Overview of the Global Manganese Industry

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International Manganese Institute (IMnI)
Introduction

I – Steel (production, manganese usage intensity)

II – Manganese Alloys (SiMn, HC FeMn, Ref FeM)

III – Manganese Ore

Conclusion
Introduction

Prices for most Mn alloys have been decreasing in 2014-2015 (Metal Bulletin)

But at the same time, global crude steel production, which drives Mn alloys demand, reaches new record highs in 2014 and 2015 (World Steel Association)

Why are prices for Mn alloys depressed, if steel production is increasing?
Introduction

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Conclusion
In 2014, **global crude steel production reached 1,665 million mt** (new record high)
2013 to 2014 % change = +1% (or 16 million mt) → **lowest growth rate since the GFC in 2008/2009**
Average capacity utilisation ratio is in the 70-75% range

From 2015 to 2020, global crude steel production expected to grow by 2% CAGR (Macquarie)
→ firming recovery momentum in the Eurozone, increased optimism about India
→ growth in steel use in some countries in the Middle East, North Africa and ASEAN

Global crude steel production is still growing, but at a slowing pace, mostly due to China’s deceleration
China’s steel industry is facing overcapacity, affecting steel prices.

Worldsteel expects its crude steel output to drop by 0.5% in 2015, and again in 2016.

China is a key driver of global crude steel production.

China produced 823 million mt of crude steel in 2014, up only 0.1% YoY.

Crude steel production slowing in China:
- weak construction demand
- overcapacity in industrial sector
- stricter environmental regulations

Source: IMnl, World Steel Association
**I – Steel – Mn consumption**

Long steel products (used in construction) contain more Mn than flat steel products (used in automotive, machinery and appliances)

> since 2008 and the global financial crisis, growth in Chinese steel production has been driven more by demand for long products than flat,
> due to continued urbanisation and infrastructure development

> but China’s economy is now becoming more consumption-driven,
> increased demand for machinery and appliances (flat steel), reduced demand for construction (long steel)
> putting pressure on the intensity of Mn usage

China’s demand is progressively shifting back from long steel products to flat steel products, reducing Mn usage intensity
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What about Mn alloys supply?

China remains balanced in Mn alloys trade, due to the imposition of a 20% export tax in 2009.

But several other major steel producing countries import a large share of their Mn alloy requirements (USA, Europe, Japan etc.)

**Fierce competition between Mn alloys producers to supply these key markets**

Mn alloys production has been growing significantly over the last few years (especially SiMn in India, the CIS)

**With cheap Mn alloy supplies becoming abundant, prices have fallen significantly**
SiMn mostly used in long steel products, like reinforcing bars and wire mesh (used in construction)

SiMn in 2014:
供应: 12.8 million mt, 下降4.3% YoY
需求: 13.2 million mt 下降2.5% YoY

- Kazchrome在哈萨克斯坦和Chelyabinsk在俄罗斯生产更多的SiMn在2014年
- 中国在2014年显著减少了其SiMn生产
SiMn supply & demand balance for 2014:

- European Union (28): -571,000 mt
- North America: -441,000 mt
- Middle East: -112,000 mt
- South America: -42,000 mt
- Other Europe: 33,000 mt
- Asia: 85,000 mt
- Oceania: 103,000 mt
- Africa: 138,000 mt
- CIS: 465,000 mt

EU28, Americas, Middle East in deficit.
CIS, Africa and Oceania in surplus.
HC FeMn mostly used in surface critical flat steel products (sheet and plate) and some long steel products (used to produce consumer appliances, tubes and pipes for the oil and gas industry, and rails)

HC FeMn in 2014:
supply: 4.9 million mt, up 9% from 2013
demand: 4.97 million mt up 5% from 2013

