V Strength

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GLOBAL RESOURCE FOR VANADIUM TECHNOLOGY

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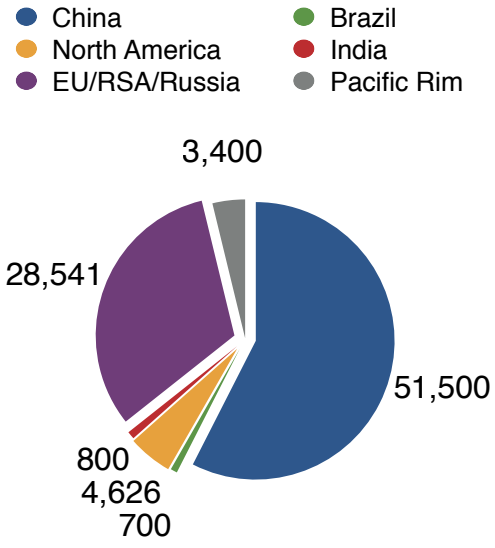
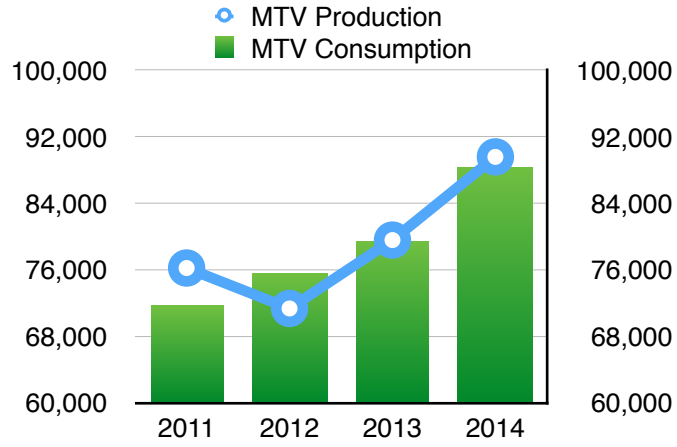
Vanadium Production & Consumption Increased in 2014

2014 full year production and consumption statistics were recently released by Vanitec showing a 12% increase in production and a 11% increase in consumption over 2013. Specific consumption rates also increased.



2014 MTV Production



Vanitec began collecting full year data in 2011 and started collecting first half data in 2013; 2 six-month periods of comparison are available.

Full details were made available at Vanitec's website for production in the six global regions allowable under antitrust guidelines. Also included were more detailed consumption estimates and specific rates of consumption for 11 separate worldwide regions.

Production growth occurred in all but one region and consumption growth was static or grew in every region of the world. The worldwide average specific consumption rate increased from 0.050 to 0.054 per ton of steel.

In 2012 Vanitec also began tracking specific consumption rates of vanadium based on world steel production statistics.

In its reporting, Vanitec defines vanadium production as MTV in all oxides produced, plus MTV in other v-compounds not produced via oxide route, plus MTV FeV not produced via V2Ox-route.

The data is not disseminated by Vanitec nor used for any purpose other than compiling overall statistics for the vanadium industry.

"The Vanitec-CISRI Vanadium Technology Center continues to expand its efforts to share the benefits of using vanadium directly to end users in China."

- David Milbourn, CEO

3rd VTC Experts Meeting Held

The Vanitec - CISRI Vanadium Technology Center held its third experts meeting in Beijing, China on March 16-17, 2015.

The meeting was kicked off by Dr. Yu Li of Vanitec at CISRI's offices. 37 representatives from vanadium producers, steel companies, industry associations, and research institutions attended the meeting. Professor Zhang Yongquan, the director of the VTC Expert Committee hosted the meeting.

The progress of 3 Vanitec projects and 2 new project proposals were reviewed in the meeting. In addition, the new technology of 5 projects from Pan-steel, Cheng-steel and CISIR was exchanged with the representatives in the meeting.

Professor Yang Caifu, the director of the VTC, made a presentation on "Development and Application of Vanadium Microalloyed Technology over the World" which included the information shared at the V symposium held as part of the MS&T'14 Conference in Pittsburgh, PA in October 2014.

In addition, the application of vanadium technology on plate and strip steels in China will be investigated in 2015. This project is particularly complicated due to the varieties on plate and strip steels and the number of steel companies in China. Fortunately all of the experts from China Iron and Steel Association, steel companies and the auto industry who were in attendance at the meeting expressed an interest in the project and agreed to assist

ASTM Standard Update

New High Strength Rebar Standard Provides Vanadium Opportunities.

After several years of development by steel producers, and after necessary changes implemented in ACI and ASTM testing procedures, a new high strength hot rolled carbon steel rebar specification has been approved and published.

