backfill containing alkali-activated slag
Ferdi Cihangir and Yunus Akyol



ENVIRONMENT

Volume 32 Number 3 April 2018

CONTENTS

- ✓ 145 Time-dependent rheological behaviour of cemented backfill mixture
X. J. Deng, B. Klein, J. X. Zhang, D. Hallbom and B. de Wit
- 163 Genetic algorithms for the optimisation of the Schwartz–Smith two-factor model: a case study on a copper deposit
Mathieu Sauvageau and Mustafa Kumral
- ✓ 182 Forecasting time-to-failure of machine using hybrid Neuro-genetic algorithm – a case study in mining machinery
Amol Paithankar and Snehamoy Chatterjee
- 196 A review of dust emission dispersions in rock aggregate and natural stone quarries
M. Sairanen, M. Rinne and O. Selonen
- iii Statement of Retraction



ENVIRONMENT

Volume 32 Number 4 June 2018

CONTENTS

- 221 Open pit mine planning considering geomechanical fundamentals
Andrés Parra, Nelson Morales, Javier Vallejos and Phu Minh Vuong Nguyen
- 239 Microstructural, hydraulic conductivity and geochemical changes of drying mature fine oil sand tailings in column experiments
Anis Roshani, Mamadou Fall and Kevin Kennedy
- 254 Relationships between the normalised difference vegetation index and temperature fluctuations in post-mining sites
Luděk Bujalský, Vladimír Jirka, František Zemek and Jan Frouz
- 264 Value-based optimisation of replacement intervals for critical spare components
David R. Godoy, Peter Knights and Rodrigo Pascual
- 273 Stope depth effect on field behaviour and performance of cemented paste backfills
Erol Yilmaz

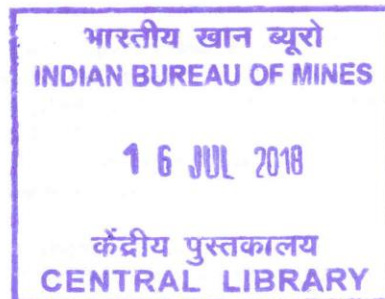


**INTERNATIONAL JOURNAL OF MINING, RECLAMATION AND
ENVIRONMENT**

Volume 32 Number 5 August 2018

CONTENTS

- 297 Coal burst induced by rock wedge parting slip: a case study in Zhaolou coal mine
Guangjian Liu, Zonglong Mu and Murat Karakus
- 312 Application of Pb-Zn tailings for surface paste disposal: geotechnical and geochemical observations
A. Bascetin and S. Tuylu
- 327 Schedule-based pushback design within the stochastic optimisation framework
Iain Farmer and Roussos Dimitrakopoulos
- 341 Increasing adherence to mine plan through data integration and process change
Muhammet Mustafa Kahraman and Sean Dessureault
- 355 Three-dimensional effect of stresses in open stope mine design
Javier A. Vallejos, Adeline Delonca and Ernesto Perez



Iron & Steel Review, Vol.61 No.12, May 2018

Features

Editor & Publisher:
Santosh Mahanti

Directors:
Sabita Mahanti
Abhishek Mahanti

Director & Content Strategist:
Kritika Mahanti

Editorial:
Anindita Banerjee
Megha Ghosh

Marketing:
Shyamalendu Banerjee
Angan Chatterjee

New Delhi Representative:
Maqsood Alam Khan

Design & Layout:
Dipak Adhikari
Arniya Kumar Das

Editorial & Corporate Office:
Merlin Links, Block 5E/5F, 5th Floor
166B, S. P. Mukherjee Road
Kolkata - 700 026
Phone: 91-033-2465-8581/9406
Fax: 91-033-2465-3790
E-mail: isinfo@eth.net
contact@isinfoindia.in
Website: www.isinfoindia.com

Registered Office:
10, Chowringhee Road
Kolkata - 700 013

Subscription Rate

Domestic
₹ 10,000 (Yearly)
₹ 950 (Single Copy)

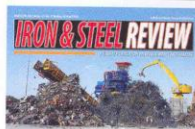
Overseas
\$ 1400 (Yearly)
€ 1200 (Yearly)

- 5% GST as applicable

Owned & Printed by Santosh Mahanti
at M/s. Gupta Quick Printers
4D/28, Dharmatalla Road
Kolkata - 700 039
and published by him from
10, Chowringhee Road
Kolkata - 700 013, India.

Reproduction of matter published here, in whole or in parts, is prohibited without written permission from the publisher.

The publisher and printer do not accept any responsibility for statements, data and opinions expressed by the author.



Cover: Vezzani Scrap Processing Equipment



Cover: Vezzani Scrap Processing Equipment



Pratibha



Pratibha

भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES

03 JUL 2018

केंद्रीय पुस्तकालय
CENTRAL LIBRARY



Now available on
Android/iOS

Follow us on:



www.facebook.com/ISIRinfoindia/

Now Available on

amazon

Special Feature

21

Blast Furnace Modernisation and Technological Solutions

A range of customized BF solutions by Primetals Technologies

National Trends

30

Bokaro Steel's performance in 2017-18 surpassed achievements of 10 years

Current events and latest developments in Indian steel & allied industries

Global Trends

44

SMS Concast to upgrade CELSA Barcelona's beam blank caster

Latest news and updates on iron & steel industry across the globe

Focus

60

Indian Steel 4.0 – The Way Forward

Requirements of a competitive steel industry in India, achieving the benefits of the Indian Steel Vision 2030

Interview

64

"We are a technology company and not only a refractory company and would like to extend total solutions package to steel industry"

Roel V. D. Sluis, President Flow Control BU, Vesuvius talks about Vesuvius Indian Business in an interview

Steel Market

71

Market Performance of Indian Steel Industry in FY 2017-18

India's steel market performance in FY 2017-18

Company News

86

JSPL back to profits

JSPL reports high figures for Q4 & full year FY 2017-18

Market & Product

88

ABB launches World's First Digitally Integrated Power Transformer

Reliable digital solution from ABB for power transformer with maximum efficiency

Steel Technology

89

Danieli to supply Two Continuous Galvanizing Lines for JSW Steel Limited, Toranagallu works

Market trend for GP/GC in India and special feature of Danieli CGL to be installed at JSW steelworks in Toranagallu

Pre Engineered Building

102

Pre-Engineered & Pre-Fabricated Steel Buildings for Rapid Construction and Energy Efficiency

Cutting-edge PEB technologies with special reference to prefab panels & prefab insulated building



<http://www.jsw.in>



Danieli

Contd...

Iron & Steel Review, Vol.61 No.12, May 2018

Features

Refractory

105

Design of 'Al₂O₃ - SiC - C' Castables for Blast Furnace Runners: Roles of Aggregates

A study of different types of aggregates for designing blast furnace runner castables

Pre Show Report

116

- 2018 SEAISI: the biggest steel event of the year in ASEAN region
- AISTech 2018 - Steel's Premier Technology Event is Here Again!

Upcoming Events

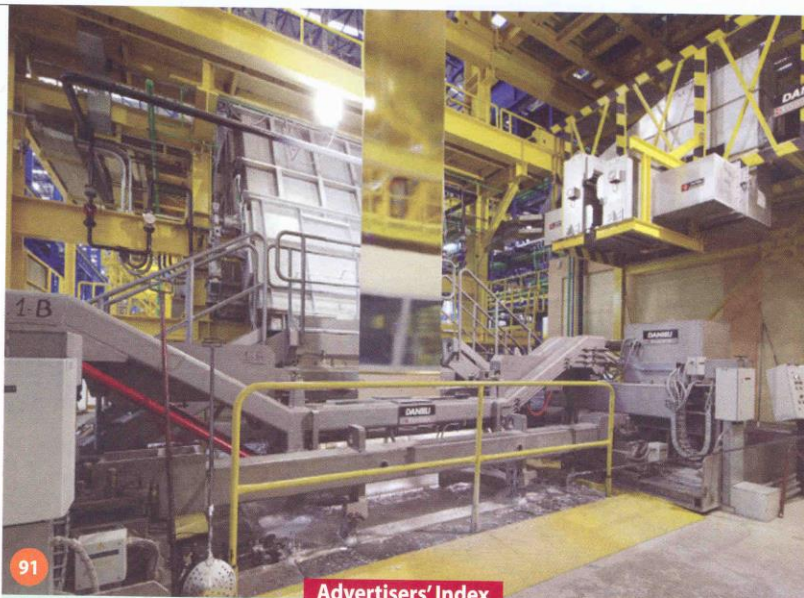
120

Upcoming Business Events/Exhibitions/Trade Fairs in India and around the world

Statistics

121

World Crude Steel & Iron Production - January - March 2018
Indian Steel Market & Prices - March 2018 & April 2017 - March 2018