<table>
<thead>
<tr>
<th>Region</th>
<th>Supply</th>
<th>Demand</th>
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</thead>
<tbody>
<tr>
<td>Asia</td>
<td>255</td>
<td>164</td>
</tr>
<tr>
<td>C.I.S.</td>
<td>111</td>
<td>27</td>
</tr>
<tr>
<td>European Union (28)</td>
<td>49</td>
<td>32</td>
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<tr>
<td>South America</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td>Oceania</td>
<td>18</td>
<td>-4</td>
</tr>
<tr>
<td>North America</td>
<td>0,5</td>
<td>16</td>
</tr>
<tr>
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<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Other Europe</td>
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<td>7</td>
</tr>
<tr>
<td>Africa</td>
<td>-35</td>
<td>1</td>
</tr>
<tr>
<td>World</td>
<td>402</td>
<td>259</td>
</tr>
</tbody>
</table>

- India, and to a lesser extent China & Japan, increased HC FeMn production in 2014
- Kramatorsk restarted production in the Donbass region of Ukraine at the beginning of 2014, after being taken over by Evgeny Ivanov, owner of the Satka Metallurgical Mill in Russia
II – Mn Alloys – HC FeMn Supply & Demand Balance

**Supply**
- Asia: 71%
- EU28: 5%
- C.I.S.: 6%
- Oceania: 3%
- Middle East: 2%
- South America: 2%
- North America: 1%
- Other Europe: 1%

**Demand**
- EU28: 11%
- North America: 7%
- Middle East: 4%
- C.I.S.: 4%
- South America: 2%
- Africa: 1%
- Other Europe: 1%
- Oceania: 1%

**Supply/Demand Balance 2014 (in '000 mt)**

<table>
<thead>
<tr>
<th>Region</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union (28)</td>
<td>-296</td>
</tr>
<tr>
<td>North America</td>
<td>-293</td>
</tr>
<tr>
<td>Middle East</td>
<td>-114</td>
</tr>
<tr>
<td>South America</td>
<td>-22</td>
</tr>
<tr>
<td>Other Europe</td>
<td>7</td>
</tr>
<tr>
<td>Asia</td>
<td>31</td>
</tr>
<tr>
<td>C.I.S.</td>
<td>86</td>
</tr>
<tr>
<td>Oceania</td>
<td>137</td>
</tr>
<tr>
<td>Africa</td>
<td>397</td>
</tr>
<tr>
<td>World</td>
<td>-68</td>
</tr>
</tbody>
</table>

**HC FeMn supply**
EU28, North America, Middle East in deficit
Africa, Oceania in surplus
Ref FeMn mostly used to produce low carbon critical surface flat steel products, used to manufacture automotive body sheet and some flat stainless steels

Ref FeMn in 2014:
**supply:** 1.84 million mt, up 7.3% from 2013
**demand:** 1.86 million mt up 7.7% from 2013

<table>
<thead>
<tr>
<th>Region</th>
<th>Change 2013-2014 (in ’000 mt)</th>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>67</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>29</td>
<td>-3</td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>13</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Other Europe</td>
<td>8</td>
<td>-3</td>
<td></td>
</tr>
<tr>
<td>European Union</td>
<td>8</td>
<td>-15</td>
<td></td>
</tr>
<tr>
<td>C.I.S.</td>
<td>3</td>
<td>-7</td>
<td></td>
</tr>
<tr>
<td>Middle East</td>
<td>0</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Oceania</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td>-3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>World</strong></td>
<td><strong>126</strong></td>
<td><strong>133</strong></td>
<td></td>
</tr>
</tbody>
</table>

- China increased its Ref FeMn production in 2014
- In South Africa, BHP Billiton & Assmang produced more Ref FeMn in 2014 than in 2013
II – Mn Alloys – Ref FeMn Supply & Demand Balance

**Supply**
- Asia 70%
- Other Europe 13%
- Africa 7%
- North America 6%
- EU28 2%
- South America 1%
- C.I.S. 1%
- Middle East 0%
- Oceania 0%

**Ref FeMn Supply 2014**
- Europe (28) -152
- North America -139
- Middle East -46
- South America -39
- C.I.S. -9
- Oceania -3
- Asia 28
- Africa 116
- Other Europe 218

**Demand**
- Asia 68%

**Ref FeMn supply**
- EU28, Americas, Middle East in deficit
- Other Europe and Africa in surplus
5 new manganese alloys projects to come on stream soon in Asia
Including 3 major projects in Malaysia
→ cheap ore, labour & electricity
→ a threat for Indian SiMn producers?

