IMnI ANNUAL REVIEW 2021

IMnI
International Manganese Institute

INTERNATIONAL MANGANESE INSTITUTE

The International Manganese Institute (IMnI) is a not-for-profit industry association that represents manganese ore and alloy producers, manufacturers of metallurgical products or chemical compounds, trading houses, industry service providers, companies involved in Mn business development, universities and research organizations around the world.

Founded in 1975, with headquarters in Paris, France, IMnI's mission is to provide vision and guidance to the Mn industry by promoting economic, social and environmental responsibility and sustainability to all stakeholders.

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TABLE OF CONTENT

MESSAGE FROM THE CHAIRMAN

"Environmental footprint has become a priority in the metals industry, and Manganese is no exception"

During his 3-year mandate, Esteban Rivero who concluded his term as IMnI Chairman in June 2021, significantly improved the IMnI value-proposition to the Manganese industry, with many additional Members, controlled expenses, and major new projects and studies started, to the benefit of all IMnI Members and to the entire Manganese community. I am honoured to have been elected by the IMnI General Assembly to succeed Esteban Rivero as IMnI Chairman, and during this mandate we plan on focussing on enhancing the sustainability, social responsibility and environmental footprint of the Manganese sector.

After the transport industry, the metals sector progressively turns its attention to sustainability and environment protection. As major energy consumers, metal smelters and steel mills have potential to improve their environmental footprint, by increasing recycling (of steel, gas, baghouse dust, water etc.), reducing their Carbon dioxide emissions, and increasing the use of green energy sources. European steel producer SSAB recently announced it will introduce fossil-free steel in the market in 2026 (no fossil CO2 emissions when producing this steel, and a requirement to use fossil-free sponge iron), and was invited to present on this "green steel" during the IMnI Webinar in September.

To better understand the environmental footprint of Manganese, and especially its CO2 emissions, the IMnI started in October 2021 a major project: the Manganese life-cycle assessment (LCA). This study will take 2 years to be finalised, and will analyse LCA data from major Manganese ore and alloy producers based on all continents. IMnI Members will then better understand their environmental performance, both at an individual and industry level, and be able to improve their operations.

In 2021, the International Manganese Institute (IMnI) was able to reach new achievements in spite of the Covid19-related challenges: 14 additional Members, regular digital events, improved finances, and several health, safety & environment (HSE) studies completed. Physical events were organised in China (in June, September and December), and the IMnI Members also gathered in Prague during the Fastmarkets conference in November, as travel restrictions have been eased by most countries.

We look forward to welcoming you to Cape Town, South Africa, in June 2022 for a major conference, gathering the entire Manganese community!

Patrick SACCO
IMnI Chairman
Managing Director of Assore International Holdings

MESSAGE FROM THE EXECUTIVE DIRECTOR

" IMnI increased its representation of the Manganese industry in 2021, with 14 new Members"

The International Manganese Institute continued its development in 2021, welcoming 14 additional Members and starting ambitious new projects to further support the Manganese industry.

14 New Members joined IMnI in 2021	Category	Country
Firebird Metals Limited	Future Mn producer	Australia
Afrimat Shared Services (Pty) Ltd.	Future Mn producer	South Africa
Galaxy Resources Limited	Future Mn producer	Australia
Mineracao Buritirama	Mn producer	Brazil
The David J. Joseph Company	Steel producer	USA
Hira Electrosmelters	Mn producer	India
Jitie (Tianjin) International Trade Co., Ltd.	Mn producer	China
Lizetta Holding	Mn producer	Ivory Coast
Mn Energy Ltd.	Mn chemical producer	Australia
Roskill	Market research	UK
Shanghai Fengri International Trading Co., Ltd.	Mn trader	China
Tianjin Zhongjun International Trading Co., Ltd.	Mn producer	China
Volkswagen	Battery producer	Germany
Vedika Metals Pvt Ltd.	Mn trader	India

Some of these new IMnI Members are producers of Manganese ore, like Mineracao Buritirama, the biggest Manganese miner in Brazil, others are consumers of Manganese chemicals for batteries, including Volskwagen, one of the biggest car manufacturers in the world. Roskill is a trusted market research company analysing the steel and metals markets, and Hira Electrosmelters is a major Manganese alloy producer based in India.

The IMnI membership now stands at 93 companies, a new record high, including 26 Chinese companies. IMnI Members are major Manganese producers and industry service providers, committed to develop their industry and promote the benefits of Manganese, while remaining proactive on compliance. Thanks to the active and dedicated engagement of its four Committees - HSE, Statistics, EPD and China - as well as the valuable involvement of its staff, IMnI continues to be the global voice of the Manganese industry.

As in 2020, this year was challenging in terms of events organisation, but the IMnI contributed to the organisation of the Electrolytic Products Division (EPD) Conference in Yunnan province, China on May 31 – June 1, attended by 120+ delegates. Several Members' meetings were also organised this year, including in June, September and December in China.

Because of travel restrictions this year, it was not possible to organise a conference in Cape Town, South Africa, so this event was postponed to June 2022. But in the meantime, IMnI Members benefited from regular webinars about the Manganese ore and alloy markets, and about Manganese used in batteries.

IMnI Members receive the best market research information on Manganese available globally, based on statistics collected directly from Manganese producers all over the world, and aggregated by the IMnI staff to ensure confidentiality. As part of its mission to cover all aspects of the Manganese value-chain, IMnI published in 2021 a new version of the Manganese in lithium-ion batteries report, with updated information on production and demand of Manganese chemicals used in batteries, including electrolytic Manganese dioxide (EMD), electrolytic Manganese metal (EMM) and Manganese sulphate (MSM). New technical presentations on furnace optimisation, energy savings and major Manganese producers have been added to the IMnI extranet (available only for IMnI Members).

In addition, IMnI invests every year in scientific projects to better understand the impact of Manganese on the environment, and find new applications for Manganese products. In 2021, several of these projects were completed, with the publication of studies funded by the IMnI in several scientific journals.

The IMnI Health, Safety & Environment Committee decided in October 2021 to start a new Manganese life-cycle assessment (LCA), to help IMnI Members better analyse their environmental performance, both at an individual and industry level, and improve their operations. This ambitious project will analyse Manganese alloy and ore but also several Manganese chemicals (EMM, EMD, Mn sulphate), with case studies in various countries, and will take 2 years to be completed. All IMnI Members will benefit from the results of this LCA.

Finally, the 2022 IMnI's Annual Conference is confirmed in Cape Town, South Africa, from Monday, May 30th to Friday, June 3rd, on the theme "South Africa at crossroads: diversified Manganese producer, or China's miner?" Do not miss this opportunity to learn from industry experts, connect with the Mn community and visit several Mn production facilities.

Aloys d'HARAMBURE
IMnI Executive Director

IMnI IN 2021

As more information has become available regarding the spread of the virus and further restrictions on travel and quarantine protocols in certain countries, the IMnI has decided the best course of action to ensure the safety of all our Members and conference delegates is to postpone all its physical events.

While travels and social interactions have been halted, Market Research reports and HSE & Regulatory Affairs newsletters are published as usual.

Despite these challenging times, several new Members joined the IMnI in 2021, and participation in virtual events and partnership with other organizations were very active and productive.

January – March

- IMnI organizes its second virtual webinar around the theme "2021, a turning point for the Manganese industry?" 100+ participants join the event. Speakers include Amy Bennett, Fastmarkets MB Research, Patrick Sacco, Ore & Metal, Jack Bedder, Roskill and Aloys d'Harambure, IMnI

- Jitie (Tianjin) International Trade Co., Ltd and Firebird Metals Limited join as Ordinary Members, Vedika Metals Pvt Ltd, Roskill and Shanghai Fengri International Trading Co., Ltd. as Affiliate Members and Mn Energy Ltd. as Chemical Producers

April – June

- IMnI organizes its Q2 virtual webinar around the theme "2021, Manganese on the spotlight of the battery sector". 100+ participants join the event. Speakers include Jack Bedder, Roskill, Zhang Liangliang, South Manganese (ex CITIC Dameng), Madelein Todd, Manganese Metal Company (MMC), Philippe Bertrand, Prince Minerals Limited, Marco Romero, Euro Manganese Inc. and Aloys d'Harambure, IMnI

- IMnI's Annual Conference is postponed due to travel restrictions in South Africa

- The Electrolytic Products Division (EPD) Conference takes place on May 31 – June 1 in Yunnan Province, China. 125 paying delegates attend physically

- Tianjin Zhongjun International Trading Co., Ltd and Hira Elecstrosmelters join as Ordinary Members

July – September

- IMnI organizes its Q3 virtual webinar around the theme "Manganese ore & alloys markets in the "new normal" era". Speakers include Thomas Hörnfeldt, SSAB, Scott Yarham, Platts, Augenija Di Bucci, Satka Group, Eva Yang, IMnI and Aloys d'Harambure, IMnI

- IMnI Executive Director Aloys d'Harambure gives a presentation during the market session at INFACON XVI's virtual conferencew

- Afrimat Shared Services (Pty) Ltd., Lizetta Holding and Mineração Buritirama SA join as Ordinary Members, Galaxy Resources Limited, The David J. Joseph Company and Volkswagen AG join as Affiliate Members

October – December

- Agnieszka Leopold starts as incoming IMnI HSE and Regulatory Affairs Manager, and Miao Yu as Market Research Assistant

- Aloys d'Harambure, IMnI Executive Director, presents during the session "Macrotrends for the Ferroalloys Industry" at Fastmarkets International Ferro-Alloys Conference in Prague.