Advertisers' Index

A		
ABB	45	
A. R. Group of Industries	93	
Atomat Group	51	
Aman Machine Tools (P) Ltd.	14	
ARB Bearings Ltd.	83	
Arcum Engineering (P) Limited	74-75	
ANT Steel Engineers (Asia) Pvt. Ltd.	95	
B		
Balmer Lawrie & Co. Ltd.	85	
Balaji Abrasives Tools Private Limited	10	
Braun Machine Technologies	62	
C		
Creative Carbon Pvt. Ltd.	101	
D		
Danieli & Co.	48-49	
Dalmia-OCIL Refractories	Second Cover	
E		
Electrotherm (India) Limited	9	
Exxon Mobil	7	
EMG	Back Cover	
H		
H & K Rolling Mill Engineers Pvt. Ltd.	13	
Henan Yuxing Engineering & Technology of Hot Blast Stove	10-11	
Co., Ltd.		
Hi-Tech Chemicals (P) Ltd.	113	
Hitachi	127	
I		
Indiana Machine Tools	12	
Indrox Global Pvt. Ltd.	15	
International Combustion (India) Limited	41	
J		
Jindal Steel & Power Limited	39	
JSW Steel Limited	130	
Jaypee Power Transmission	42	
K		
KOCKS	53	
KME Germany GmbH & Co. KG	55	
M		
Mipalloy Nomura Plating Company Private Limited	69	
Maxis Motion Controls Pvt. Ltd.	79	
N		
Nuhydro	97	
NMDC Limited	37	
National Engineering Industries Ltd.	81	
O		
Orind Special Refractories Ltd.	111	
P		
Primalis Technologies	29	
P. S. Rolling Mills Mfg. Co. Pvt. Ltd.	32-33, 77, 99	
Preet Group	35	
R		
RHI Magnesita	107	
Refratechnik Steel	Third Cover	
S		
SMS group	Gate Fold	
Subscription Form	62	
Seminar Advt. (MMMM 2018)	20	
Seminar Advt. (INDIA STEEL 2019)	18	
Schaeffler	43	
T		
TMEIC	57	
TRL Krosaki Refractories Limited	109	
Transformers & Rectifiers (India) Ltd.	17	
U		
UGI Engineering Works Pvt. Ltd.	70	
V		
VELCO GmbH	115	
Vezzani Scrap Processing Equipment	Front Cover	
Z		
Zhuzhou Cemented Carbide Works Import & Export Company	16	
Zumbach Electronics	59	

Iron & Steel Review, Vol.62 No.1, June 2018

Features

Editor & Publisher:
Santosh Mahanti

Directors:
Sabita Mahanti
Abhishek Mahanti

Director & Content Strategist:
Kritika Mahanti

Editorial:
Anindita Banerjee
Megha Ghosh

Marketing:
Shyamalendu Banerjee
Angan Chatterjee

New Delhi Representative:
Maqsood Alam Khan

Design & Layout:
Dipak Adhikari
Amiya Kumar Das

Editorial & Corporate Office:
Merlin Links, Block 5E/5F, 5th Floor
166B, S. P. Mukherjee Road
Kolkata - 700 026
Phone: 91-033-2465-8581/9406
Fax: 91-033-2465-3790
E-mail: isrinfo@eth.net
contact@isrinformedia.in
Website: www.isrinformedia.com

Registered Office:
10, Chowringhee Road
Kolkata - 700 013

Subscription Rate

Domestic
₹ 10,000 (Yearly)
₹ 950 (Single Copy)

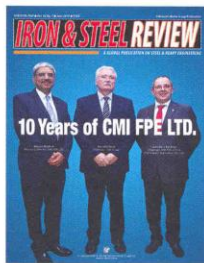
Overseas
\$ 1400 (Yearly)
€ 1200 (Yearly)

• 5% GST as applicable

Owned & Printed by Santosh Mahanti
at M/s. Gupta Quick Printers
4D/28, Dharmatalla Road
Kolkata - 700 039
and published by him from
10, Chowringhee Road
Kolkata - 700 013, India.

*Reproduction of matter published
here, in whole or in parts, is
prohibited without written
permission from the publisher.*

*The publisher and printer do not
accept any responsibility for
statements, data and opinions
expressed by the author.*



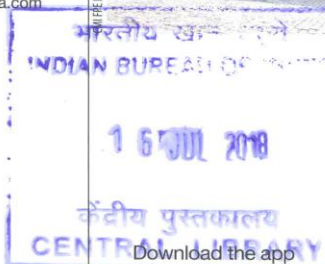
Cover: CMI FPE LTD.



CMI FPE LTD.



CMI FPE LTD.



Download the app



Now available on
Android/iOS

Follow us on:



www.facebook.com/ISRinformedia/

Now Available on

amazon

Cover Story

22

"We have a decade of good work behind us, but still many challenging years ahead of us"

10 years anniversary interview of J. F. Da Silva, Executive Committee Member of CMI Group, President of CMI Industry Sector & Chairman of CMI FPE & CMI Automation

Special Feature

29

Innovations in Steel Industry

A study of various innovations made in the steel industry

National Trends

38

SAIL's Rourkela Plant blown in rebuilt BF #1 - Parvati

Current events and latest developments in Indian steel & allied industries

Global Trends

56

SMS group to supply a thick slab caster for NLMK Group

Latest news and updates on iron & steel industry across the globe

Focus

70

Better Times Ahead for the Global Steel Industry

Global steel industry is likely to experience stable growth in 2018

Steel Market

72

Indian Steel Market April FY 2018-19

Performance of Indian Steel Market during the first month of FY'19

Company News

88

SAIL reports improved figures in FY 2017-18

SAIL reports strong numbers for Q4 and full year FY 2017-18

Market & Product

92

ExxonMobil's Mobil DTE 10 Excel Series to Enhance Productivity and Profitability in Mining

Mobil DTE 10 Excel Series of ExxonMobil fulfils the requirements of mining sector

Steel Technology

94

Measuring carbon in steel - absolute reliability matters

The OES solution and PMI-MASTER Smart from Hitachi High-Tech accurately measures the carbon content in steel

Environment

103

Electrical Energy Conservation through Energy Efficient Motors

Energy saving by using energy efficient motors is highly necessary in the age of energy scarcity



SMS group



Danieli

Contd...

Iron & Steel Review, Vol.62 No.1, June 2018

Features

Automotive Steel

110

Designing Hot Dip Galvanized Advanced High Strength Steels for Automotive Application

Two different strength levels of Hot Dip Galvanized AHSS

Rolling & Finishing Technology

112

New Solutions for the New Normal

Danieli's innovative CapEx- and OpEx-optimized process equipment for enhancing performance of discontinuous cold mills

Refractory

124

Development and Application of "Green", Environmentally Friendly Refractory Materials for the Iron & Steel Production Cycle

The development of green refractory products for iron & steel production are discussed

Upcoming Events

134

Upcoming Business Events/Exhibitions/Trade Fairs in India and around the world

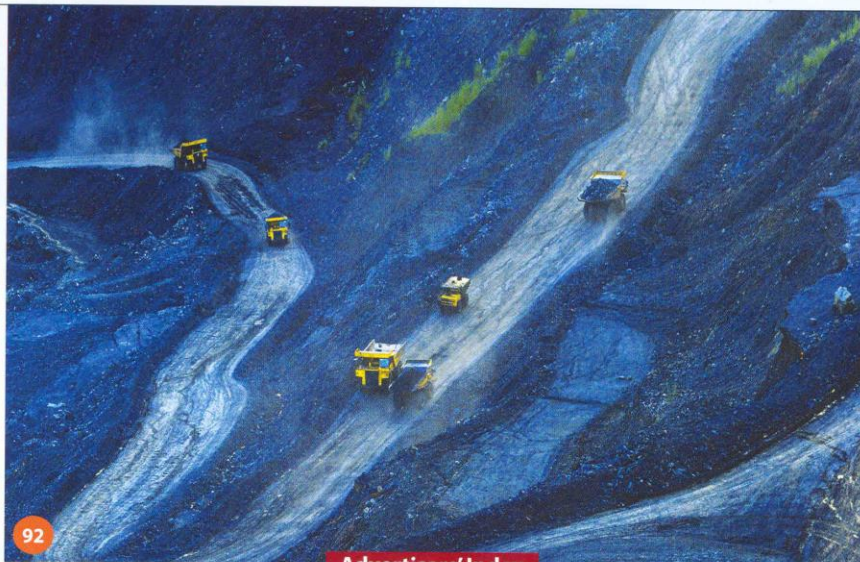
Statistics

135

World Crude Steel & Iron Production - January - April 2018
Indian Steel Market & Prices - April 2018



