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Edited by
JOHN GRANDFIELD
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Addendum

Light Metals 2013

AlTi5B1 Grain Refiners on the Casting of DIN 226 Aluminum Alloys

O. Yucel, C. Yapici, and A. Turan

Author Index

Subject Index
My late father spent his 30-year working life at the Comalco Bell Bay aluminium smelter as a crane driver, anode setter, tapper, metal scheduler, and cast shop and reduction foreman. His positive reports of and faith in the industry are the reason I studied metallurgy. My undergraduate degree was supported by a Comalco Aluminium living allowance, and Comalco Research Centre fostered my research and development skills. I now teach, consult, and research aluminium and magnesium metallurgy globally. I feel a strong debt of gratitude to an industry that enabled my father to support his family and for myself to build a rewarding career. It pleases me greatly to have the opportunity to give something back to the industry by organising the Light Metals sessions and editing the *Light Metals 2014* proceedings.

The meeting and the proceedings come about through the considerable efforts of authors and presenters, session chairs, and subject chairs (Ian Duncan, André Proulx, Margaret Hyland, Eddie Williams, Kai Karhausen, Dmitry Eskin, Wim Sillekens, and Zhengdong Long), ably and cheerfully supported by TMS staff. My sincere thanks to all concerned. A big thank you also goes to our current Aluminum Committee chair Barry Sadler for his guidance and support. My thanks also go to the organisers of a number of short courses held in conjunction with the meeting.

Recently, I helped compile a volume in the TMS *Essential Readings in Light Metals* collection. Going through almost 50 years of *Light Metals* papers brought home just what a momentous collection of key papers *Light Metals* contains. This year’s collection is in the same league and will prove immensely useful, covering the full value chain, from bauxite to final products and alloys.

Effective technology management remains the primary source of industry improvement and competitive advantage. The Light Metals sessions and proceedings are an important part of achieving safe, low environmental impact, sustainable, productive, and profitable aluminium smelting and processing. *Light Metals* is the preeminent and essential technology reference work and resource for our industry.

The Light Metals program reflects the truly global nature of the aluminium industry. The international industrial community, including company, government, and academic researchers and technologists, mixes and mingles at the meeting, and out of such a melting pot, truly great ideas and innovations can arise.

The continued investment companies make by sending staff to the TMS Annual Meeting gives excellent returns. I commend that ongoing investment in these difficult times. Although the situation remains challenging for the industry with high inventory, low prices, reduced demand and overcapacity, the long-term outlook remains positive. Our industry has a crucial role in fuel-efficient transport, packaging, and infrastructure and is of great benefit to humanity. Meetings like those that offer these Light Metals symposia are an essential mechanism for maximising that benefit, a benefit my father would have been proud of.

**John Grandfield**

Editor
John Grandfield is director of Grandfield Technology Pty Ltd, a consulting and technology firm, and adjunct professor at Swinburne University of Technology in the High Temperature Processing Group. He has a bachelor of applied science in metallurgy (RMIT), a M.Sc. in mathematical modeling (Monash University), and a Ph.D. in materials science (University of Queensland).

Dr. Grandfield has 30 years’ experience in light metals research and technology in smelting, continuous casting, and metal refining (Rio Tinto Alcan, CASTcrc and CSIRO). He has conducted plant benchmarking audits, technology reviews, optimized existing technology, managed technology transfer, and developed and commercialized new casthouse technologies. He remains active in research with a current focus on trace elements.

His work on direct chill and ingot casting of aluminum and magnesium has been awarded both internationally and within Australia. He is regularly invited to give training courses, participate in in-house innovation workshops, and conduct R&D program reviews around the world.