- IMnI organizes a networking cocktail in Prague for IMnI Members during the Fastmarkets conference, and a dinner for the Members of the IMnI Supervisory Board

MANGANESE IN 2021

Quarter 1

- UK-based conglomerate GFG Alliance completes takeover of Temco manganese alloys smelter in northern Tasmania, Australia in January
- Zambian miner RTB Minerals recently increased its Mn ore capacity to 10,000 wet mt per month by adding more machinery
- OM Holdings increased manganese alloy output in Sarawak, Malaysia in October-December 2020 and is on track to convert two idled furnaces from ferro-silicon furnaces later in 2021
- Chinese manufacturer of battery material Green Eco-Manufacture (GEM)'s Mn sulphate project in Indonesia is on the track, planning to start in 2021
- OM Holdings is increasing the flexibility and capacity of its Qinzhou manganese smelting and sinter ore processing operation in China, which will enable it to produce up to 80,000-95,000 t/yr of manganese alloys and 300,000 t/yr of sintered ore
- Element 25 is on track to start manganese ore production at its Butcherbird project in northwest Australia from the first half of March
- China's Inner Mongolia province will suspend the approval of new production projects for ferro-alloys, aluminium, alumina and polysilicon in line with the northern autonomous region's targets of controlling energy consumption in March
- Ukraine's Privat Group increases manganese alloy production at its Nikopol ferro-alloys plant hit a monthly production target for up by about 2,000 tonnes from April, amid strengthening European prices this year

Quarter 2

- Australia-based resources firm South32 achieved a production record at its Australian manganese ore operations in the nine months to March 31 and has raised the full-year guidance for its South African mines
- Afrimat is purchasing the Gravenhage manganese mining right and associated assets in the Northern Cape, South Africa
- OM Holdings suspends operations at Sarawak Malaysia due to an outbreak of Covid-19 among its workers
- Giyani Metals reports that the preliminary results from metallurgical test work at its Botswana-based K.Hill manganese project shows a high-purity manganese sulphate monohydrate (HPMSM) with less than 1% total impurity and manganese content of more than 31.5%
- South Africa's Tshipi Borwa sharply increased its output of high- and low-grade manganese ore during March-May on the back of the highest quarterly mining volumes in the mine's history
- Manganese Metal Company (MMC) announced that the Mn metal producer will diversify in the coming years and start producing battery-grade Mn sulphate at their plant in Nelspruit, South Africa. In the first phase, the company targets a capacity of 30,000 tons per year of HP MSM
- The Winchelsea project in Australia is expected to produce 1.3 million tonnes of Mn ore per year with an expected annual production of 1.3 million tonnes, and the average grade would be >40%Mn
- Euro Manganese, a Vancouver-based battery materials company, has announced plans to restart its pilot plant to produce high-purity manganese samples for prospective customers, primarily in Europe, targeting for production in late 2024 or early 2025

Quarter 3

- Conglomerate Posco has signed an agreement with local authorities to build a 60,000 t/y cathode material plant in Pohang, South Korea in July
- Malaysian authorities have given OM Holdings permission to resume ferroalloy operations in Sarawak in July
- Anglo American's Mn Ore production increased by 18% YoY in Q2 2021 from the same period in 2020
- Bulk freight rates on the rise again amid vessel shortages and Covid-19 issues in Asia
- India's Inland Metallics is seeking approval from the government to carry out environmental impact studies for its proposed 30,000 t/yr silico-manganese plant
- Indian ferroalloy producer Maithan Alloys (MAL), which is buying Impex Metal & Ferro Alloys (IMFAL), plans to begin operations at IMFAL's silico-manganese plant in the third quarter of this fiscal year, thus increasing its total capacity by around 49,500 t/yr
- India's Moil plans to establish an electrolytic manganese metal (EMM) production plant, with an expected production of 10,000 t/yr

Quarter 4

- China's Ulanqab city in Inner Mongolia has cancelled 32 production projects for calcium carbide and ferro-alloys so far this year in response to the government's carbon reduction targets
- OM Holdings' joint venture with Bryah Resources Ltd has commenced drilling for manganese in the Bryah Basin, 150km north of the central Western Australian town of Meekatharra in September
- Spain-based ferro-alloys producer Ferroglobe has temporarily shut another furnace in the country due to expensive energy prices at the end of September
- With mining now ramping up, the new Mokala manganese mine in the Northern Cape anticipates being at steady state production by the third quarter of 2021
- Investment company Menar's first manganese asset, the East Manganese mine, located near Hotazel, in the Northern Cape, mined ore for the first time in September
- Since mid-September, a swathe of provincial governments in China have imposed power cuts and rationing on local industrial users, which could cast a bigger influence on downstream fabricating sectors than previous curbs
- Ukrainian ferroalloy plants had to slash their capacity utilization due to higher production costs amid surging electricity prices in October
- Saryarka ferroalloy plant in Karaganda, eastern Kazakhstan, has commissioned a new furnace with three others planned to be put into operation by year-end with a total production capacity 57,000 t/y
- The Satka group of Russia has agreed to acquire Metalloys manganese alloy smelter in South Africa from Samancor in November
- China's Ningxia province, a major production hub for ferro-alloys and some minor metals in the country, has laid out a plan to reduce energy consumption in the next three years
- Giyani Metals Corporation has, through Mintek in South Africa, completed enhanced metallurgical test work and final process flowsheet design, as part of its feasibility study on the K.Hill manganese oxide project in Botswana in October (repetitive with the 5th news in Q2)

IMnI MARKET RESEARCH

"IMnI provides the most comprehensive manganese industry market research available."

Circulated on a monthly basis, IMnI reports examine both production and consumption, and the balance between the two, looking at the industry from both sides of the supply demand equation. The primary objective of these reports is to offer an analysis of the immediate past, which can provide the basis for Members to develop a greater understanding of their business.

IMnI Executive Director Aloys d'Harambure examines manganese ore and alloy consumption as they relate to the steel industry with the application of an industry model. This systematic approach provides increased accuracy to better understand and anticipate changes in the industry. A detailed analysis of IMnI data is also published on a monthly basis.

Our China and Rest of the World Weekly reports summarize the most important news of the industry during the week.

IMnI also issues monthly trade matrices for Mn Ore, Alloys, EMM and EMD, steel production statistics by country, and a database of current and future manganese producers.
All IMnI data is available to IMnI Members via our website www.manganese.org

MESSAGE FROM THE STATISTICS COMMITTEE CHAIRMAN

" Manganese production recovered globally in 2021, although slowing steel output in China is a concern"

As the year 2021 was again marked by the Covid19 pandemic, travel restrictions and supply disruptions have eased, allowing the Manganese industry to get back to its pre-Covid production levels. Demand from the steel industry recovered very strongly in the first half of 2021 in China, and in the second half of the year in the rest of the world, although the shortfall of semi-conductor chips constrained production of cars, impacting steel demand in many countries.

The Manganese industry also witnessed last year a slowdown of steel production growth in China, which increased by only 2% because of the will of the central government to limit pollution and reduce power consumption. Though domestic steel demand remains robust and no "hard landing" is expected for steel output in China, this new trend has major implications for Manganese alloy and ore producers.

Although travel restrictions linked to the Covid19 pandemic made the organisation of conferences and technical visits challenging last year again, the IMnI market research service continued improving, to better meet the needs of all the IMnI Members. Investments were made to improve the IMnI website security, and make the IMnI reports easier to find for Members. We also improved the IMnI trade matrices, by adding monthly statistics on alkaline batteries import and export, as this is the main application of electrolytic Manganese dioxide (EMD). An updated version of the report on Manganese in lithium-ion batteries was also published, with updated production data on forecasts on demand for Manganese sulphate high purity.

Today, statistics and market research reports represent one of the most important services IMnI Members benefit from. Our statistics are considered the most accurate in the manganese community, as they are based on data collected on a monthly basis from major manganese ore, alloy and metal producers. Confidentiality for producers is ensured with a 6-month time-lag in production data by country, but production figures by region are published with a time-lag of only 1 month (i.e in January, December's data is published by region). IMnI reports analyse production, demand, but also inventory, imports and exports for all major Manganese products (ore, 3 types of alloy, chemicals, etc.).

In the future, we plan to continue improving the quality of IMnI reports by publishing more technical information.

Guillermo RECIO
IMnI Statistics Committee Chairman

STATISTICAL PACKAGES ARE AVAILABLE FOR NON-MEMBERS:

enquire at stats@manganese.org

IMnI offers the most comprehensive and detailed statistics available on manganese

Manganese production, demand and inventory statistics collected directly from IMnI Members on a monthly basis.

Monthly import and export data by country for manganese ore, silico-manganese, high-carbon and refined ferro-manganese, manganese metal and manganese dioxide. Steel production report, country-by-country every month.

Complete database of manganese producers and future projects, with filter by product and by country, with capacity.