106



92

Advertisers' Index

A	KELK	105
A. R. Group of Industries	KME Germany GmbH & Co. KG	81
Atomat Group	M	
Aman Machine Tools (P) Ltd.	Mipalloy Nomura Plating Company Private Limited	85
ARB Bearings Ltd.	Maxis Motion Controls Pvt. Ltd.	77
ANT Steel Engineers (Asia) Pvt. Ltd.	N	
B	Nuhydro	101
Balmer Lawrie & Co. Ltd.	National Engineering Industries Ltd.	87
Balaji Abrasives Tools Private Limited	O	
Beekay Engineering Corporation	Orind Special Refractories Ltd.	129
C	Orient Refractories Ltd.	125
CMI FPE LTD.	P	
Creative Carbon Pvt. Ltd.	P. P. Rolling Mills Mfg. Co. Pvt. Ltd.	40-41, 71, 99
D	Preet Group	51
Danieli & Co.	Premur Impex Ltd.	27
Danieli Corus	Q	
Dalmia-OCL Refractories	Quaker Chemical India Private Limited	121
E	R	
Electrotherm (India) Limited	Rajendra Gears, R. G. Rolling India Ltd.	79
ExxonMobil Lubricants Pvt. Ltd.	S	
EMG	SMS group	Gate Fold
G	Subscription Form	28
Gates India	SEW Eurodrive	21
GFG PeaBody	Seminar Advt. (MMMM 2018)	20
GSB Group	Seminar Advt. (INDIA STEEL 2019)	18
H	Schaeffler	61
H & K Rolling Mill Engineers Pvt. Ltd.	SAIL	39
Henan Yuxing Engineering & Technology of Hot Blast Stove	Sick India	33
Co. Ltd.	Siempelkamp	57
Hi-Tech Chemicals (P) Ltd.	T	
Hitachi	TMEIC	67
I	TRL Krosaki Refractories Limited	123
Indiana Machine Tools	Transformers & Rectifiers (India) Ltd.	17
Indrox Global Pvt. Ltd.	U	
IMS Maco	UGI Engineering Works Pvt. Ltd.	86
Integrated Services	V	
J	Vedanta	45
Jindal Steel & Power Limited	Verder Scientific Private Limited	49
JSW Steel Limited	VSM Venture Control Systems (P) Ltd.	75
K	Z	
KOCKS	Zhuzhou Cemented Carbide Works Import & Export Company	16

JOURNAL of THE GEOLOGICAL SOCIETY OF INDIA

(Abstracted/Indexed in AGI's Bibliography and Index of Geology, Chemical Abstracts, Current Contents,
GEOBASE, GEORef, Mineralogical Abstracts, GeoArchive, Thomson ISI database (SCIE, CC/PC & ES))

Vol. 91 JUNE 2018 No. 6

CONTENTS

Wadia Institute of Himalayan Geology. B.R. ARORA 647

RESEARCH ARTICLES

- Transition in Late Quaternary Paleoclimate in Schirmacher Region, East Antarctica as Revealed from Lake Sediments.**
HARI B. SRIVASTAVA, PRAKASH K. SHRIVASTAVA, SANDIP K. ROY, M. JAVED BEG, RAJESH ASTHANA PAWAN GOVIL and KAMLESH VERMA 651
- Spatial Potential Analysis of Earthquakes in the Western Himalayas Using b-value and Thrust Association.**
RAMESH PUDI, PRIYOM ROY, TAPAS R. MARTHA, K. VINOD KUMAR and P. RAMA RAO 664
- Lineament Mapping over Sir Creek Offshore and its Surroundings using High Resolution EGM2008 Gravity Data: An Integrated Derivative Approach.**
✓ UJJAWAL KUMAR, S.K. PAL, SOUMYASHREE DEBASIS SAHOO, SATYA NARAYAN, SAURABH, SUBHENDU MONDAL and SHUVA SHANKHA GANGULI 671
- Morphometric Parameters and Neotectonics of Kalyani River Basin, Ganga Plain: A Remote Sensing and GIS Approach**
✓ DHIRENDRA KUMAR, DHRUV SEN SINGH, SHAILENDRA KUMAR PRAJAPATI, IMRAN KHAN, PAWAN KUMAR GAUTAM and BALKRISHAN VISHAWAKARMA 679
- A Study of Bioerosion of Belemnites and Taphonomy of Cephalopods from Kuldhar Member of Jurassic Jaisalmer Formation from Jaisalmer, Rajasthan**
SHARMISTHA PAUL, TAPAS K. GANGOPADHYAY and UJJAL MAL 687
- Lagerstroemia* L. wood from the Kimin Formation (Upper Siwalik) of Arunachal Pradesh and its Climatic and Phytogeographic Significance**
R.C. MEHROTRA, GAURAV SRIVASTAVA and C. SRIKARNI 695
- Measurement of Radon Concentration in Drinking Water in Bhiwani District of Haryana.**
VIKAS DUGGAL, SAMRITI SHARMA, AJAY KUMAR SRIVASTAVA and ROHIT MEHRA 700
- The Effects of Cracking on Slope Stability.**
MUHAMMAD MUKHLISIN and KHIRUN NISSAH KHIYON 704
- Estimation of Anthropogenic Influences in Groundwater Quality of Shallow Aquifers of Moradabad City, Western Uttar Pradesh**
NASEEMUS SABA, RASHID UMAR and AHSAN ABSAR 711

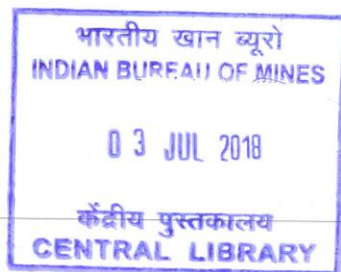
Identification of Groundwater Potential Zones using Remote Sensing and GIS of K-J Watershed, India. B.S. CHAUDHARY and SANJEEV KUMAR	717
Physical Criteria for Recognition of Lacustrine Gravel Beach-bar Deposits using Modern Examples, the Qinghai Lake, Qinghai-Tibet Plateau, China. BIAO PENG, ZHENKUI JIN, XIAOER ZHU, RUI LI, KUN YUAN	722
Stability Analysis of Landslide near Dewal Village along Murree-Muzaffarabad Road, Pakistan. MIAN SOHAIL AKRAM, MUHAMMAD ZEESHAN and ASIF ALI	729
Assessment of Reservoir Rock Properties from Rock Physics Modeling and Petrophysical Analysis of Borehole Logging Data to Lessen Uncertainty in Formation Characterization in Ratana Gas Field, Northern Potwar, Pakistan. NISAR AHMED, TAYYABA KAUSAR, PERVEIZ KHALID and SOHAIL AKRAM	736
Assessment of Potentially Toxic Elements Pollution and Human Health Risk in Soil of Ilesha Gold Mining Site, Southwest Nigeria. A. M. ODUKOYA, S. B. OLOBANIYI and T. O. OLUSEYI	743
Statistical Completeness Analysis of Seismic Data. MOHAMMAD MUZZAFFAR KHAN and KALYAN KUMAR, G.	749

NEWS AND NOTES

Report on International Conference on Maritime Archaeology with Special Reference to Indian Ocean countries & 10th Biannual Conference of Society for Marine Archaeology, NIO, Goa. SANDHYA MISRA, RAJESH S.V. and ABHYAN G.S.	754
---	-----

AUTHOR INDEX	755
--------------------	-----

SUBJECT INDEX	760
---------------------	-----



Cover

*Spatial distribution of b-value prepared from earthquake data for the 1900-2015 period in the western Himalayas.
(for details see pages 664-670)*

ADDRESS OF EDITOR

All papers intended for publication and also related correspondence should be addressed to: B. Mahabaleswar,
Editor, Geological Society of India, No.63, 12th Cross, Basappa Layout, Gavipuram, Bengaluru - 560 019.

Email: editorjournalgsi@gmail.com; jgsi.journal@gmail.com; **Mobile:** 09341264052;
Telefax: 080-2661 3352; **Telephone:** 080-2242 2943; **Website:** <http://www.geosocindia.org>.

**JOURNAL
of
THE GEOLOGICAL SOCIETY OF INDIA**

(Abstracted/Indexed in AGI's Bibliography and Index of Geology, Chemical Abstracts, Current Contents, GEOBASE, GEORef, Mineralogical Abstracts, GeoArchive, Thomson ISI database (SCIE, CC/PC & ES))

Vol. 92

JULY 2018

भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES

No. 1

CONTENTS

B. P. Radhakrishna – A Lone Crusader. M.S. RAO 5

RESEARCH ARTICLES

Dating of Columbite-tantalite and Monazite from Pegmatites of the Kawadgaon–Challanpara Area, Bastar Craton, Central India.
YAMUNA SINGH, D.V.L.N. SASTRY, SANJAY BAGORA, P.S.C. PANDIT, S.D. RAI and M.B. VERMA 7

Genesis of the Sulfide Hosted Refractory Gold Occurrences within the Carbonaceous Metasedimentary Units of the Dalma Volcano-sedimentary Basin, North Singhbhum Mobile Belt, Eastern India.
MOUSOMA KHATUN and SAHENDRA SINGH 11

A Reappraisal of Stratigraphy of Bagh Group of Rocks in Dhar District, Madhya Pradesh with an Outline of Origin of Nodularity of Nodular Limestone Formation.
DHIREN KUMAR RUIDAS, SHARMISTHA PAUL and TAPAS KUMAR GANGOPADHYAY 19

Petrographic and Geochemical Study of Gurha Lignites, Bikaner Basin, Rajasthan, India: Implications for Thermal Maturity, Hydrocarbon Generation Potential and Paleodepositional Environment
ALOK K. SINGH and ALOK KUMAR 27

Geophysical Log-based Coal Characterization of Middle Permian Barakar Formation from North Karanpura Coal Field, India.
JOYJIT DEY, SOUVIK SEN and SURJYENDU BHATTACHARJEE 36

Quantitative Geomorphological Analysis to Infer the Hydrological Behaviour of Streams Draining into the Vembanad Lake – A Ramsar Site along the Southwest Coast of India.
M. S. SHYLESH CHANDRAN and B. AJAYKUMAR 45

Global Attenuation Relationship for Estimating Peak Ground Acceleration
AMIT SHIULY 54