ASTM A615/615M-15, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement, was issued on April 1, 2015. This latest revision of the long-standing specification for ASTM rebar now contains the new "Grade 100".

At 100,000 psi minimum yield strength (690 MPa), it boasts the highest strength hot rolled rebar requirement in the world.

U.S. steelmakers have demonstrated the capability of meeting these strength requirements while still maintaining the same ductility requirements of the previous grades 75 and 80.

They use a careful combination of controlling melting and rolling procedures, and, of course, a generous helping of their most useful micro alloy - vanadium.

Vanadium additions can run from 5 to 10 times the normal addition for Grade 60, providing the dramatic strength increase needed to meet these new requirements.

While the new Grade 100 is not expected to replace all of the lower strength grade applications, it does provide practical solutions to problem areas where the amount of steel required was limiting the volume remaining to place the necessary amount of concrete.

Steelmakers are continuing to develop a similar strength version for ASTM A706, the more ductile "Low-Alloy" specification recommended for earthquake prone regions of the world.

Vanitec Meeting Held

The 88th Vanitec Meeting was hosted by Vanchem Vanadium Products and held in Sun City, South Africa 22-24 April, 2015

Before the board meeting, Vanitec members were presented with the latest regulatory challenges and scientific research during the 41st Vanitec HSE Committee. Health, Safety & Environmental challenges continue in the EU, North America and around the world. The vanadium industry continues to do its part to better understand the potential health and environmental impacts from its compounds and internationally recognized toxicologists presented the latest scientific results from industry co-sponsored research.

In addition, the Market Development Committee held its 15th meeting where the latest technological research was presented, including updates on all worldwide projects currently underway. Vanitec members were given a briefing on the vanadium situation in China as well as discussed recent innovations in the redox battery market. Initial 2014 full year stats were also shared with the membership.

The meeting wrapped up with a beautiful dinner at The Palace Hotel where Vanitec members and their spouses enjoyed a wonderful south african meal with their colleagues and friends. The fall Vanitec meeting was announced to take place 14&15 October in London, UK.

M. Korchynsky (MS&T) Symposium Web Links

Publications and videos of the presentations made during the Michael Korchynsky Vanadium Symposium held in October 2014 as part of the MS&T conference are now available at the Vantiec website.

Videos of the presentations can be found at **http://vanitec.org/education/video-presentations/**

Copies of the publications can be accessed at **http://vanitec.org/michael-korchynsky-symposium/**

Members

AMG Vanadium, Inc.

Bear Metallurgical Company

Beijing Zhongkaihongde Technology Company

Chengde Iron & Steel Group Co Ltd

China Iron & Steel Research Institute Group

Evraz East Metals AG

Evraz East Metals North America, LLC

Evraz Highveld Steel & Vanadium Limited

Evraz NTMK

Evraz Stratcor, Inc.

Evraz Vanady Tula

Glencore

Gulf Chemical & Metallurgical Corporation

Largo Resources Ltd.

Mustavaaran Kaivos Oy

Neometals Limited

New Zealand Steel Ltd.