Manganese ore production

Global Mn ore supply contracted by 1% MoM in September, to around 1.8 million mt Mn units, and it was 4% lower than in September last year. Year-to-date output rose by 4% from Jan.-Sep. 2020, mainly because of rising supply in Africa. But year-to-date Mn ore production in wet metric tonnes contracted by 7% YoY in the first 9 months of this year. The average Mn ore content increased this year due to Chinese importers consuming more high grade material (because of energy consumption constraints, and high stocks of low-grade material at China's ports).

- **Africa & Middle East:** September supply remained stable, with rising output in South Africa offset by lower production in Gabon. Year-to-date production was 21% higher than in January-September 2020, on rising supply in South Africa, Gabon, Ghana, Namibia, Zambia, etc.
- **Asia & Oceania:** September output decreased slightly by 1% from the previous month as rising production in India offset production cuts in Australia, Vietnam and Myanmar. YTD output contracted by 22% from the January to September period of last year, on supply cuts in China, India and Malaysia compensating the higher output in Australia, Vietnam and Myanmar.

Mn Ore Supply & Demand in September 2021

(in '000 net mt Mn units)	Supply	MoM % Change in Supply	YoY % Change in Supply	YoY % Change in supply since Jan.	Demand	MoM % Change in Demand	YoY % Change in Demand	YoY % Change in demand since Jan.	Supply & Demand Balance
Africa & Middle East	1,207	0%	5%	21%	44	19%	69%	40%	1,163
Asia & Oceania	427	-1%	-19%	-22%	1,178	-15%	-22%	6%	-752
Americas	89	-13%	1%	-11%	53	-4%	10%	4%	36
C.I.S.	80	0%	-24%	-5%	134	-5%	40%	14%	-54
Europe	2	-20%	3%	83%	77	0%	35%	14%	-75
World	1,804	-1.3%	-3.7%	4.2%	1,486	-12.6%	-14.1%	7.5%	318

Source: International Manganese Institute (IMnI)

More details on Mn ore statistics are available here (for IMnI Members)

MANGANESE MARKET OVERVIEW

"In 2021, the global Manganese industry continued its recovery, but it was also impacted by energy consumption constraints in China"

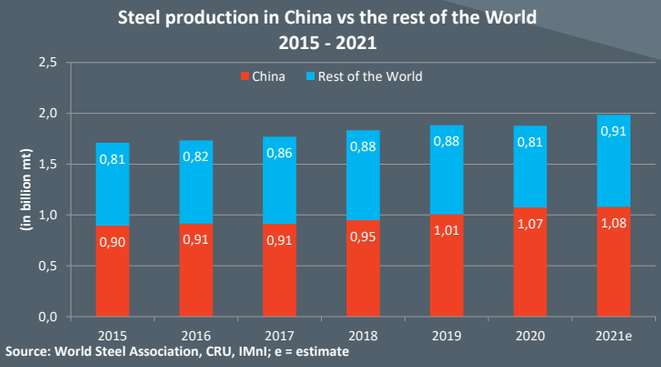
Steel

Global steel production recovered in 2021 from the previous year marked by production disruption in many countries because of Covid19

Global crude steel production increased in 2021 by an estimated 5.6% from 2020, after production constraints have eased in most countries. The world's output of steel almost reached 1.98 billion mt in 2021 according to a first estimate by CRU and Worldsteel, from 1.88 billion mt in 2020. Around 104 million additional tons were produced globally in 2021 from the previous year. In 2020, global steel production contracted by 4.8 million mt (or 0.3%) because of production disruptions in many countries at the beginning of the Covid19 pandemic.

In 2021, China's total steel production expanded marginally to an estimated 1.08 billion tons on increasing output in the first half of the year, followed by stricter constraints in the last six months of 2021. The total is up by 0.5% from 1.07 billion mt the year before, and China now represents 54% of the world's output of steel. Nonetheless, China's steel production in the second half of 2021 was significantly reduced by power use and environmental constraints, as the Central government ordered in the third quarter many large energy consumers (including steel mills) to reduce their power consumption, officially to curb carbon emissions, in fact mostly because of a shortage of coal due to trade tensions with Australia. After 5 years of decline, steel exports from China recovered in 2021, rising by 29% from the previous year, because of strong demand from Asian countries (South Korea, Japan etc.).

Outside China, the steel production recovery continued in 2021, with rising output in Europe (+15%), the CIS countries (+5%), North America (+17%), South America (+18%), Africa (+21%), Asia exc. China (+13%), and Oceania (+6%). The only region with lower steel output in 2021 was the Middle East (-3% from 2020), according to preliminary data released by Worldsteel.



Source: World Steel Association, CRU, IMnI; e = estimate

Source: China Customs, IMnI; e = estimate

Steel production statistics by country are available here (for IMnI Members only).

SiMn

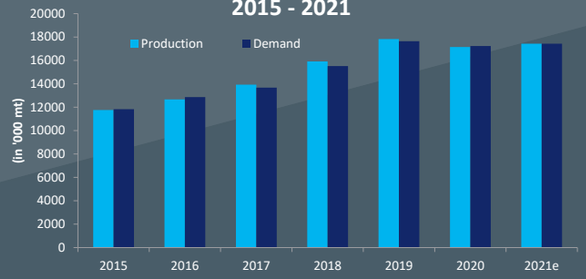
The slow recovery of SiMn production in 2021 was constrained by lower output in China

Global SiMn production expanded by 2% in 2021 to around 17.4 million mt, but it was still lower than the 17.8 million mt produced in 2019 before the Covid19 disruptions, because of slowing production in China in the second half of 2021.

Nonetheless, around 285,000 additional mt of SiMn have been produced in 2021 compared to the previous year, mostly because of higher output in Asia exc. China (+21%), the CIS countries (+17%), and Africa (+63%). The Central government in China ordered many large energy consumers to reduce their power consumption in the third quarter of 2021, affecting several major Manganese alloy and Manganese chemical plants.

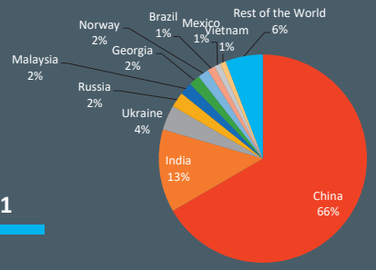
China's output of SiMn contracted by 654,000 mt (-5%) from the previous year, and China now accounts for 66% of global silico-manganese supply (from 72% in 2020), followed by India with 13% and Ukraine with 4% of the world's SiMn production in 2021. India's output of SiMn increased by 26% in 2021 from the previous year, to 2.25 million mt, driven by strong demand from domestic steel mills, and overseas consumers (in Japan, Taiwan, Europe, the Middle East etc.).

SiMn production and demand 2015 - 2021

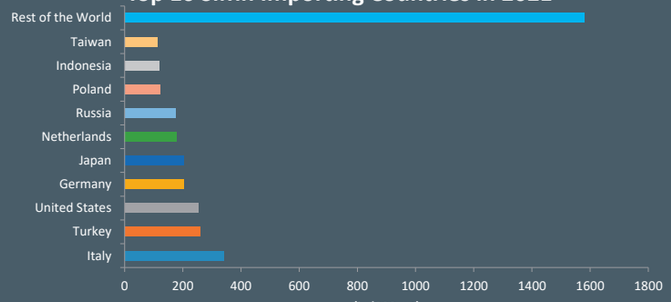


Source: IMnI; e = estimate

Top 10 SiMn Producing countries in 2021 (source: IMnI)



Top 10 SiMn Importing Countries in 2021



Source: TDM, IMnI

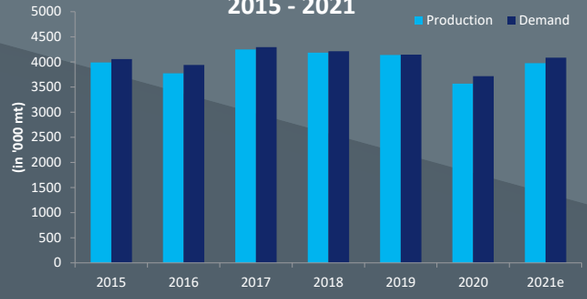
Statistics for production, demand, inventory and trade of Mn ore & alloy are available by region here (for IMnI Members only).

HC FeMn

Global production expanded in 2021 for the first time since 2017, but it remains lower than pre-Covid19 levels

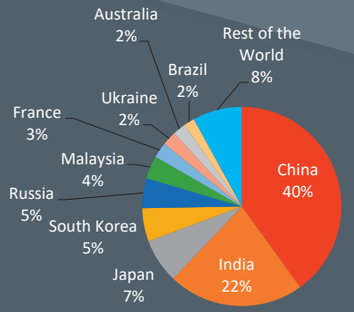
The world's output of high-carbon ferro-manganese expanded in 2021 for the first time since 2017, increasing by 409,000 mt (+11%) from 2020, to nearly 4 million mt, driven by the recovery of the steel industry in most countries. A remarkable growth in output was seen in Asia (+14%) and Europe (22%), compensating production cuts in the CIS countries (-4%), South America (-7%) and Africa (-15%). Production expanded by an estimated 4% in China in 2021, and it accounted for 40% of the world's supply in 2021, down from 43% in 2020, due to the intensified energy constraints in the second half of the year in China. Output in India, the world's second-largest producer, increased by a huge 55%, driven by very strong demand from the export markets (especially Europe, the USA, Canada, and Taiwan). Today India represents 22% of global steel production, a rise from 16% in 2020.