Assessment of Land-use and Land-cover Change and its Impact on Groundwater Quality Using Remote Sensing and GIS Techniques in Raipur City, Chhattisgarh, India.
RUBIA KHAN and D. C. JHARIYA 59

Hydrogeochemical Characterization and Groundwater Quality of Jamshedpur Urban Agglomeration in Precambrian Terrain, Eastern India.
NISHI KANT, PRASOON KUMAR SINGH and BUENDRA KUMAR 67

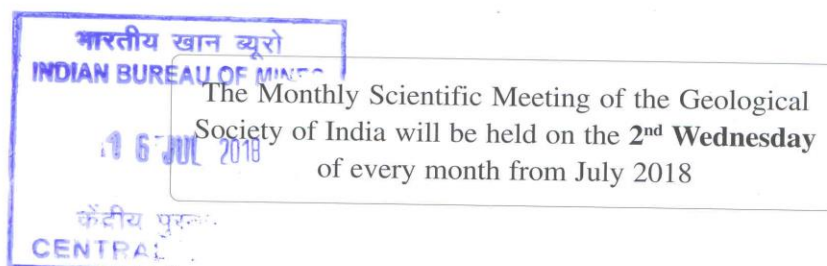
Groundwater Quality Assessment using Water Quality Index (WQI) in parts of Varanasi District, Uttar Pradesh, India. ABHISHEK KUMAR CHAURASIA, H. K. PANDEY, S. K. TIWARI, RAM PRAKASH, PRASHANT PANDEY and ARJUN RAM	76
Lower Palar River Sediments, Southern Peninsular, India: Geochemistry, Source-Area Weathering, Provenance and Tectonic Setting. RESMI, M.R. and HEMA ACHYUTHAN	83
Analysis of the Tectonic Stress Field of SE Sichuan and its Impact on the Preservation of Shale Gas in Lower Silurian Longmaxi Formation of the Dingshan Region, China. TANG, YONG, LI F. ZHOU, KONG Q. CHEN, XIAO X. DONG and WEN J. TANG	92
Assessing Groundwater Resource Vulnerability by Coupling GIS-Based DRASTIC and Solute Transport Model in Ajmer District, Rajasthan PRANJAY JOSHI and PANKAJ KUMAR GUPTA	101
Non-Conventional Energy Sources: A Geo-Spatial Study of Site, Situation, Production and Economy of Wind Farms in Satara District. BHARAT M. SULE	107
Formation Environment of Main Brown Coal Seam in Xi-2 Minefield of Shengli Coalfield Based on Coal Ash Phase Analysis BOYANG WANG, YONG QIN, JIAN SHEN, GANG WANG, JIUQING LI	111

BOOK REVIEW

A Photographic Atlas of Flood Basalt Volcanism by Hetu C. Sheth. Reviewed by P. KRISHNAMURTHY	120
---	-----

NEWS AND NOTES

Birth Centenary Celebrations of B. P. Radhakrishna. P. KRISHNAMURTHY	122
Brain Storming Session on Surface and Ground Water Resources of Odisha : Status, Policy and Strategy. B.K. MOHANTY and SUBHAJYOTI DAS	125



Cover

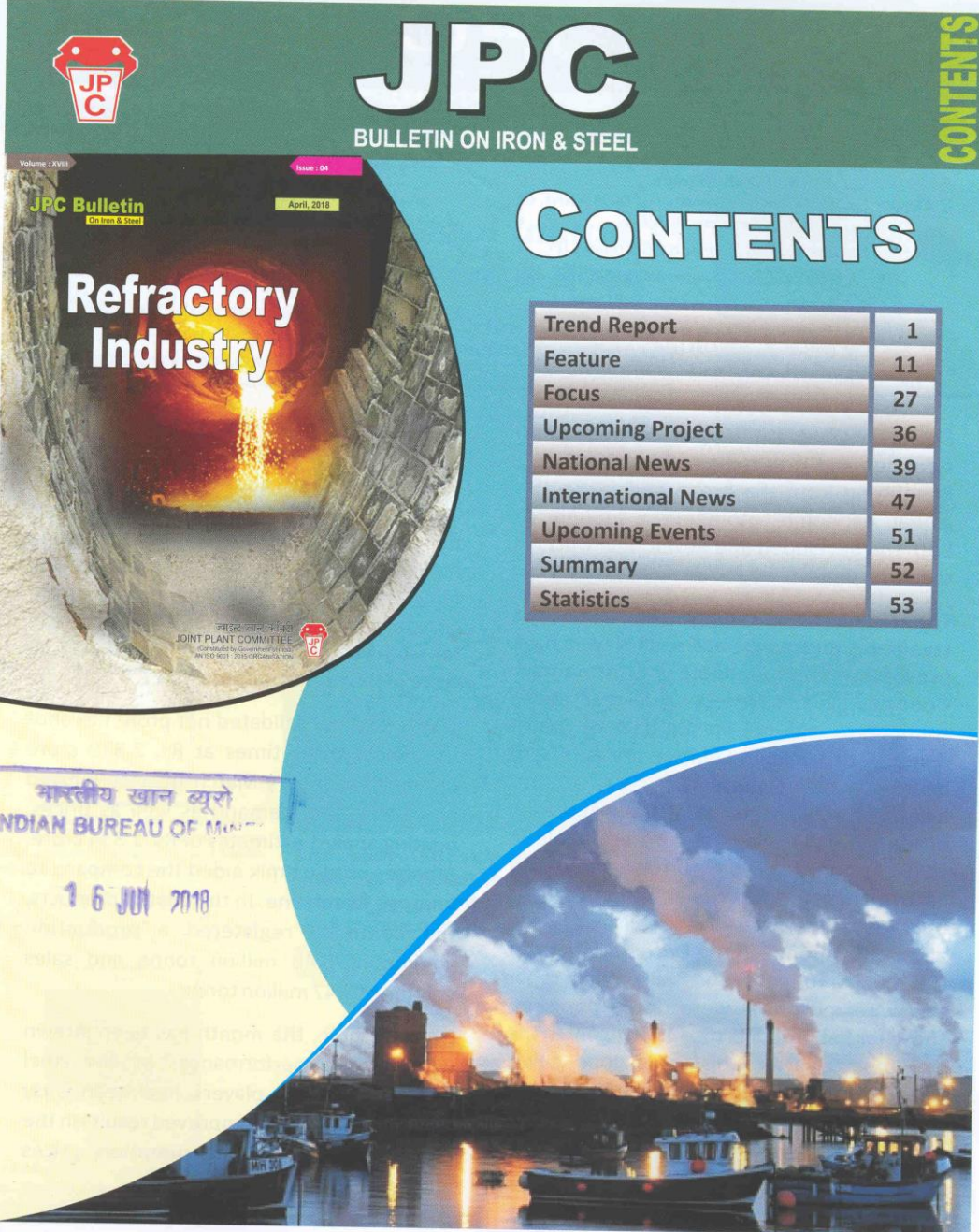
Special Cover released to mark the Birth Centenary of Dr. B.P. Radhakrishna

ADDRESS OF EDITOR

All papers intended for publication and also related correspondence should be addressed to: B. Mahabaleswar, Editor, Geological Society of India, No.63, 12th Cross, Basappa Layout, Gavipuram, Bengaluru - 560 019.
Email: editorjournalgsi@gmail.com; jgsi.journal@gmail.com; Mobile: 09341264052;
Telefax: 080-2661 3352; Telephone: 080-2242 2943; Website: <http://www.geosocindia.org>.

JPC *Bulletin on Iron & Steel*, Vol.18 No.5, May 2018

May, 2018



The cover of the JPC Bulletin on Iron & Steel, Vol.18 No.5, May 2018. The top left features the JPC logo (a red shield with 'JP' and 'C' inside). The title 'JPC' is in large white letters, with 'BULLETIN ON IRON & STEEL' below it. A vertical yellow banner on the right says 'CONTENTS'. The main image is a circular inset showing a glowing molten metal stream in a refractory-lined furnace. Text on the cover includes 'Volume : XVIII', 'Issue : 04', 'JPC Bulletin', 'On Iron & Steel', 'April, 2018', and 'Refractory Industry'. At the bottom left, there is a stamp from the 'INDIAN BUREAU OF METALLURGY' dated '16 JUN 2018'. The bottom right shows a photograph of a steel plant at night with smokestacks and boats in the foreground.

CONTENTS

Trend Report	1
Feature	11
Focus	27
Upcoming Project	36
National News	39
International News	47
Upcoming Events	51
Summary	52
Statistics	53

Mineral Economics, Vol.31 No's.1-2, May 2018

Volume 31 • Numbers 1–2 • May 2018

**Raw
Materials
Report**

SPECIAL ISSUE dedicated to Marian Radetzki's 80th birthday

INTRODUCTION

Marian Radetzki 80 years

M. Ericsson 1

Marian Radetzki—a portrait of a close friend

N. Lundgren 3

MINERALS

PERSONAL COMMENTS OF WIDER GENERAL INTEREST

Mineral rents and social orders: when Radetzki meets Douglass North

O. Bomsel 7

Despite our best intentions: Papua New Guinea's Ok Tedi mine and the limits of expert advice

S. Zorn 13

Political economy, Mr. Churchill, and natural resources

T. Gylfason 23

TRADITIONAL MINERAL ECONOMICS

Neither Dutch nor disease?—natural resource booms in theory and empirics

G.M. Nülle · G.A. Davis 35

Intensity of use reexamined

P. Crowson 61

Assessing the market power of mineral commodity producers

J.E. Tilton 71

Misinvoicing in mineral trade: what do we really know?