In South Africa, Eskom is struggling to supply electricity, rising power prices
Lower Mn alloy prices combined with rising power tariffs in Brazil, India, South Africa and China → plant closures (Indsil in India, Vale in Brazil etc.)

→ New projects in Malaysia, where electricity is relatively cheap

The market is becoming more balanced as excess Mn alloys supply is going down
Introduction

I – Steel (production, manganese usage intensity)

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Conclusion
The price of manganese ore fell in 2014 and continues to drop in 2015

→ excess production
→ ample stocks in China, the key consumer

Lower raw material prices do not result in higher margins for Mn alloys producers, due to the competition between Mn alloys producers, and to the slow demand from the steel sector. The price gain is passed on to steel mills, which are able to reduce their Mn alloys purchase prices

Lower manganese ore prices contribute to the downtrend of Mn alloys prices
Mn ore (wet) in 2014:
supply: 61 million mt, up 3% from 2013
demand: 56 million mt down 1% from 2013

<table>
<thead>
<tr>
<th>Region</th>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>2,008</td>
<td>-352</td>
</tr>
<tr>
<td>North America</td>
<td>72</td>
<td>-97</td>
</tr>
<tr>
<td>European Union (28)</td>
<td>25</td>
<td>-105</td>
</tr>
<tr>
<td>Middle East</td>
<td>0</td>
<td>61</td>
</tr>
<tr>
<td>Oceania</td>
<td>-19</td>
<td>-478</td>
</tr>
<tr>
<td>C.I.S.</td>
<td>-50</td>
<td>149</td>
</tr>
<tr>
<td>South America</td>
<td>-88</td>
<td>-49</td>
</tr>
<tr>
<td>Other Europe</td>
<td>-107</td>
<td>106</td>
</tr>
<tr>
<td>Asia</td>
<td>-146</td>
<td>178</td>
</tr>
<tr>
<td>World</td>
<td>1,695</td>
<td>-586</td>
</tr>
</tbody>
</table>

New Mn ore miners in South Africa ramped up production in 2014
  → United Manganese of Kalahari (UMK),
  → Tshipi Borwa
III – Manganese Ore Supply & Demand Balance

**Mn ore (wet) 2014**

### Supply
- Asia: 44%
- Africa: 33%
- Oceania: 13%
- EU28: 0%
- Middle East: 0%
- Other Europe: 0%
- North America: 1%
- South America: 4%
- C.I.S.: 5%

### Demand
- Asia: 82%
- C.I.S.: 9%
- Other Europe: 2%
- North America: 2%
- EU28: 2%
- South America: 1%
- Africa: 1%
- Middle East: 1%
- Oceania: 0%

### Supply/Demand Balance 2014 (in '000 mt)

<table>
<thead>
<tr>
<th>Region</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>-19,434</td>
</tr>
<tr>
<td>C.I.S.</td>
<td>-2,094</td>
</tr>
<tr>
<td>European Union (28)</td>
<td>-994</td>
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<tr>
<td>Other Europe</td>
<td>-962</td>
</tr>
<tr>
<td>North America</td>
<td>-427</td>
</tr>
<tr>
<td>Middle East</td>
<td>-310</td>
</tr>
<tr>
<td>South America</td>
<td>1,820</td>
</tr>
<tr>
<td>Oceania</td>
<td>7,686</td>
</tr>
<tr>
<td>Africa</td>
<td>19,803</td>
</tr>
<tr>
<td>World</td>
<td>5,089</td>
</tr>
</tbody>
</table>

**Mn ore supply**
- Asia, CIS, Europe and N. America in deficit
- Africa, Oceania and S. America in surplus
Gabon, Australia, Brazil, South Africa are major producers of high grade ore.