HC FeMn production and demand 2015 - 2021

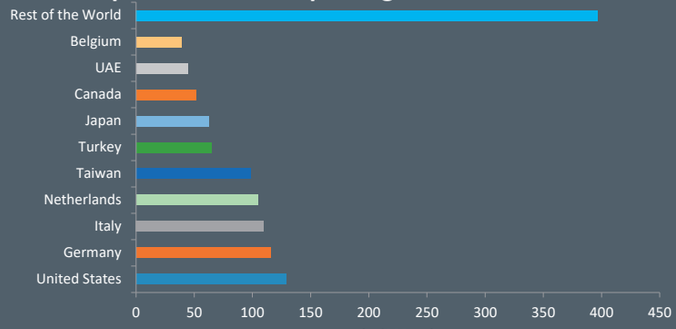


Source: IMnI; e = estimate

Top 10 HC FeMn Producing countries in 2021 (source: IMnI)



Top 10 HC FeMn Importing Countries in 2021



Source: TDM, IMnI

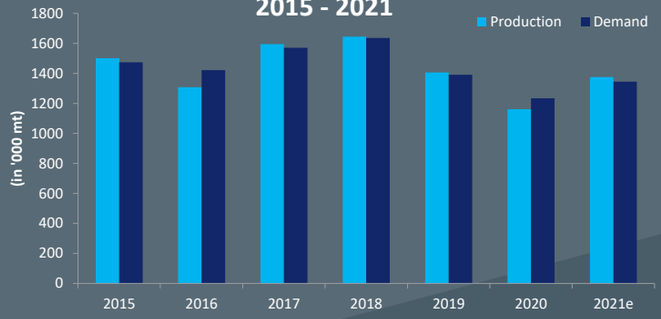
Statistics for production, demand, inventory and trade of Mn ore & alloy are available by region here (for IMnI Members only).

Ref FeMn

Production recovered across all regions in 2021, driven by supported demand in Europe, North America and Asia

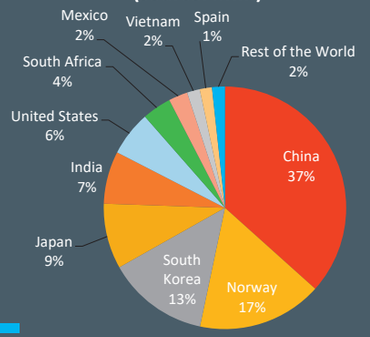
Global production of refined ferro-manganese expanded in 2021 to nearly 1.4 million mt, up significantly by 18% from the previous year, and almost back to the 2019 level, before the Covid-19 disruption started. Supply increased in all regions compared with 2020: Asia (+16%), Europe (+21%), CIS (+42%), North & South America (+36%), and Africa (+6%). All major Ref FeMn producing countries increased output, including China (+4%), Norway (+17%), South Korea (+40%), Japan (+19%) and India (+37%). China now accounts for 37% of global refined FeMn production, down from 42% in 2020, followed by Norway (17%) and South Korea (13%).

Ref FeMn production and demand 2015 - 2021

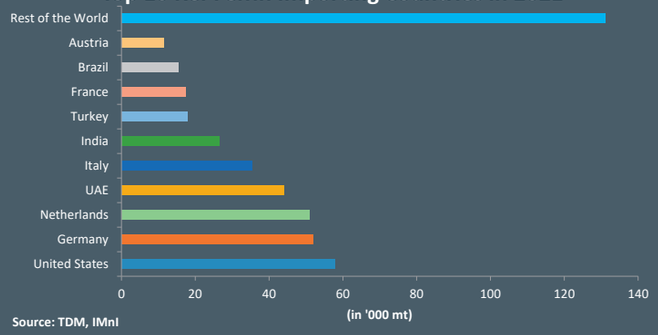


Source: IMnI; e = estimate

Top 10 Ref FeMn Producing countries in 2021 (source: IMnI)



Top 10 Ref FeMn Importing Countries in 2021



Source: TDM, IMnI

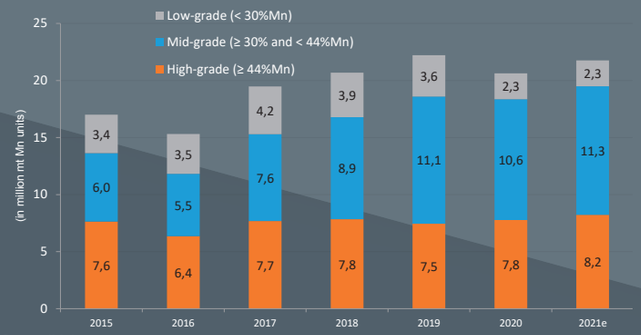
Statistics for production, demand, inventory and trade of Mn ore & alloy are available by region here (for IMnI Members only).

Mn ore

Rising production in 2021 was driven by high- and mid-grade Manganese ore output in Africa

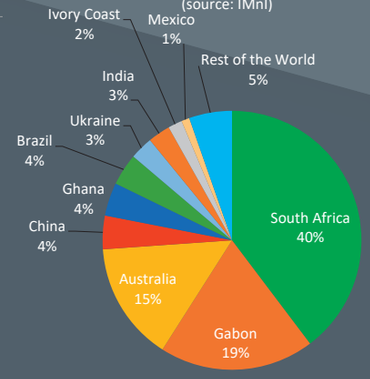
The world's output of Manganese ore increased to 21.8 million mt Mn units in 2021, up by 6% from the previous year. The increase largely comes from expanding production of high- and mid-grade ore (+6% each), while supply of low-grade ore remained stable. High-grade Mn ore production (>44%Mn) now represents 38% of total output, while mid-grade ore (>30% and <44%Mn) accounts for 52% and low-grade ore (<30%Mn) makes up for the remaining 10%. Production contracted in 2021 in Brazil, China Australia, Ukraine, India and Ivory Coast, while output rose in South Africa, Gabon, Ghana and Mexico. South Africa now accounts for 40% of global Mn ore production, up from 35% in 2020, followed by Gabon (19%) and Australia (15%).

Global Mn ore production by grade 2015 - 2021

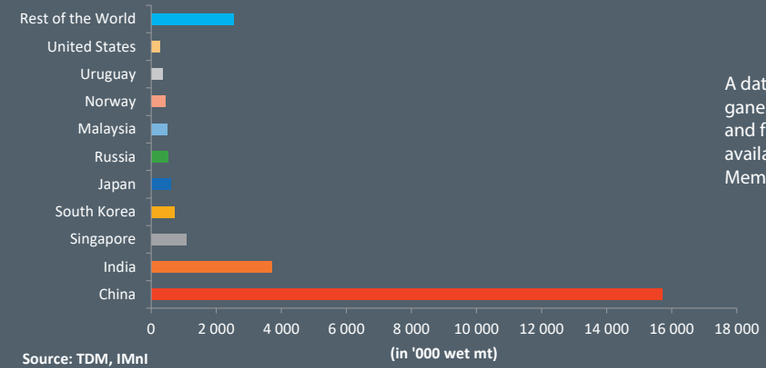


Source: IMnI

Top 10 Mn Ore Producing countries in 2021 (source: IMnI)



Top 10 Mn Ore Importing Countries in 2021



Source: TDM, IMnI

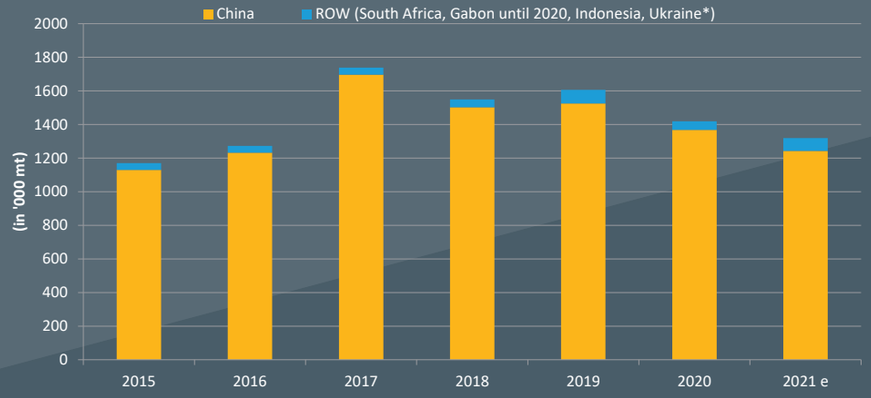
A database of manganese producers and future projects is available here (for IMnI Members only).