O. Östensson 77

Investor sentiment and market fundamentals: the impact of index investment on energy and metals markets

C.L. Gilbert 87

In search of a new China: mineral demand in South and Southeast Asia

D. Humphreys 103

COPPER

The International Copper Cartel, 1935–1939: the good cartel?

J.I. Guzmán 113

COUNTRY BASED PAPERS

Mining nationalization and privatization in Peru and in Chile

G. Lagos 127

Mining's impact on the competitiveness of other sectors

in a resource-rich economy: Australia since the 1840s

K. Anderson 141

The end of the mining boom? A Western Australian perspective

P. Maxwell 153

Are natural resources a curse or a blessing for Mongolia?

B. Narankhuu 171

IRON ORE

Managing the 1970s energy crises in a state-owned mining company: strategies pursued by the Swedish iron ore producer LKAB

K. Söderholm · L. Larsson · P. Söderholm 179

Analysis and projection of global iron ore trade: a panel data gravity model approach

R. Lundmark 191

An analysis of iron ore prices during the latest commodity boom

L. Wårell 203

ENERGY

COMMENTS

Marian Radetzki 80 years

M.G. Löw · U. Svahn 217

Three decades after Chernobyl: are Ukraine's nuclear plants safe now?

I. Dobozi · H. Wackman 219

Revisiting the long-run energy mix with the global energy market model (GEM)

R.F. Aguilera · R. Aguilera 221

The Polish power industry in energy transformation process

L. Gawlik 229

Enhanced oil recovery as a stepping stone to carbon capture and sequestration

D.M. Abdulbaqi · C.A. Dahl · M.R. AlShaikh 239

The Saudi 2014 gambit: a counterfactual analysis

J.M. Griffin 253

Coal sector in Poland, light in the tunnel or dimming candle?

W. Suwala 263

Indexed in Google Scholar, EBSCO, Environment Index, OCLC, Research Papers in Economics (RePEc), Summon by Serial Solutions.

Instructions for Authors for *Mineral Economics* are available at <http://www.springer.com/13563>

Mineralogical Magazine, Vol.82 No.538, February 2018

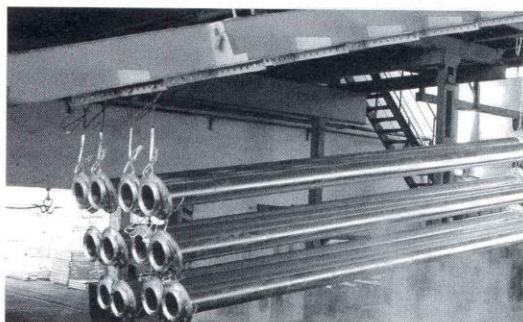
CONTENTS OF No. 538, February 2018

Page

CHAO CHANG, WEN-XUAN HU, QI FU, JIAN CAO, XIAO-LIN WANG, YE WAN and SU-PING YAO: Characteristics and formation processes of (Ba, K, NH ₄)-feldspar and cymrite from a lower Cambrian black shale sequence in Anhui Province, South China	1
MARIKO NAGASHIMA and DAISUKE NISHIO-HAMANE: Transmission electron microscopy study of the epitaxial association of hedenbergite whiskers with babingtonite	23
GURMEET KAUR, ROGER H. MITCHELL and SUHEL AHMED: Mineralogy of the Vattikod lamproite dykes, Ramadugu lamproite field, Nalgonda District, Telangana: A possible expression of ancient subduction-related alkaline magmatism along Eastern Ghats Mobile Belt, India	35
LUKE L. GEORGE, NIGEL J. COOK, BRYONY B. P. CROWE and CRISTIANA L. CIOBANU: Trace elements in hydrothermal chalcopyrite	59
ADAM J. ROPER, PETER LEVERETT, TIMOTHY D. MURPHY and PETER A. WILLIAMS: The stability of the rare sodium antimonate, brizziite, and its role in Sb mobility	89
DANIELA NOVEMBRE, CARLA PACE and DOMINGO GIMENO: Synthesis and characterization of wollastonite-2M by using a diatomite precursor	95
MARCELO B. ANDRADE, DANIEL ATENCIO, LUIZ A. D. MENEZES FILHO and JOHN SPRATT: Melcherite, trigonal Ba ₂ Na ₂ Mg[Nb ₆ O ₁₉]·6H ₂ O, the second natural hexaniobate, from Cajati, São Paulo, Brazil: Description and crystal structure	111
MARCELO B. ANDRADE, HEXIONG YANG, ROBERT T. DOWNS, GUNNAR FÄRBER, REYNALDO R. CONTREIRA FILHO, STANLEY H. EVANS, CLAYTON W. LOEHN and BENJAMIN N. SCHUMER: Fluorlamprophyllite, Na ₃ (SrNa)Ti ₃ (Si ₂ O ₇) ₂ O ₂ F ₂ , a new mineral from Poços de Caldas alkaline massif, Morro do Serrote, Minas Gerais, Brazil	121
LUIZ A. D. MENEZES FILHO, MARIO L. S. C. CHAVES, NIKITA V. CHUKANOV, DANIEL ATENCIO, RICARDO SCHOLZ, IGOR PEKOV, GERALDO MAGELA DA COSTA, SHAUNNA M. MORRISON, MARCELO B. ANDRADE, ERICO T. F. FREITAS, ROBERT T. DOWNS and DMITRIY I. BELAKOVSKIY: Parisite-(La), ideally CaLa ₂ (CO ₃) ₃ F ₂ , a new mineral from Novo Horizonte, Bahia, Brazil	133
ROBERTA OBERTI, FERNANDO CÁMARA, FABIO BELLATRECCIA, FRANCESCO RADICA, ANTONIO GIANFAGNA and MASSIMO BOIOCCHI: Fluoro-tremolite from the Limecrest-Southdown quarry, Sparta, New Jersey, USA: crystal chemistry of a newly approved end-member of the amphibole supergroup	145
ANATOLY V. KASATKIN, JAKUB PLÁŠIL, RADEK ŠKODA, DMITRIY I. BELAKOVSKIY, JOE MARTY, NICOLAS MEISSER and IGOR V. PEKOV: Redefinition of thérèsemagnanite, NaCo ₄ (SO ₄)(OH) ₆ Cl·6H ₂ O: new data and relationship to 'cobaltogordaite'	159
EMILIA GARCÍA-ROMERO and MERCEDES SUÁREZ: A structure-based argument for non-classical crystal growth in natural clay minerals	171
STUART J. MILLS, ANDREW G. CHRISTY and GEORGES FAVREAU: The crystal structure of ceruleite, CuAl ₄ [AsO ₄] ₂ (OH) ₈ (H ₂ O) ₄ , from Cap Garonne, France	181
ROBERTA OBERTI, MASSIMO BOIOCCHI, FRANK C. HAWTHORNE, MARCO E. CIRIOTTI, OLAV REVHEIM and ROBERTO BRACCO: Clino-suenoite, a newly approved magnesium-iron-manganese amphibole from Valmalenco, Sondrio, Italy	189

Mineralogical Magazine, Vol.82 No.538, February 2018

PAVEL ŠKÁCHA, JIŘÍ SEJKORA and JAKUB PLÁŠIL: Bytízite, a new Cu-Sb selenide from Příbram, Czech Republic	199
MARIO TRIBAUDINO, LUCIANA MANTOVANI, FRANCESCO MEZZADRI, GIANLUCA CALESTANI and GEOFFREY BROMILEY: The structure of $P2_1/c$ $(\text{Ca}_{0.2}\text{Co}_{0.8})\text{CoSi}_2\text{O}_6$ pyroxene and the $C2/c$ – $P2_1/c$ phase transition in natural and synthetic Ca–Mg– Fe^{2+} pyroxenes	211
<i>CNMNC Newsletter 41</i>	
U. HÄLENIUS, F. HATERT, M. PASERO and S. J. MILLS: New minerals and nomenclature modifications approved in 2017 and 2018	229
<i>Obituaries</i>	
DAVID STEPHENSON: Charles Henry Emeleus (1930–2017)	235
BERNARD ELGEY LEAKE: Douglas Saxon Coombs (1924–2016)	239
COLIN G. MACPHERSON: Jon Paul Davidson (1959–2016)	241



07 Market Report

18 Lead & Zinc

Sustainability credentials of the lead metal
Stringent govt regulations to positively impact battery recycling market
Global lead, zinc demand to outpace supply in 2018; ILZSG
Electric Cars Lithium versus lead
Zn surges on strong fundamentals; Pb lagging behind
New age gadgets driving the usage of zinc metal
Galvanneal steel – the answer for life cycle corrosion & maintenance challenges
Nanotechnology intervention for the century old lead acid battery
Environmentally sound mgmt of spent pickling acid in galvanizing