Dr. Grandfield has four patents, has published two book chapters and more than 50 conference and journal papers, and has co-authored a book on DC casting of light metals. He is a member of the TMS Aluminum Committee.
THE MEETING OF THE MINERAL PROFESSIONS

PROGRAM ORGANIZERS

ALUMINA AND BAUXITE

Ian Duncan is Director for Light Metals based in Perth, Western Australia, with responsibility for managing the Hatch bauxite and alumina team. This team is the basis of Hatch’s center of excellence for bauxite and alumina and has responsibility for providing technical input and developing business opportunities on Australian and international alumina projects with a key focus on projects in South East Asia, Middle East and South America.

Ian has been with Hatch for 16 years, and during that time has had a variety of project and business development roles. His project roles include engineering management and study management roles on projects at the Worsley Alumina Refinery, the Global Alliance Coordinator for the Alcoa-Hatch Engineering Alliance, Refinery Area Manager for the Chalco Aurukun Feasibility Study, and Project Sponsor for the recently completed Shaheen Alumina Pre-Feasibility Study. Ian’s business experience includes developing opportunities in Vietnam, China, Indonesia, and Australia and for the provision of consulting services on bankable/due diligence studies and financial analyses to government and non-government companies.

Prior to joining Hatch, Ian provided engineering, business development and project management expertise for projects in iron and steel, industrial minerals, natural gas and railways (civil/mechanical).

ALUMINUM ALLOYS: DEVELOPMENT, CHARACTERIZATION AND APPLICATIONS

Zhengdong (Steven) Long is Senior Alloy Development Engineer at Kaiser Aluminum in Spokane, Washington, United States.

He has more than 15 years’ experience in aluminum and special alloys development and applications in the aerospace and automotive industries. He has been active for more than a decade in the areas of physical and mechanical metallurgy of metallic material. Dr. Long’s diverse experience includes casting, thermo-mechanical processing, mechanical properties, fatigue, and corrosion behaviors. He specializes in microstructure characterization, thermodynamic and kinetic material modeling, casting and rolling process modeling. His principle research interests are in the development of industrial processes for manufacturing. He has two patents to his credit and more than 30 published papers.

Dr. Long received his doctorate in materials science and engineering from Central Iron and Steel Research and Institute in Beijing, China, in 2000.
Subodh Das is the founder and CEO of Phinix, LLC, an international light metals research and development company. Dr. Das is a recognized global thought leader in the area of aluminum recycling. He has founded six research companies and consortia. He has served on the TMS Board of Directors and was awarded the prestigious TMS Distinguished Service Award. He was awarded the JOM Best Paper Award in 2011.

Tongguang Zhai is an associate professor in the Department of Chemical and Materials Engineering, University of Kentucky, and an adjunct professor at Shandong Jianzhu University. Dr. Zhai has a bachelor’s degree of science in metal physics (Beijing University of Science and Technology) and a Ph.D. in materials science (University of Oxford).

Dr. Zhai’s research interests include alloy design, property-microstructure relationships, crystallographic texture, fatigue damage, 3-D simulation of short fatigue crack growth based on a microstructure-based model, and failure analysis. He has published more than 100 technical articles in materials science, mostly on aluminum alloys. His research has been sponsored by US-NSF, DOD, and industry.

Dr. Zhai serves as a key reader for Metallurgical and Materials Transactions A, and has organized and co-organized symposia on aluminum alloys and fatigue at TMS meetings.

Xiyu Wen has been a senior research associate for the Center for Aluminum Technology, College of Engineering, University of Kentucky and a materials engineer in Secat, Inc. since 2002.

He was a 1983 graduate of the Jilin University in P. R. China with a B.S. in physics. He was a faculty member for three years at the Northeast Heavy Machinery Institute, P. R. China. In 1989, Dr. Wen obtained M.S. in Materials Science from Yanshan University in P. R. China, where he worked again in Teaching and Research in Materials Science. Dr. Wen received his Ph.D. from the Hong Kong Polytechnic University in 2000.

His research focuses on the physical and mechanical metallurgy mainly concerned with textures and microstructures of metal materials/sheet metal forming, and he assists undergraduate, graduate, and post-graduate students in their research. His main work is conducting research and development, providing technical assistance to the aluminum industries.