Manganese metal

Lower global production in 2021 because of supply cuts in China, while output increased in the rest of the world

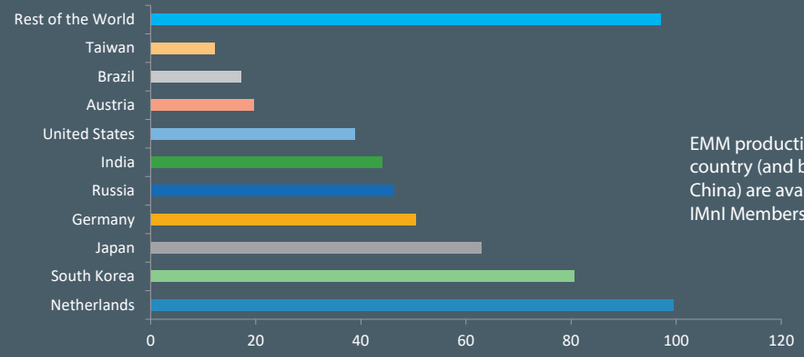
Manganese metal production contracted in 2021 for the second consecutive year, by 7% from 2020 to 1.32 million mt. The supply drop is mainly due production cuts decided by an alliance of Chinese producers since the first quarter of 2021, and to a lesser extent to power consumption constraints in China in the second half of 2021. In the rest of the world, Manganese metal production expanded by 49% in 2021 because Tsingshan resumed output in Indonesia (mostly for internal consumption in stainless steel), while Privat's output recovered in Ukraine. China now accounts for 94% of the global output of Mn metal, down from 96% in 2020.

Manganese metal production in China vs the rest of the World 2015 - 2021



*** Manganese metal produced at Privat's plant Zaporozhye in Ukraine aluminothermic manganese metal, not electrolytic**

Top 10 EMM Importing Countries in 2021

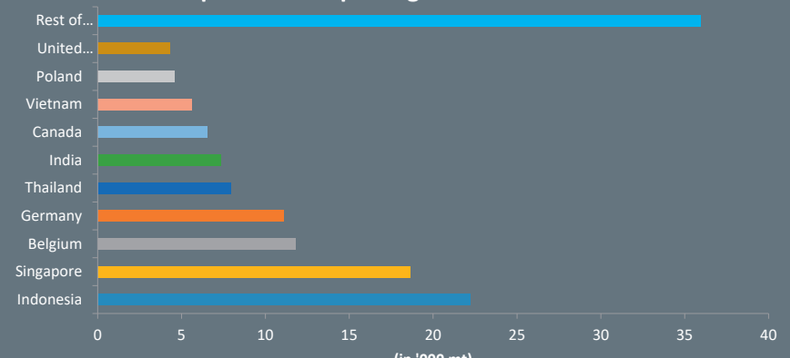


Source: TDM, IMnI

EMM production statistics by country (and by province in China) are available here (for IMnI Members only).

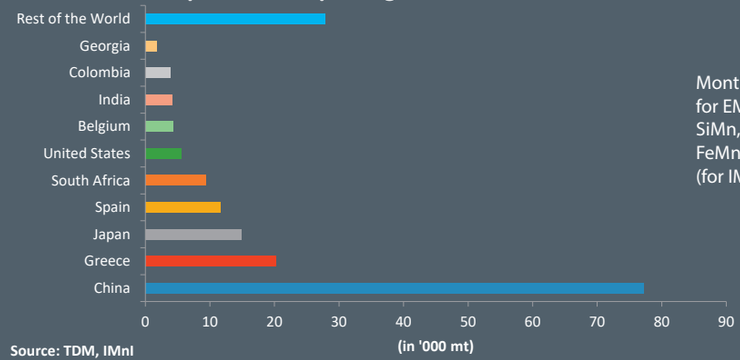
Electrolytic Manganese Dioxide (EMD)

Top 10 EMD Importing Countries in 2021



Source: TDM, IMnI

Top 10 EMD Exporting Countries in 2021



Source: TDM, IMnI

Monthly trade matrices for EMD, EMM, Mn ore, SiMn, HC FeMn and Ref FeMn are available here (for IMnI Members only).

HSE: SOCIAL RESPONSIBILITY

The mission of the HSE Committee is to develop the IMnI as the platform for providing the Mn industry with guidance, tools and information that will allow it to anticipate occupational health, environment and safety demands whilst improving worker safety, sustainability and ensuring industry profitability. To support this mission, the committee answers three main objectives:

- To identify those HSE topics that can impact on the Mn industry and to provide answers.
- To establish and employ a global network that can provide appropriate HSE expertise to IMnI, when necessary.
- To provide relevant information and support to members enabling them to promote and pro-actively ensure their interests when faced with new regulatory demands.

2021 HSE COMMITTEE CHAIRMAN'S MESSAGE

"In spite of the Covid19 pandemic, the IMnI Health, Safety & Environment Committee achieved significant results in 2021, with the conclusion of several major scientific studies"

2021 was a year of achievements for the IMnI HSE Committee. Some of the on-going projects have resulted in papers being published in internationally recognized journals. Others are about to be finalized in the first half of 2022, providing the same outcome. A few new projects have been started to strengthen the knowledge on the health, safety and environmental aspects of manganese, and guarantee the growth of the industry whilst ensuring its protection and sustainable development.

The cooperation work between IMnI and the US Manganese Interest Group (MIG), a coalition interested in the scientifically sound evaluation and regulation of manganese in the USA, has been focused on the study published in November 2021, counteracting previous analysis by the US EPA of Mn health impacts linked to monitoring data and its conclusions. IMnI has also supported MIG in their response to the EPA as for the inclusion of Mn in the draft list of drinking water contaminants for potential regulation, as inclusion on this list would put manganese in the mix for development of drinking water standards.

Risk Sciences International (RSI), the IMnI's partner for the Manganism project, held the International Workshop on Diagnostic Criteria for Manganism in November 2020 with participation of international experts in manganese toxicity, and is now finalizing the papers based on the workshop. Additionally, RSI is concluding a workshop report manuscript to be submitted for publication early in 2022. Lastly, a final revision and validation of the diagnostic criteria for manganism is planned to be performed in the first half of 2022. The redefined diagnostic criteria will be a powerful guideline for the industry, health practitioners and employees.

A project with Canada-based Salient Energy and its MnO_2 electrodes was finalized with publication of a paper in October 2021. The objective of the project was to develop rechargeable aqueous Zin-ion battery (ZIB) technology, to replace Li-ion batteries for stationary energy applications, and therefore increase the use of manganese in batteries.

As in the previous years, 2021 IMnI's involvement in the China Associations Coordination Group (CACG), initiated in 2018, was focused on developing the China Metal Environmental Risk Assessment Guidance (CN-MERAG), with the collaboration of the Solid Waste and Chemicals Management Center of the Ministry of Ecology and Environment (MEE-SCC). Other activities of the group included introducing the Metals Toolbox to MEE-SCC and raising awareness about responsible sourcing (Joint Due Diligence Standard) to the Ministry of Industry and Information Technology (MIIT).

IMnI's primary involvement in the activities of the International Council on Mining and Metals (ICMM) in 2021 was for the development of the brief on the considerations for the adoption of real-time particulate monitoring (RTPM) in the mining and metals industry. The draft was finalized in October 2021. The intent is to publish the final report early in 2022. The brief aims to encourage the operationalization of RTPM to reduce worker exposures to hazardous airborne particulates, to improve understanding of the benefits and the limitations of RTPM and ultimately seek the improvement of RTPM through an industry call to action. The outcome of this project is expected to be of significant use for the IMnI's Members.

In September 2021, following the IMnI's previous collaboration with the Purdue University, the research dealing with exposure to different metals mixtures profiles contained in steel and aluminum welding fumes and resulting health effects was initiated. The findings of the study, which aims at addressing the existing wide knowledge gap on effects and synergies of exposure to metal mixtures, will be described in two peer-reviewed journal articles. This will be very valuable to increase the health and safety knowledge aspects of Mn exposure.

In December 2021, a Manganese life-cycle assessment (LCA) project was initiated by the IMnI HSE Committee. This major project has been of great interest to the Members for some time, giving that the reduction of environmental impacts is an ongoing priority in the metals and chemicals industry. This project aims at analysing the global Manganese value-chain environmental impacts, from the ore to the alloys and chemicals, leading to the assessment of the whole battery of manganese products: Mn ore, Mn alloys, $MnSO_4$, EMD and EMM. The project will last 2 years. The Mn industry will benefit from detailed information on recycling of Manganese and its products, water consumption, land use, gas emissions etc. at an industry level.

The HSE Committee looks forward to providing continued support to IMnI Members in the future, to enable them to successfully manage the increasing challenges in terms of health, safety and environmental impacts.