44 Recycling

Metal recycling the answer to meet the finite nature of resources
New scrap policy unlikely to perk up demand significantly
Recycling of lithium-ion batteries and mitigating risks with used lead-acid batteries
EMS, its advantages to lead recycling plants



**FOCUS ON
LEAD & ZINC
RECYCLING**

59 Company Profile

Amara Raja – carving a niche in batteries segment
EV era would force a paradigm shift in battery major Exide Industries

65 Mining

Zn mining gains traction as consumption rises
Mining and metals in a sustainable world 2050



68 Technofocus

EAF route for efficient recycling of Zn-coated steel

70 Power

ABB's microgrids offer viable solution to mitigate power outages

73 Lubricants

Where does that grease go

75 Product Profile

ITI-1600 high-precision thickness gauge

76 Statistics

Minerals & Metals Review, Vol.44 No.06, June 2018



- 06 Market Report**
- 18 Research & Development**
India's efforts in research and development for steel sector
- 23 Stainless Steel**
Stainless steel: The harbinger for progress
Digital revamping is the new age mantra for Viraj Profiles
Global stainless steel market size to reach \$133.8 bn by 2025
Not all stainless steel is stainless, after all
Stainless Steel – a sustainable and economical choice
- 35 Steel**
Top steelmakers to gain as a fifth of capacity changes hand?
US' new tariffs could disrupt the just about recovering global steel industry
- 38 Raw Material**
Global nickel demand forecast at 2.34 mt in 2018
Ferrochrome market to witness moderate demand growth
Positive demand outlook to drive Mo prices
- 44 Analysis**
Non-ferrous metals industry in India – some random thoughts
Deleveraging led by metals, broad-based recovery to take longer
- 49 In Conversation**
Dastur Innovation Labs envisions to be global innovation engine for metals & mining industry
Heavy engineering sees upsurge in technology assimilation
- 56 Company Profile**
Mukand's JV with Sumitomo catapults it into the big league
Air Products opens world-class engineering centre in Pune
- 59 Product Profile**
Outokumpu introduces nickel-based alloy - Ultra Alloy 825
Jindal Panther: A solution to losses caused by non-standard rebars
New generation technology portable digital hardness tester - ITI-130
- 65 Technology**
A lower cost option for high temperature auto and truck fasteners
Innovative ways to reduce environmental impact of metal processing
Siemens PLM and Local Motors tie up to advance the future of manufacturing
- 70 Electric Vehicles Update**
EVs to drive Cu demand by more than 500,000 tonne by 2027
- 73 Minor Metals**
Graphite prices to rise on tightening markets for batteries & electrodes
- 75 New Appointment**
Wolfram Diener new MD for Messe Düsseldorf
- 76 Statistics**
- Editor :** Bina Verma
Editorial : Paresch Parmar
Business Development : Yogesh Chawda
Statistics : Sudhakar Govekar
Production : P. S. Sawant

Printed & Published by Bina Verma on behalf of Binani Industries Ltd., printed at Dhote Offset Technokrafts Pvt. Ltd., 2nd Floor, Paramount Estate, Plot No. 5-A, Off Aarey Road, Near Kotkar Estate, Dindoshi Village, Goregaon (East), Mumbai 400 063 and published from Binani Industries Ltd., Mercantile Chambers, 12, J. N. Heredia Marg, Ballard Estate, Mumbai 400 001. Tel: 022-2266 0623 / 22664710

Metal Market *Magazine*, March, 2018

Features

20

Cover story

Barry Zekelman, executive chairman and CEO of Zekelman Industries, on turning around his family's business and growing it into a multi-billion-dollar venture



ZEKELMAN INDUSTRIES

Tube & pipe

25

US energy pipe market outlook

A summary of the multiple market drivers and uncertainties impacting the US energy pipe markets and the global recovery in OCTG markets

Rail

32

ArcelorMittal's way with rail

Profiling ArcelorMittal's rail production capabilities and summarizing the advantages gained by the company's investments at its Spanish rail mill

Spotlights

35

Market spotlight: Alumina & bauxite

As environmental restrictions shrink Chinese bauxite and alumina production, high prices are encouraging other producers to ramp up output

39

Technology spotlight: Enterprise software

Expert comment on digital trends and the future capabilities emerging in the ERP and AI sectors

46

End-user spotlight: Renewable energy

With movement from carbon-fuel generated energy to clean renewable energy accelerating, what part does the metals industry play in the new technology?

New orders

49

New plant orders

A quarterly list of recently placed orders



Metal Market *Magazine*, March, 2018

News and analysis

8

Non-ferrous news review

A summary of recent key developments in the international non-ferrous industries

10

Steel news review

A round-up of important recent developments in the global iron and steel sectors

14

Base metals and steel analysis

Metal Bulletin Research analyses the drivers of the base metals, steel and steel raw materials markets



Regulars

7

Comment

Dynamic markets

18

Pricing bauxite and alumina

An explanation of how changing market dynamics for bauxite and alumina have demanded evolution in the means of pricing them

53

Innovations

New developments in steel and metals technology, processes and products

54

End-user

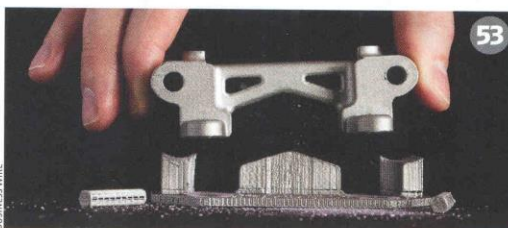
Advances and market developments in applications



8



10



53



54

Disclaimer

This disclaimer is in addition to our Terms and Conditions as available on our website and shall not supersede or otherwise affect these Terms and Conditions. Prices and other information contained in this publication have been obtained by us from various sources believed to be reliable. This information has not been independently verified by us. Those prices and price indices that are evaluated or calculated by us represent an approximate evaluation of current levels based upon dealings (if any) that may have been disclosed prior to publication to us. Such prices are collated through regular contact with producers, traders, dealers, brokers and purchasers although not all market segments may be contacted prior to the evaluation, calculation, or publication of any specific price or index. Actual transaction prices will reflect quantities, grades and qualities, credit terms, and many other parameters. The prices are in no sense comparable to the quoted prices of commodities in which a formal futures market exists.

Evaluations or calculations of prices and price indices by us are based upon certain market assumptions and evaluation methodologies, and may not conform to prices or information available from third parties. There may be errors or defects in such assumptions or methodologies that cause resultant evaluations to be inappropriate for use. Your use or reliance on any prices or other information published by us is at your sole risk. Neither we nor any of our providers of information make any representations or warranties, express or implied as to the accuracy, completeness or reliability of any advice, opinion, statement or other information forming any part of the published information or its fitness or suitability for a particular purpose or use. Neither we, nor any of our officers, employees or representatives shall be liable to any person for any losses or damages incurred, suffered or arising as a result of use or reliance on the prices or other information contained in this publication, howsoever arising, including but not limited to any direct, indirect, consequential, punitive, incidental, special or similar damage, losses or expenses.

We are not an investment adviser, a financial adviser or a securities broker. The information provided is not an offer to buy or sell or a solicitation of an offer to buy or sell any security, commodity, financial product, instrument or other investment or to participate in any particular trading strategy. Such information is intended to be available for your general information and is not intended to be relied upon by users in making (or refraining from making) any specific investment or other decisions. Your investment actions should be solely based upon your own decisions and research and appropriate independent advice should be obtained from a suitably qualified independent adviser before any such decision is made.

Metal Market *Magazine*, April 2018

Features

18

Cover story

Gareth Penny, chairman of Norilsk Nickel, talks about his career in mining business from diamonds to nickel



Scrap

28

US steel scrap challenges

So far 2018 appears to be a banner year for the US ferrous scrap market, but how high are the risks of a price bubble forming?

30

Global impacts of Section 232

An examination of the ferrous scrap industry's initial reactions to President Trump applying a 25% tariff on imports of steel to the US

35

Volatile times for US non-ferrous scrap

China's National Sword Initiative, the aluminium Section 232 tariffs and domestic logistics issues all have potential to affect the US non-ferrous scrap market

DRI and pellet

41

Encouraging outlook for Indian DRI production

An overview of the factors, including long-term steel production targets, at play in India's markets for iron units

Spotlights

45

Market spotlight: Nickel

The long-term outlook for nickel looks bright, but has the market run too far ahead on optimistic expectations of demand growth?

48

Market spotlight: Tin

Tin prices were volatile during 2017 but what direction do industry experts expect the market to take in 2018?