China is the world's greatest producer of Mn ore on a gross weight basis. But it has mostly low grade ore reserves (18-20% Mn), so it is only the second biggest producer of Mn ore on a metal contained basis, after South Africa.
China’s manganese ore production has stabilised at around 4.14 million mt Mn units
Equivalent to around 40% of its needs in 2014
The gap is filled by imports (mostly from South Africa, Australia, Gabon and Ghana)

China has the potential to produce more manganese ore, but at the moment, given the low price of imported ore, there is no incentive
China imported 16.2 million wet mt of manganese ore in 2014, representing 60% of global trade.

China drives global manganese ore trade and price.

Mn ore inventory at China’s ports has increased since 2013, to reach 3.5 million wet mt at the beginning of 2015.

Until these stocks are run down, Mn ore prices will remain under pressure.
Most new manganese ore projects located in Asia

But in Africa, investments in transportation system and port terminals to increase exports capacity:

- **South Africa**: rail-freight state-owned Transnet is investing in a new Mn terminal at Ngqura port (expected capacity: 12 million mtpy by February 2019 and 16 million mtpy by October 2020)

- **Congo/Angola**: investment in the rail network, to link the Kisenge manganese mine owned by Entreprise Miniere de Kisenge-Manganese (EMK-Mn), and the port of Lobito on the Atlantic coast of Angola

<table>
<thead>
<tr>
<th>Country</th>
<th>Company/Project</th>
<th>Capacity (in '000 mtpy)</th>
<th>Launch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>Pertama Ferroalloys (JV of Asia Minerals, Nippon Denko, Shinsho Corp.)</td>
<td>200 (sintered Mn ore)</td>
<td>H2 2015</td>
</tr>
<tr>
<td>Togo</td>
<td>Ferrex - Nayega project</td>
<td>60 (first phase), ramping up to 250</td>
<td>2016</td>
</tr>
<tr>
<td>India</td>
<td>Rungta Mines</td>
<td>161</td>
<td>2016</td>
</tr>
<tr>
<td>India</td>
<td>MOIL - Kandri project</td>
<td>57</td>
<td>2018</td>
</tr>
<tr>
<td>India</td>
<td>MOIL - Ukwa project</td>
<td>105</td>
<td>2019</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Gulf Minerals/Asia Minerals</td>
<td>180</td>
<td>2018</td>
</tr>
</tbody>
</table>
Outline

Introduction

I – Steel (production, manganese usage intensity)

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Conclusion
Why are prices for Mn alloys depressed, if steel production increases?

- Crude steel production is still growing, but at a slower pace than before.
- Mn usage intensity is reducing, due to China’s demand shifting back from long steel products to flat steel products.
- Excess Mn alloys supply and fierce competition to supply some key markets of the steel industry.
- Lower Mn alloys prices and rising production costs (electricity) → plant closures.
- Lower manganese ore prices contribute to the downtrend of Mn alloys prices.
- Excess Mn alloys supply is reducing.
- Manganese ore prices are not likely to increase significantly until China’s stocks are run down.
Conclusion – Mn Alloys Outlook

The Mn alloys market will take time to become balanced, what do we do in the meantime?

**Buy, plan, produce and sell with profits in mind.**
1. Use competitively priced raw materials,
2. Seek to minimize power costs via renegotiations, captive generation, effective utilization, etc.,
3. Strategically plan production of Mn products that will be in demand,
4. Be compliant with applicable regulations, be they domestic or abroad,
5. Seek to be profitable!!

**Industry Sustainability**
Will depend on macro-economic growth, particularly in emerging markets,
In the long-term, Mn units needed should continue to grow.

**Individual Producer Sustainability**
Will depend on their ability to remain competitive within the dynamics of the developing industry.
Thank you!

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