Rocklin REED
IMnI HSE Committee Chairman

2021 UPDATE ON HSE SPECIAL PROJECTS

IMnI studies

Relationship between Mn accumulation in hair and internal tissue to demonstrate hair as a valid biomarker for internal manganese exposure

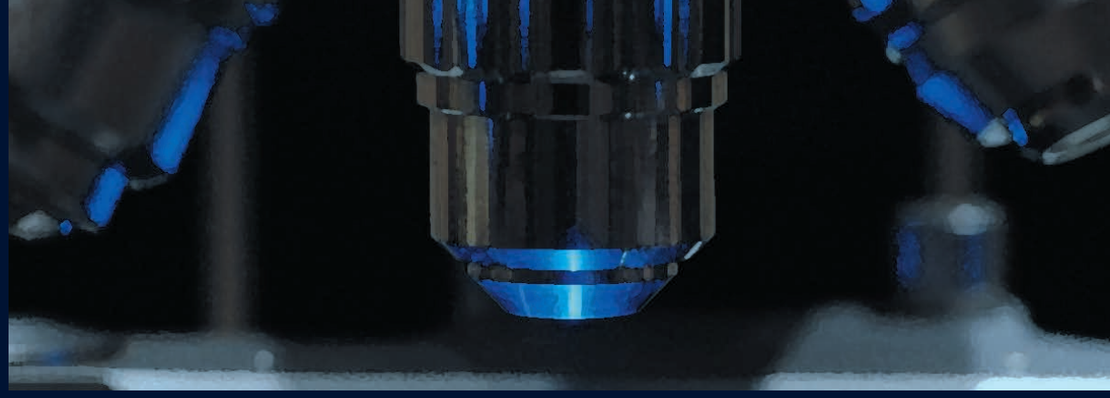
This project, which was funded by the IMnI in late 2018, has been completed with a paper publication in Food and Chemical Technology in November 2021. In March 2021, the findings of the research work have been presented at the virtual Society of Toxicology 60th Annual Meeting. The joint efforts of Albert Einstein College of Medicine and Purdue University in the USA demonstrate that manganese levels in rodent hair are not representative of actual internal manganese exposure. Hair is studied because it has potential to serve as a non-invasive biomarker for Mn exposure. The results show that, unlike mercury, manganese accumulation in rats and mice hair does not correlate with sub-cutaneous administration of manganese. Hence, it serves to convey lack of validation when using hair as a biomarker for internal Mn exposure in the rodent models. Despite the lack of evidence in these, the researchers conclude that the utility of hair as a reliable biomarker in humans needs to be validated by performing the validation in human cohorts. Until that the hair data should be interpreted with caution as to its ability to quantify internal vs external Mn exposure.

Can toenail Mn levels predict brain Mn levels?

The Purdue University in the USA received funding from the IMnI in late 2018 to study if toenail Mn levels can predict brain Mn levels, following workplace exposure in welders. Preliminary results show that Mn concentrations in toenails produce strong correlations with exposures during the previous 7–12-month period, and that toenail concentrations also correlate with motor function test results. Toenail concentrations from toenail clippings acquired at the same time as the MRI exam are however not correlated with brain Mn levels, which only correlate with exposures during the last 3 months. Data acquisition of toenails at timepoints 3, 6, 9 and 12 months after the MRI exam has been recently finalized. The toenails concentrations are currently being analysed with the expectation being that toenail Mn levels acquired 6 months after the MRI exam would predict better brain Mn levels, due to each biomarker representing different past exposure times.

Between March 2021 and May 2021, the findings of the research work were presented at several international scientific meetings: Society of Toxicology 60th Annual Meeting, International Society for Magnetic Resonance in Medicine Annual Meeting, American Industrial Hygiene Conference and Exposition. These findings are expected to be documented in a paper to be submitted for publication in April-May 2022.

A $3.5M grant from the US National Institutes of Health (NIH) for the next 5 years was obtained thanks to the preliminary work funded by IMnI. The objective is to study toxico-kinetics of Mn exposure in welders with neuroimaging, in particular uptake of Mn from baseline at non-exposure, as well as wash-out of Mn after end of exposure. By these means the IMnI study will be completed at a much larger scale.



Research on metal mixtures exposures in welding fumes

Following the previous investigations of the Purdue University, the research dealing with exposure to different metals mixtures profiles contained in steel and aluminum welding fumes and resulting health effects was initiated in August 2021. Welding fumes contain more metals than just Mn. Several of these have shown to be neurotoxic in case of very high exposures, just like Mn. Few studies have taken into account the co-exposure to additional metals when interpreting results of correlations between exposure to Mn contained in welding fumes and health effects. This study thus aims to address the existing wide knowledge gap on effects and synergies of exposure to metals mixtures, where it is not clear that all the described effects are due to Mn. Additionally, this study will evaluate the importance of each metal contribution to a particular effect. The investigation part of the project will include the analysis of steel and aluminium welders that will be compared for exposure data (personal air samples and toenail clippings), brain MRI and MRS, and neuropsychological testing (cognition and motor). Recruitment of subjects has already commenced. The project is expected to be completed by 2023. The resulting research findings will be described in two peer-reviewed Tier 1 journal articles.

Investigation of metabolites related to manganese exposure in metalworkers using targeted mass spectrometry methods

Funded by the IMnI early in 2019, this project has been completed in May 2021, with publication of a paper in Frontiers in Public Health. The study of the University of Washington uses targeted urine metabolomics to investigate metabolic differences between Mn-exposed and -unexposed workers in order to try to determine a validated and reliable biomarker for Mn exposure. In this study, urine samples collected from exposed and unexposed workers of the Puget Sound region of the United States went through a targeted assay of 362 metabolites using liquid chromatography-tandem mass spectrometry (LC-MS/MS). Metabolite levels were compared between exposed and unexposed workers. Metabolite levels and pathways perturbations were analysed in exposed workers. As a result, seven metabolites were significantly differentially abundant between exposed and unexposed workers and three pathways were significantly perturbed in exposed workers. In conclusion, workers exposed to Mn-containing fumes show perturbations of amino acids and amino acid pathways, the findings being consistent with other studies of workers exposed to Mn-containing fumes. Additional investigation is needed to characterize the biological importance of amino acids in Mn toxicity, and to determine how to appropriately utilize and interpret metabolomics data collected from occupational cohorts.

Factors Impacting Zinc Cation Intercalation into Manganese Oxide Structures for Rechargeable Aqueous Zinc-Ion Batteries

In 2019, Canadian-based Salient Energy in collaboration with the University of Alberta received funds from the IMnI to investigate and characterize different MnOx as positive electrodes in zinc-ion batteries using electrochemical techniques, X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), energy dispersive X-ray spectroscopy (EDX). The objective was to fully understand the mechanisms associated with charging and discharging of the manganese oxide positive electrodes in zinc-ion batteries, with the ultimate goal of using this knowledge to fabricate better electrodes and better performing batteries using Manganese.

The findings of the research have been concluded in a paper published in Scientific Reports in October 2021. The study reports on the discharge and charge reaction mechanisms for cycling EMD in the zinc-ion battery. Reversible insertion of Zn+2 cations into and from EMD was observed by X-ray diffraction. In addition to the desirable insertion of Zn+2 cations, other reversible side-reactions were identified. The project supports the replacement of lithium-ion batteries with zinc-ion batteries for stationary energy storage systems, and therefore increasing the use of Manganese in batteries.

The initial grant from IMnI allowed Salient Energy to be awarded a $3 million grant from Sustainable Development Technology Canada (SDTC) to construct a pilot plant in 2021 and begin manufacturing their zinc-ion batteries.

Manganism

The project was originally commissioned to Risk Sciences International (RSI) at the beginning of 2018. The objective is to redefine current diagnosis criteria for Manganism as they appear outdated given that Mn exposure is far lower nowadays than it has been historically. The idea is to provide workers and employers in the manganese industry with a stronger basis for ensuring occupational health and safety. The first phase of the project, which involved a comprehensive review of criteria for measuring neurological impairment, was completed in 2019. Subsequent phases of the project, that focused on review of manganese pharmacokinetics and imaging and review of manganese biomarkers, were completed in 2020. These phases were used as a background information for the International Workshop on Diagnosis Criteria for Manganism that took place in November 2020 with participation of international experts in manganese toxicity. As a result of the workshop, three papers were submitted for publication in Critical Reviews in Toxicology in April 2021. The corresponding papers focus on environmental biomarkers for Manganese, occupational biomarkers for Manganese and Manganese pharmacokinetics and magnetic resonance imaging. As an additional achievement of the workshopa report on the diagnosis of manganism and manganese neurotoxicity will be submitted for publication during 2022. As the last phase of the project, an "Independent medical panel review of suggested diagnostic criteria" will focus on converting workshop recommendations into updated diagnostic considerations for manganism and manganese neurotoxicity.

Manganese Interest Group (MIG)

The Manganese Interest Group (MIG) commissioned a review to evaluate the conclusions of detrimental Mn epidemiology studies conducted in Ohio communities (2012, 2015, 2016) and funded by the US Environmental Protection Agency (US EPA). This review resulted in a paper, authored by Gradient, published in Regulatory Toxicology and Pharmacology in November 2021. The published manuscript supports the effort to ensure that evaluation of the published research is grounded more fully in science and that the findings of several of the Mn studies published previously on this issue are understood.

In June 2021, the US EPA included Mn in its newly issued draft list of drinking water contaminants for potential regulation under the Safe Drinking Water Act (Draft Contaminant Candidate List 5 – CCL 5). Listing on the CCL would put manganese in the mix for development of drinking water standards (which are used as a primary basis for site cleanup standards, among other things). As a response, IMnI provided the Manganese Interest Group (MIG) with information and documentation in support of the comments that were submitted to the EPA in September 2021.

Life Cycle Assessment of manganese products

In December 2021, due to high interest of the Members, IMnI has initiated the Manganese Life Cycle Assessment project. The goal of this study is to assess the life cycle environmental profile for the global production of manganese products in an effort to provide the interested parties with reliable and representative life cycle data. Based on the input from the IMnI members, the study will focus on quantifying the environmental impacts of the cradle to gate production of Mn ore, Mn alloys, EMD, EMM, MnSO4. The target audience for this study includes the IMnI, manganese producers, first and end users (customers), legislators, academia, LCA practitioners, non-governmental organisations (NGOs), etc. The study will be conducted in accordance with the ISO standards. The project will take approximately 2 years to complete.