50

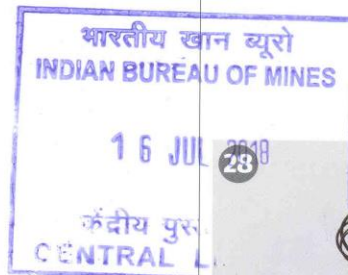
Technology spotlight: Scrap equipment

A selection of the latest developments and new technologies being deployed in the metal scrap supply chain

57

End-user spotlight: Aerospace

Reviewing the latest developments in lighter weight alloys for use in the international aerospace industry



Metal Market *Magazine*, April 2018

News and analysis

8

Non-ferrous news review

A summary of recent key developments in the international non-ferrous industries

10

Steel news review

A round-up of important recent developments in the global iron and steel sectors

14

Base metals and steel analysis

Metal Bulletin Research analyses the drivers of the base metals, steel and steel raw materials markets

Regulars

7

Comment

Challenging times

61

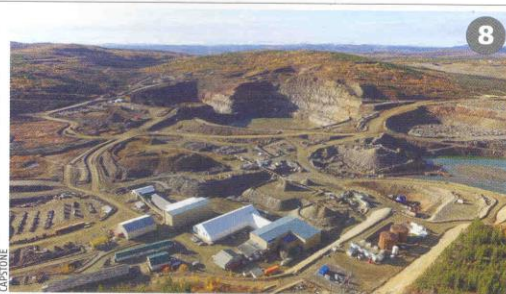
Innovations

New developments in steel and metals technology, processes and products

62

End-user

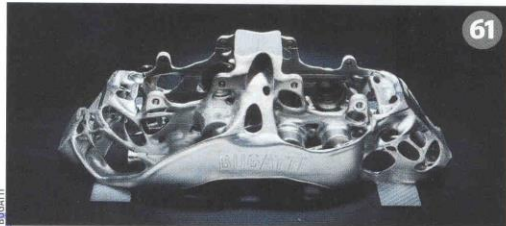
Advances and market developments in applications



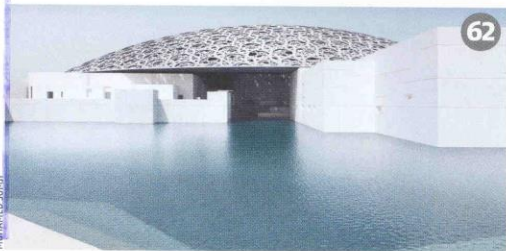
CAPSTONE



BRITISH STEEL



OLGATTI



MARINER SOMI

भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
16 JUL 2018
केंद्रीय पुस्तकालय
CENTRAL LIBRARY

Disclaimer

This Disclaimer is in addition to our Terms and Conditions as available on our website and shall not supersede or otherwise affect these Terms and Conditions. Prices and other information contained in this publication have been obtained by us from various sources believed to be reliable. This information has not been independently verified by us. Those prices and price indices that are evaluated or calculated by us represent an approximate evaluation of current levels based upon dealings (if any) that may have been disclosed prior to publication to us. Such prices are collated through regular contact with producers, traders, dealers, brokers and purchasers although not all market segments may be contacted prior to the evaluation, calculation, or publication of any specific price or index. Actual transaction prices will reflect quantities, grades and qualities, credit terms, and many other parameters. The prices are in no sense comparable to the quoted prices of commodities in which a formal futures market exists.

Evaluations or calculations of prices and price indices by us are based upon certain market assumptions and evaluation methodologies, and may not conform to prices or information available from third parties. There may be errors or defects in such assumptions or methodologies that cause resultant evaluations to be inappropriate for use. Your use or reliance on any prices or other information published by us is at your sole risk. Neither we nor any of our providers of information make any representations or warranties, express or implied as to the accuracy, completeness or reliability of any advice, opinion, statement or other information forming any part of the published information or its fitness or suitability for a particular purpose or use. Neither we, nor any of our officers, employees or representatives shall be liable to any person for any losses or damages incurred, suffered or arising as a result of use or reliance on the prices or other information contained in this publication, howsoever arising, including but not limited to any direct, indirect, consequential, punitive, incidental, special or similar damage, losses or expenses.

We are not an investment adviser, a financial adviser or a securities broker. The information published has been prepared solely for informational and educational purposes and is not intended for trading purposes or to address your particular requirements. The information provided is not an offer to buy or sell or a solicitation of an offer to buy or sell any security, commodity, financial product, instrument or other investment or to participate in any particular trading strategy. Such information is intended to be available for your general information and is not intended to be relied upon by users in making (or refraining from making) any specific investment or other decisions. Your investment actions should be solely based upon your own decisions and research and appropriate independent advice should be obtained from a suitably qualified independent adviser before any such decision is made.

Metal Market *Magazine*, May 2018

Features

20

Cover story

Óscar Landerretche
on managing change
at Chilean copper
producer Codelco



Aluminium

27

Tariff turbulence

The 10% tariff on
aluminium imports and
sanctions applied by the
US have created much
volatility in aluminium
markets – here is the
story so far

28

Global and local impacts in India

Raw materials supplies,
aluminium import duties
and government policy
are major drivers of
the Indian aluminium
industry. What are the
sector's long-term plans?

भारतीय खनन ब्यूरो
INDIAN BUREAU OF MINES

16 JUL 2018

केंद्रीय पुस्तकालय
CENTRAL LIBRARY

Copper

31

Volatility impacts copper

A look at market
prospects for the red
metal in 2018

Spotlights

35

Market spotlight: Asian markets

Asian commodity
exchanges continue to
expand and diversify
their product ranges
to appeal to both local
and global market
participants



43

Technology spotlight: Steel technology & equipment

Continuous processes,
more compact plants,
ever greater process
control, digitalization
and robotics are all
having a positive impact
on steel production

49



The finalists for the
2018 AMM Awards for
Steel Excellence



Metal Market *Magazine*, May 2018

News and analysis

9

Non-ferrous news review

A summary of recent key developments in the international non-ferrous industries

12

Steel news review

A round-up of important recent developments in the global iron and steel sectors

16

Base metals and steel analysis

Metal Bulletin Research analyses the drivers of the base metals, steel and steel raw materials markets

Regulars

7

Comment

Innovative thinking

109

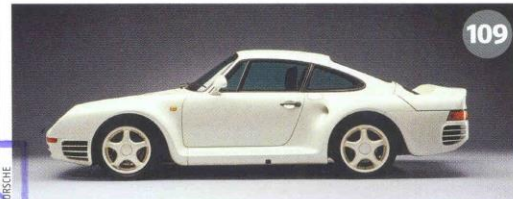
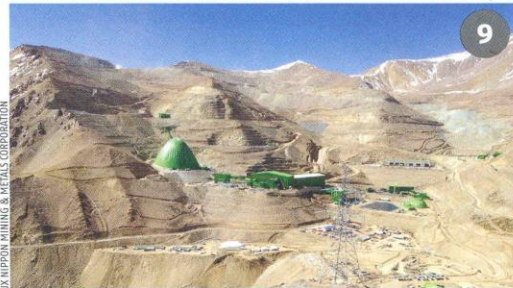
Innovations

New developments in steel and metals technology, processes and products

110

End-user

Advances and market developments in applications



Disclaimer

This Disclaimer is in addition to our Terms and Conditions as available on our website and shall not supersede or otherwise affect these Terms and Conditions. Prices and other information contained in this publication have been obtained by us from various sources believed to be reliable. This information has not been independently verified by us. Those prices and price indices that are evaluated or calculated by us represent an approximate evaluation of current levels based upon dealings (if any) that may have been disclosed prior to publication to us. Such prices are collated through regular contact with producers, traders, dealers, brokers and purchasers although not all market segments may be contacted prior to the evaluation, calculation, or publication of any specific price or index. Actual transaction prices will reflect quantities, grades and qualities, credit terms, and many other parameters. The prices are in no sense comparable to the quoted prices of commodities in which a formal futures market exists.

Evaluations or calculations of prices and price indices by us are based upon certain market assumptions and evaluation methodologies, and may not conform to prices or information available from third parties. There may be errors or defects in such assumptions or methodologies that cause resultant evaluations to be inappropriate for use. Your use or reliance on any prices or other information published by us is at your sole risk. Neither we nor any of our providers of information make any representations or warranties, express or implied as to the accuracy, completeness or reliability of any advice, opinion, statement or other information forming any part of the published information or its fitness or suitability for a particular purpose or use. Neither we, nor any of our officers, employees or representatives shall be liable to any person for any losses or damages incurred, suffered or arising as a result of use or reliance on the prices or other information contained in this publication, howsoever arising, including but not limited to any direct, indirect, consequential, punitive, incidental, special or similar damage, losses or expenses.

We are not an investment adviser, a financial adviser or a securities broker. The information published has been prepared solely for informational and educational purposes and is not intended for trading purposes or to address your particular requirements. The information provided is not an offer to buy or sell or a solicitation of an offer to buy or sell any security, commodity, financial product, instrument or other investment or to participate in any particular trading strategy. Such information is intended to be available for your general information and is not intended to be relied upon by users in making (or refraining from making) any specific investment or other decisions. Your investment actions should be solely based upon your own decisions and research and appropriate independent advice should be obtained from a suitably qualified independent adviser before any such decision is made.