Panzhihua Iron & Steel Group

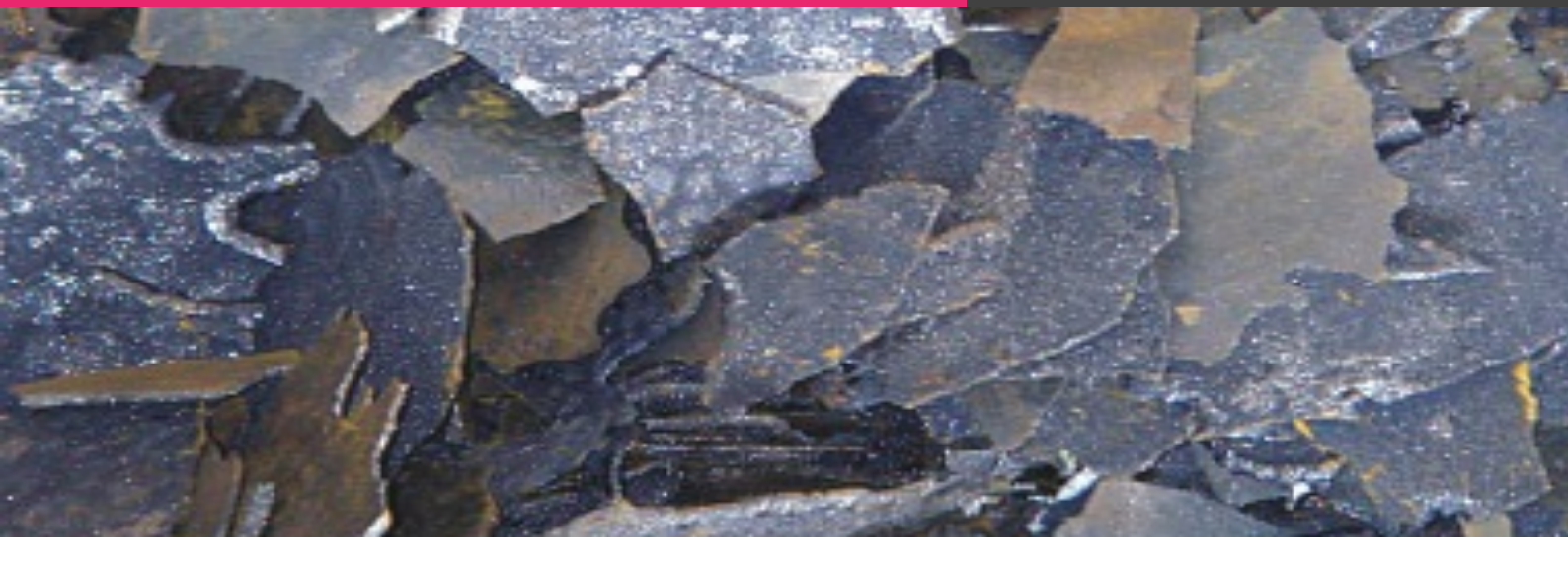
Syrah Resources

Treibacher Industrie AG

VandiumCorp Resource Inc.

Vanchem Vanadium Products (Pty) Ltd.

Yellow Rock Resources



UPCOMING EVENTS

89th Vanitec Meeting

London, UK
14 & 15 October 2015

HSLA 2015 Conference

Hangzhou, China
11-13 November 2015

Vanitec is proud to be a sponsor and supporter of this joint conference of the 7th International Conference on High Strength Low Alloy Steels (HSLA Steels 2015), the International Conference on Microalloying 2015 (Microalloying 2015) and the International Conference on Offshore Engineering Steels 2015 (OES 2015) which is co-organized by The Chinese Society for Metals (CSM) and Chinese Academy of Engineering (CAE).

Vanitec will be supporting various Chinese and overseas speakers to present their work.

For further information and registration details you can visit our website at **http://vanitec.org/conferences/**.

Vanitec Partnership with Canmet Materials started

Vanitec has recently added two new projects at CanmetMATERIALS to is research porfolio.

Led by Dr Colin Scott, and with technical and in-kind support from international steel companies, the new projects will investigate specific advantages of vanadium additions in new advanced high strength steels (AHSS).

As well as providing significant overall strengthening, it is anticipated that the addition of vanadium to new Ultra High Strength (>1GPa) and Damage Resistant Dual Phase Steels will result in improved damage (Hole Expansion) behaviour by selectively hardening the softer ferrite phase.

It is also expected to show improvements in tempering response due to the well known effects of vanadium in solution in martensite.

Canada

In the second project, the potential for substantial grain refinement and vanadium precipitation strengthening in Low Carbon Single Phase (XPF type) Steels, with tensile strength >800MPa, will be investigated.

It has previously been demonstrated that high strength and excellent formability can be achieved with vanadium microalloyed (0.14-0.28%V) low carbon single phase steel in thinner (3mm) hot strip for automotive chassis application.

The aim of this new project will be to increase the thickness to 8-18mm, and still achieve the required strength and microstructure, for applications such as truck chassis and pipeline

Development of V Steels Drives Growth in China

There has been fast growth in the production of V steels in China recently.
written by Professor Yang Caifu, PhD, Central Iron & Steel Research Institute

The speculation indicated that 2014 actual production of V steels in China could be close to 88 million tons, and takes up about 10% of total Chinese crude steel production. The upgrade of rebar products made the greatest contribution to the fast growth of China V steel production. Until 2013, the production of Chinese grade 3 rebar had been over 150 million tons, which consumed about 30,000 MT vanadium metal.

As noted in the Vanitec statistical reporting, V production and consumption in china has showed continued growth.

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Vanitec is a technical and scientific committee (The Vanadium International Technical Committee), which brings together representatives of companies and organisations involved in the mining, processing, manufacture, research and use of vanadium and vanadium-containing products.

The objective of Vanitec is to promote the use of vanadium bearing materials and thereby to increase the consumption of vanadium across the range of steel, titanium and chemical applications.

Vanitec strives to provide those with a vested interest in Vanadium – users, educators, students, producers – convenient access to research, events, resources and publications regarding Vanadium.