2021 REGULATORY HIGHLIGHTS

Quarter 1

• Mn not included in the Second Batch of Substances of the Inventory of Existing Chemical Substances in China (IECSC)

• Manganese considered for listing under the Proposition 65 (chemicals known to the state of California to cause cancer or reproductive toxicity)

• Manganese compounds included in the updated list of pre-registered substances under K-REACH of Korea

• Mn included in China's Online Database with Chemicals Hazard Information and Occupational Exposure Limits (OELs)

• Japan plans to introduce Chemical Management Numbering System to help companies comply with PRTR requirements, manganese and its compounds being listed under PRTR's Class I Designated Chemical Substances

Quarter 2

• Mn and its alloys not included under EU Export Control Handbook for Chemicals

• Japan designates welding fumes and "basic manganese oxide" as controlled Class 2 substances with a threshold limit of 0.05 mg/m3

• Japan lowers the threshold limit for manganese and its compounds, classified as Class 2 substances, from 0.2 mg/m3 to 0.05 mg/m3

• The European Economic and Social Committee proposes EU Sustainability requirements for batteries

Quarter 3

• EU renew the authorization of manganese chelate of hydroxy analogue of methionine for use as feed additive for animal nutrition

• Manganese included in the US EPA Draft Contaminant Candidate List 5 as priority contaminant for potential regulation

• 15 manganese substances included in pool 2 of the draft restrictions roadmap under the EU Chemicals Strategy for Sustainability

• Consultation on reduced OELs for welding fumes and identification of priority list of reprotoxicants under the EU Strategy on Health and Safety at Work

Quarter 4

• Manganese articles, mostly related to Lithium Manganese Batteries, present in large numbers in the ECHA's SCIP database established under the Waste Framework Directive (WFD)

• Revision of the draft restrictions roadmap under the EU Chemicals Strategy for Sustainability with reiterated inclusion of 15 manganese substances in its pool 2

• Manganese/Trimanganese tetraoxide/ Cobalt manganese nickel hydroxide listed under Korea-REACH as substances with the registration deadline as of end of 2021

• Manganese dichloride in the light of evaluation as suspected endocrine disruptor by the French authorities

• ECHA's releases assessment of regulatory needs for Simple Manganese Compounds under EU chemicals universe project

THE IMNI ELECTROLYTIC PRODUCTS (EPD) DIVISION

- Focuses on electrolytic manganese metal (EMM), electrolytic manganese dioxide (EMD) and other manganese chemicals ($MnSO_4$, Mn_3O_4, MnO, etc.)
- Collects production and trade data on electrolytic products
- Provides coverage and weekly analysis of EMM and EMD markets in China through on the ground investigation by our IMnI China Representative
- Acts as a forum for discussion of industry matters, particularly those relating to health, safety, environment and regulatory affairs

THE IMnI ELECTROLYTIC PRODUCTS DIVISION (EPD) CONFERENCE

The Electrolytic Products Division (EPD) Conference took place on May 31 & June 1 in Yunnan province, China, and was attended by 125 delegates.

Around the theme "What are the latest developments for the EMM, EMD and Mn chemical products?", experts and specialist of Manganese industries, representatives from upstream and downstream industries, in China and abroad, were invited to share their opinion on the development and potential of the manganese industry.

Hosts:

- International Manganese Institute (IMnI)
- National Committee of Manganese Industry Technology (NCMIT)
- Manganese Industry Branch of China Mining Association
- Guangxi Manganese Institute

Organizers:

- South Manganese International Trade Company
- International Manganese Institute China Committee

For more information about the IMnI and its events,
please contact events@manganese.org
or follow us on LinkedIn.

UPDATE ON THE CHINA COMMITTEE

The China Committee aims to assist IMnI in enlarging its membership base in China, to provide IMnI Members with accurate statistics on China, to facilitate the networking between Chinese companies and IMnI Members from the rest of the world, and to support Chinese Members in terms of HSE, market research and technical information. Mrs. Eva Yang (evayang@manganese.org), based in Shanghai, is the IMnI China Representative.

With 3 new Chinese companies joining the IMnI in 2021, the China Committee now represents a total of 26 Chinese IMnI Members, including 16 major producers of Mn alloys, 1 producer of electrolytic products and Manganese ore, and 9 prominent trading companies.

In June 2021, the IMnI China Committee, chaired by Mr. Jian Zhou (Fengri Trading) met in Tianjin during the Cnfeol conference.

This meeting was attended by 30+ IMnI Members with offices in China.

The China Statistics sub-committee also organised several teleconferences, animated by IMnI China Representative Ms. Eva Yang, to discuss the latest IMnI statistics.

In 2022, IMnI plans to organise a Technical & HSE Workshop in Guangxi province, to visit Guikang New Materials, and hold technical discussions on energy consumption and furnace optimization etc.

THE ANNUAL CONFERENCE

IMnI's Premier Event

As more information has become available regarding the spread of the virus and further restrictions on travel and quarantine protocols in certain countries, the IMnI has decided the best course of action to ensure the safety of all our Members and conference delegates is to postpone its 46th Annual Conference, originally scheduled for June 2020. **This event will be held in Q2 2022, in Cape Town, South Africa.**

Structured around the theme "South Africa at crossroads: diversified Manganese producer, or China's miner?", main speakers will include: **Robert Ward**, Director of Geoeconomics & Strategy and Japan Chair at the International Institute of Strategic Studies (IISS); **Goolam Ballim**, Chief Economist of Standard Bank Group, **Maxime Vandersmissen**, Associate Partner, Basic Materials of McKinsey & Company, **Steven Vercammen**, Senior Expert in the Basic Materials Institute of McKinsey & Company, **Gajanan U. Kapure**, Head, Ferro Alloy Minerals Research Group of Tata Steel Limited, Ramsey Yavuz, Analyst for Roskill Information Services, Aloys d'Harambure, IMnI Executive Director, Kevin Fowkes, Managing Consultant for AlloyConsults, Rorie Wilson, Managing Director of Ore & Metal Company, Navesh Ragoonanthun, Group General Manager: Business Development of Transnet, Sebastian Kreft, Managing Director of Metals Hub GmbH, Bingbing Song, Secretary of the CCC Sub-Committee of the International Maritime Organisation (IMO) and John Bell, CEO of S.H. Bell Company.

A panel discussion on manganese will be part of the program.

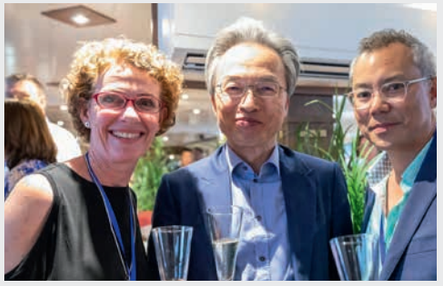
Pre and post conference, technical tours to open-pit and undergroung mines (Kudumane, South32 Mamatwan, Tshipi, UMK, Assmang Gloria & Nchwaning), plants (Manganese Metal Company and Transalloys) and ports (Transnet Port Elizabeth & Coega) will be scheduled.

Sponsors to date for this event include Assore, Autlan, Kudumane Manganese Resources (Pty) Ltd., South32, South32, Transalloys (Pty) Ltd., Tshipi & Ntle Manganese Mining and United Manganese of Kalahari (UMK).

For more information about the IMnI and its Annual Conference, please contact events@manganese.org or follow us on LinkedIn.