Mineral Processing and Extractive Metallurgy

(Trans. Inst. Min. Metall. C)

Contents

- 1 Reductive roasting and ammonia leaching of high iron-bearing zinc calcines
Ning Peng, Bing Peng, Hui Liu, Ke Xue, Dong Chen and Dong-Hong Lin
- 10 Review of applicable desulphurization models for crude ferronickel refining
Alvin Ma, Sina Mostaghel and Kinnor Chattopadhyay
- 29 Reduction kinetics of magnetite concentrate particles by carbon monoxide
Bahador Abolpour, M. Mehdi Afsahi and Mehdi Azizkarimi
- 40 HPGR effect on the particle size and shape of iron ore pellet feed using response
surface methodology
Armin Abazarpour, Mohammad Halali, Rasool Hejazi and Majid Saghaeian
- 49 Application of the chloridizing roasting method for the removal of copper and
sulphur from copper slags
Lei Li, Jian-hang Hu and Hua Wang
- 56 The stimulus response of chitosan and its depression effect on talc flotation
Bo Feng, Jinxiu Peng, Wei Guo, Xianwen Zhu and Wanfu Huang
- 62 Potential utilization of hazardous mining wastes in the production of lightweight
aggregates
Hyunsik Park, Minchul Ha, Doyun Shin, Minseok Kim and Il Sohn

Mineral Processing and Extractive Metallurgy

(Trans. Inst. Min. Metall. C)

Contents

- 73 Zero CO₂ steelmaking in a future low carbon economy. 1. Energy conservation in smelting hematite ore directly to refined iron slab
Noel A. Warner
- 84 Zero CO₂ steelmaking in a future low carbon economy. 2. Secondary steelmaking using refined iron slab, with clean and contaminated scrap
Noel A. Warner
- 91 Novel multi-stage aluminium production: part 1 – thermodynamic assessment of carbosulphidation of Al₂O₃/bauxite using H₂S and sodiothermic reduction of Al₂S₃
M. A. Rhamdhani, N. Huda, A. Khaliq, G. A. Brooks, B. J. Monaghan, D. A. Sheppard and L. Prentice
- 103 Importance of textural information in mathematical modelling of iron ore fines sintering performance
E. Donskoi, J. R. Manuel, L. Lu, R. J. Holmes, A. Poliakov and T. D. Raynlyn
- 115 A hydrometallurgical process for the recovery of metal values from spent Cu–Cr catalyst
J. Panigrahi, P. C. Rout, B. Garnaik and K. Sarangi
- 121 Effect of slag basicity in ferromanganese production using medium-grade manganese ore from East Java-Indonesia
Fajar Nurjaman, Eka Bobby Saputra, Deni Ferdian and Bambang Suharno

Mining Engineers Journal, Vol.19 No.12 July 2018

Mining Engineers' Journal

INDIAN BUREAU OF MINES

16 JUL 2018

केंद्रीय पुस्तकालय
CENTRAL LIBRARY



Official Publication of
Mining Engineers' Association of India

Vol. 19

No. 12

MONTHLY

July - 2018



President

Arun Kumar Kothari

Vice President - I
S.K. Pattnaik

Vice President - II
K. Madhusudhana

Vice President - III
S.N. Mathur

Secretary General
S. Krishnamurthy

Jt. Secretary cum. Treasurer
K. Umamaheswar Rao

Ex-officio Council Members

T. Victor, A. Bagchi, Dr S.K. Sarangi, Dr V.D. Rajagopal, R.P. Gupta

Council Members (Elected)

A.L. Thakor, A.R. Vijay Singh, C.S. Dhavaji, D.A. Hiremath,
Deepak Gupta, D.K. Saxena, D.S. Maru, Dr K. Srihari,
Kolli Umamaheswara Rao, Maheem Kachhwaha,
Mahesh A. Bongale, M.S. Raju, Pankaj Kumar Satija, R.H. Sawkar,
Raghunath Singh, Rajendra Singh Rathore, Prof Sushil Bhandari,
S.C. Suthar, S. Kumaraswamy, Vilas Teggi

Representatives of Life Institutional Members

The India Cements Ltd (LIM No. 16)
The Ramco Cements Ltd (LIM No. 17)
Gujarat Mineral Development Corporation Ltd (LIM No. 18)
Associated Mining Company Ltd (LIM No. 19)
NMDC LTD (LIM No. 20)

Council Members (Nominated)

T.N. Gunaseelan, A.K. Gupta, A.K. Sinha, S.M. Bothra, Deep Krishna

Council Members (Co-Opted)

Dr N.K. Nanda, Prof B.C. Sarkar, Prof B.B. Dhar, M. James, Akhilesh Joshi

this issue contains...

President's Message	5
Editor's Desk	7
News from the mining world	8
Experience in Treatment of Sewage at Mining areas	15
- Prabhash Gokarn, Nikhil Agarwal, Simma Kiran Kumar, Arijit Mondal	
Groundwater Abstraction in Mining for Industrial Applications: Obtaining Permission for Statuary Compliance	22
- A. K. Soni	
MEAI News	27
Conferences, Seminars, Workshops etc.	38

Correspondence Address

MEAI National Headquarters

Contact: **Secretary General,**

Mining Engineers' Association of India

F-608 & 609, Raghavaratna Towers, 'A' Block, VI Floor,

Chirag Ali Lane, Abids, Hyderabad - 500 001.

Ph.: 040-66339625, 23200510

E-mail : meai1957@gmail.com

website : www.meai.org

The Views expressed by the authors in these pages are not necessarily those of publisher / editor / MEAI. Reproduction in whole or in part is strictly prohibited without written permission from the publisher.

THE INDIAN MINING & ENGINEERING JOURNAL

(Incorporating Mineral Markets: The Founder Publisher & Editor: J.F. De. Souza, Mumbai)

www.theimejournal.com

VOLUME 57: Number 06

JUNE 2018

ISSN 0019-5944

Publisher

Anita Pradhan

Editor-in-Chief

Prof.(Dr.) S.Jayanthu, Deptt. of Mining, NIT, Rourkela

Technical Editor (Hony.)

Prof.(Dr.) T.N. Singh, Deptt. of Earth Sciences, IIT,

Bombay

Prof. (Dr.)G. K. Pradhan, Dean, Faculty of Engineering & Technology, AKS University, Satna

Principal Consulting Editor

Prof. (Dr.) Manoj Pradhan, Deptt. of Mining, NIT, Raipur

Prof. Khanindra Pathak, Deptt. of Mining, IIT, Kharagpur

Editor

S.K.Mahanta

Associate Editor

A.Sahoo

Consulting Editors

Dr. S.S.Rathore, Deptt. of Mining, MPUAT, Udaipur

Dr N.R.Thote, Dept. of Mining, VNIT, Nagpur

Mr. V. Srikant, MD, Uttam Blastech, Hyderabad

Dr. M. Ramulu, CIMFR, Nagpur

Dr. K Ram Chandar, NITK, Surathkal

Overseas Consultants

Japan: Prof. Hideki Shimada

Nordic Countries : Prof Uday Kumar

Thailand: Dr. Thitisak Boonpramote, Asst. Prof., Head of Mining & Petroleum Engineering Deptt., Chulalongkorn University, Bangkok

The publishers and the editorial team do not necessarily individually or collectively, identify themselves with all the views expressed in this journal.

Qualified recipients : Selected members of IMMA/MEAI/MGMI/SGAT, CEO's, Mine Managers, Maintenance Engineers, Processing Engineers, Govt. officials and Scientists etc.

All rights reserved. Reproduction in whole or in part is strictly prohibited, without written permission from the publishers. **Published Monthly by IME Publications.**

Annual Subscription : Rs.650/- (Incl. Postage)

Unit Price: Rs.50/-

FOREIGN: £ 75 OR US \$ 150 (By Air Mail)

Payment by Cheque/Draft. Cheques drawn outside Bhubaneswar must include Rs.50/- (Overseas £1 or US\$2) as bank charges and should be drawn in favour of

"The IM & E JOURNAL" payable at Bhubaneswar

IME PUBLICATIONS

Correspondence Address

The IM & E Journal 1457, Fishery Tank Road, Chintamaniswar, Laxmisagarpatna, Bhubaneswar - 751006, Odisha **Mobile:** +919861008387

Mail: indianminingjournal61@hotmail.com

Branch office: Near TV Tower, JODA, Dt. Keonjhar 758034

Phone: 06767-273173

Special Number on SDMiNER 2018 : VOLUME - III

Contents

- IV. The IME Journal Readers' Forum
- IV. Persons in the News
- LI. Indian Mining Industry News
- LIV. Mining Events Diary

Technical Papers

- V. SDF-based CSR in Mining Sector (With a self-study on CSR & Sustainability Practices of Malanjkhand Copper Project, HCL)
Dr. O. N. Tiwari, Himanshu Sekhar Panigrahi, Anoop Kant Shukla & Binod Kumar Gupta
- IX. Silica Sand or Crushed Stone Sand an Alternate, Better than River Sand
Chand chandna
- XIV. Managing Sustainability in Open Cast Mining Operations Through Geotechnical Planning and Design: A Need of the Era
Sanjay Kumar Singh
- XXVI. Environmental Protection Measures by Sustainable Development Framework for Decision Making - A Case Study of Dongri Buzurg Opencast Mine of MOIL Limited
Dipankar Shome* Ganesh Manekar* Surajit Chakraborty Suranjan Sinha**
- XXXI. Highwall Mining: Economic & Environment Friendly Coal Extraction by World Class Method of Mining
Mr. Anurag Dixit, Praveen Ranjan & Amit Prakash
- XXXV. Challenges of Sustainable Development in the Mining Industry-An Indian Scenario
Singam Jayanthu & Guntha Karthik
- XXXIX. Sustainable Development in Mining Industry Through Energy Management & Energy Efficiency
Tushar Kant Tiwari

Spl. Number on SDMiNER 2018 June 2018

III

The Indian Mining & Engineering Journal