COMPANIES THAT ATTENDED THE IMNI 45TH ANNUAL CONFERENCE

Abhijeet Ferrotech Limited
Afro Minerals Trading AG
Allied Petrochemical B.V.
Alloys Consulting Luxembourg
AlloysConsult
ArcelorMittal Sourcing
Argus Media
Asia Minerals Limited
Asia Minerals North America LLC
Assore
Barry Rogliano Salles
Borman Specialty Materials
Cahya Mata Sarawak Berhad
CCMA, LLC
Charisma Resources Ltd
China National Minmetals
CITIC Commodities Pte Ltd.
CITIC Dameng Mining Industries Limited
Clarksons Platou
Compagnie Minière du Littoral
Compañía de Minas Buenaventura S.A.A.
Compania Minera Autlán, SAB de CV
CRU Group
Dameng Resources Limited
DCM Alloys GmbH
Demeka Mining Inc.
DPRC SL
E+ Plus Company
Element 25 Limited
Eramet Comilog Manganese
FeConsult and Trading
Ferroglobe
Ferroglobe PLC
Full Comex Trading S.A.
Galmet SpA
Glencore International AG
GoodEarth
Guangxi Guikang New Materials Co., Ltd.
Guangxi Hourong Trading Company
Gulf Manganese Corporation Limited
Gurta A.G.
IMnI
Italghisa S.p.A.
Japan Ferroalloy Association
JFE Shoji Trade Corporation
JMD Ltd.
Jupiter Mines Limited
Kalahari Trading AG
Kalon Resources Pte Ltd.
Kimpe SAS
Kudumane Manganese Resources
L&M Rohstoffhandelsgesellschaft mit beschränkter Haftung
London Commodity Intelligence Bureau LTD
Mali Manganese SA
Manganese Metal Company (Pty) Ltd.
Manganese Products Corporation
Maringá Ferro Liga
Marubeni Tetsugen Co., Ltd.
McKinsey & Company Inc. France
Meca-Trade Oy
Metalleghe Spa
Micromesh Minerals & Metals
Mineracao Buritirama S.A.
Minerais US LLC
Minmet Sam
MITRA S.K. do Brasil Inspeçao e Analises Ltda
Mitra S.K. Hong Kong Limited
Mizushima Ferroalloy Co.
Nippon Denko Co., Ltd
Nizi International SA
Ntsimbintle Marketing & Trading
OFZ, a.s.
Oldendorff Carriers
OM Holdings Ltd.
Ore & Metal Company Ltd.
Organisation for Economic Co-operation and Development (OECD)
Oswal Minerals Limited
POSCO
Prince
Prosperous Resources (HK) Limited
Purdue University
Quintal S.A.
Radhika Metals & Minerals
Ronly Ltd.
Roskill
S.H. Bell Company
S.K. Sarawagi & Co. Pvt. Ltd.
Sarda Metals & Alloys Ltd.
Shaanxi Sinian Metal & Mining Co., Ltd.
Shanghai J. Sun Trading Consultants Ltd.
Shanghai Qunxian International Trade Co., Ltd.
Shyam Sel and Power Ltd.
Sibelco
Simpac Inc.
Sineco S.P.A.
Sinosteel Resources Company Limited
Somani Group
South32
Southern Jade Resources
SSAB
Sumitomo Corporation
Sumitomo Corporation Africa (Pty) Ltd.
Tata Steel Limited
The Economist Intelligence Unit
Transalloys
Traxys Europe S.A.
Tremendous Beijing International Trading Co., Ltd.
Tremond Metals Corp.
Tshipi é Ntle Manganese Mining (Pty) Ltd
Turfes Alyaj Dis Ticaret Ltd
Ultrabulk South Africa (Pty) Ltd.
United Manganese of Kalahari (UMK)
Vilmeks A.S.
Voestalpine Rohstoffbeschaffungs GmbH
World Metals & Alloys (FZC)
Xiangxi Minmetals Co., Ltd.
YASAI Resources LLP



IMnI 46TH ANNUAL CONFERENCE

will be held in Cape Town, South Africa on May 31 to June 2, 2022

The IMnI Annual Conference is a unique global platform for manganese leaders to meet, network and exchange on the development of manganese industry. Hosted by the International Manganese Institute, the conference moves around the world and always includes technical visits to mines and/or plants. The IMnI conference is open to IMnI Members and relevant stakeholders.

After the success of the 2019 edition in Vienna, where 200+ delegates of the manganese community networked and learned about the latest trends of the industry, Cape Town has been chosen for the 2022 event.

The conference will include technical visits to:

- Manganese Metal Company (MMC), Transalloys and Transnet Port Elizabeth & Coega on Monday, May 30.
- 4 open-pit mines (Kudumane, South32 Mamatwan, Tshipi & UMK) and 2 underground mines (Assmang Gloria & Nchwaning) on Friday, June 3.

Sponsors to date: Autlán , Assore, Transalloys, South32, Tshipi é Ntle Manganese Mining Proprietary Limited and United Manganese of Kalahari (UMK).

For additional information, please email us at events@manganese.org

IMnI COMMITTEES 2021

The life of the Institute is regulated by the work done by its committees. There are three standing committees: Health, Safety and the Environment (HSE), Statistics and the China Committee. They meet on average between two and four times a year and are open to both Ordinary and Affiliate members. Each committee is chaired by a member, while the secretariat is handled by a permanent IMnI staffer. Each also has about a dozen members.

The China Committee has three Sub-Divisions: statistics, technical issues and regulatory affairs.

The Electrolytic Products Division (EPD) operates like a committee and is formed of producers of electrolytic manganese metal and electrolytic manganese dioxide.

Committees are the lifeblood of the IMnI, providing vision, ideas and direction to nourish its fundamental missions.

Statistics Committee

Guillermo Recio (Chairman), *Autlán*
Juan Bosco Alvarez, *Autlán*
Jay Cho, *Asia Minerals Ltd.*
Antoine Delavenne, *Eramet Comilog Manganese*
Jan Coetzee, *Ferroglobe*
Jian Zhou, *Shanghai Fengri International Trading Co., Ltd.*
Toshiaki Abe, *Japan Ferroalloy Association (JFA)*
Thembelani Gantsho, *Kudumane Manganese Resources (Pty) Ltd.*
Luis Pessoa, *Maringá Ferro Liga S.A.*
Daisuke Narita, *Nippon Denko Co. Ltd.*
Martin Levcik, *OFZ, a.s.*
Leehann Yue, *Oldendorff Carriers*
Adrian Low, *OM Holdings*
Augenija Di Bucci, *Omni Industries B.V. / Satka Group*
Keneilwe Lerumo, *Ore & Metal Company Ltd.*
Shanshan Huang, *South32*
Carel Malan, *Tshipi é Ntle Manganese Mining (Pty) Limited*
Aloys d'Harambure, *IMnI Executive Director*

Health, Safety & Environment Committee

Rocklin Reed (Chairman), *Ore & Metal Company Ltd.*
Jenny Cronje (Vice-Chair), *South32*
Athena Keene (Science Chair), *Afton Chemical Corporation*
Nadxiely Yescas, *Autlán*
Frederic Gaidou, *Eramet Comilog Manganese*
Cristina Cadarso, *Ferroglobe*
Orson Lui, *Guangxi Guikang New Materials Co., Ltd.*
Rodrigo Junqueira Dos Santos, *Maringá Ferro Liga S.A.*
Matej Siculia, *OFZ, a.s.*
Agnieszka Leopold, *IMnI HSE & Regulatory Affairs Manager*
Aloys d'Harambure, *IMnI Executive Director*

China Committee

Jian Zhou (Chairman), *Shanghai Fengri International Trading Co., Ltd.*
Li Weijian (Honorary Chairman), *South Manganese Group Limited*
Deng "Dan" Guohong (Chairman of Technical Sub-Division), *Inner Mongolia Chayouqianqi Mengfa Ferroalloy Co.*
Yang Bin (Chairman of HSE Sub-Division), *Ningxia Shengyan Industry Group*
Wang Ning (Chairman of Statistic Sub-Division), *Minmetals Development Co., Ltd*
Huang Junjie, *Baosteel Resources (International) Co., Ltd.*
Yuan Zhilun, *Chongqing Bosai Miining Group*
Zhan Haiqing, *South Manganese Group Limited*
Edward Li, *Guikang New Materials*
Guo Yimin, *Vietnam Hai Duong New Resources Metallurgy Shareholdings*
Aloys D'harambure, *IMnI Executive Director*
Eva Yang, *IMnI China Representative*

Electrolytic Products Division (EPD)

Li Weijian (Chairman), *South Manganese Group Limited*
Madelein Todd (Vice-Chairwoman), *Manganese Metal Company (MMC)*
Philipe Bertrand, *Prince - Erachem*
Li Tongqing, *South Manganese Group Limited*
Hiromu Otsuka, *Tosoh Corporation*
Aloys d'Harambure, *IMnI Executive Director*
Eva Yang, *IMnI China Representative*

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Ezekiel Lotlhare, *Tshipi é Ntle Manganese Mining (Pty) Ltd. (CEO)*
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Health, Safety & Environment Committee (HSE) - Rocklin Reed, *Ore & Metal Company*
Statistics Committee - Guillermo Recio, *Autlán*
China Committee - Jian Zhou, *Shanghai Fengri International Trading Co., Ltd.*
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Branislav Klocok (Vice-Chairman), *OFZ, a.s.*
Paul Desportes (Vice-Chairman), *Eramet Comilog Manganese*
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Aloys d'Harambure, *IMnI*

Treasurer

Sergio Romero (Treasurer), Autlán (Managing Director)

Executive Director

Aloys d'Harambure, IMnI


Patrick Sacco


Branislav Klocok


Paul Desportes


Sergio Romero


Esteban Rivero


Marco Levi


David Chitrin


Wang Ning


Mukund P. Chaudhari


Ngee Tong Low


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Li Weijian


Beata Plazura-Ingram


Ezekiel Lotlhare


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Aloys d'Harambure

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Inner Mongolia Chayouqianqi Tengfei Ferroalloy Co., Ltd. - *China*
Inner Mongolia Xinchuang Metallurgical Group Co., Ltd. - *China*
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Manganese Metal Company (MMC) - *South Africa*
Tosoh Corporation - *Japan*

INTERNATIONAL MANGANESE INSTITUTE

IMnI provides vision and guidance to the manganese industry by promoting economic, social and environmental responsibility and sustainability for all stakeholders.

IMnI Label
be part of a recognised network

Market Research & Stats
get the best data available on the manganese market

Health, Safety & Environment (HSE)
improve your processes

Regulatory Affairs
stay up-to-date on compliance

Events & Conferences
network during major events of the manganese industry

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