WORLD TITANIUM SPONGE
SUPPLY SITUATION

Sylvain GEHLER, UKTMP Chairman
1. TI FEEDSTOCK FOR SPONGE PRODUCTION SUPPLY ISSUES

2. WORLD TITANIUM SPONGE SUPPLY
   A. WORLD TITANIUM SPONGE PRODUCTION
   B. CURRENT PRODUCTION LEVEL AT EACH PRODUCER
   C. US IMPORTS
   D. TI SPONGE PRODUCTION CAPACITY VERSUS ACTUAL PRODUCTION
   E. TITANIUM SPONGE INVENTORY LEVEL

3. CONCLUSION AND FUTURE TRENDS
1. TI FEEDSTOCK SUPPLY FROM SPONGE PRODUCER PERSPECTIVE

• During Q4 2018 destocking of TiO2 pigment inventory took place.

• Ti feedstock supply still remains in deficit position.

• Demand for TiO2 pigment should increase in H2 2019 triggering inventory replacement.

• No new sources of feedstock are expected in near future.

• Ti sponge producers have been unable to get additional supply of high grade Titanium feedstock in 2019.
1. TI FEEDSTOCK SUPPLY FROM SPONGE PRODUCERS PERSPECTIVE

- Price increase for rutile, synthetic rutile and high grade slag.
- As a consequence, additional sales of sponge are limited and sponge producers are unable to use fully their production capacity.
- Operational problems at Ti feedstock producers could be expected due to high production.
- Ti sponge producers will have to monitor closely Ti feedstock availability and pricing situation.
WORLDWIDE TITANIUM SPONGE PRODUCTION
World consolidated sponge production has increased in 2018 to 202,453 t which is 16,119 t over 2017. It is set to increase further in 2019 to 216,000 t which is again an increase of 13,547 t against 2018. It is estimated to increase in 2018 and 2019 by 29,666 t. This is the largest increase of production in the last 6 years.
AEROSPACE MARKET

Aerospace industry demand for Titanium is very strong with Boeing and Airbus showing a backlog at the end of March 2019 of 12,962 airplanes although mainly single aisle:

- A320 family being 86.7% of Airbus backlog and
- B737 family being 79.4% of Boeing backlog.

This backlog represents 9 years of production. Aeroengines manufacturers have as well increased their production in line with the ramp up of Boeing and Airbus.
## Aerospace Market

### Airbus Orders Backlog
31 March 2019

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Firm Order Backlog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Aisle (A320, A320NEO)</td>
<td>6,379</td>
</tr>
<tr>
<td>Long Range (A330, A350XWB)</td>
<td>923</td>
</tr>
<tr>
<td>Large Aircraft (A380)</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,357</strong></td>
</tr>
</tbody>
</table>

Source: [www.airbus.com](http://www.airbus.com)

### Boeing Orders Backlog
31 March 2019

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Firm Order Backlog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing 737 family</td>
<td>4,448</td>
</tr>
<tr>
<td>Boeing 747-800</td>
<td>22</td>
</tr>
<tr>
<td>Boeing 767/777 family</td>
<td>539</td>
</tr>
<tr>
<td>Boeing 787 family</td>
<td>596</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,605</strong></td>
</tr>
</tbody>
</table>

Source: [www.boeing.com](http://www.boeing.com)

### Single Aisle Aircraft share in the backlog

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>March 2019</th>
<th>July 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing (B737 family)</td>
<td>79,4%</td>
<td>47,7%</td>
</tr>
<tr>
<td>Airbus (A320 family)</td>
<td>86,7%</td>
<td>79,0%</td>
</tr>
</tbody>
</table>

Source: [www.airbus.com](http://www.airbus.com) [www.boeing.com](http://www.boeing.com)
Demand of the industrial market has recovered, particularly for energy, chemical industry, oil and gas in Asia.

Large orders taken by ship builders in China and Korea have contributed to the recovery of industrial market.
CIS sponge production shows an increase of 13,900 t in 2018 against 2017 with 2018 production at 67,500 t. In 2019, CIS sponge production is forecasted to increase further by 7,500 t against 2018.
US sponge production shows a stable production after 2015, due to ATI Rowley sponge plant stopping production in 2015. Since 2016 sponge production in the US is coming only from Timet who remains the only sponge producer in the USA.
US imports in 2018 were 23,971 t, a slight increase of 406 t compared to 2017. Japanese sponge increased further its lead on imported sponge to the US in 2018 with 92.3% of US imports compared to 2017 where Japanese sponge represented 81.3% of imported sponge in the US.
Sponge production in Asia increased only by about 1,000 t in 2018 at 124,953 t against 123,922 t in 2017. In 2019 sponge production is forecasted to reach 130,000 t an increase of 5,000 t compared to 2018.
Chemical, 45%
Aerospace, 18%
Power, 11%
Ocean Graphic Engineering, 4%
Salt making, 3%
Metallurgy, 2%
Shipping, 3%
Medicine, 4%
Sport & Leisure, 3%
Others, 7%

Chinese Ti sponge production in 2018 – 74,953 mt
Chinese Ti ingots production in 2018 – 75,049 mt

Source: Chinese Titanium Association
World Titanium Sponge Capacity

*end of 2018*

Total World Titanium sponge production capacity is 269,300 mt
Average rate of utilization of sponge capacity is 75%. Russia has the highest rate (over 90%). Only Japan and Ukraine have biggest idle production capacity. Forecast for 2019 shows capacity utilization at 80%.
US Titanium Sponge Stocks

*metric tons, end of year*

<table>
<thead>
<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>Q3 2017</th>
<th>Q4 2017</th>
<th>Q1 2018</th>
<th>Q2 2018</th>
<th>Q3 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10,800</td>
<td>18,100</td>
<td>25,200</td>
<td>22,900</td>
<td>25,000</td>
<td>25,100</td>
<td>14,700</td>
<td>13,200</td>
<td>10,200</td>
<td>10,100</td>
<td>10,700</td>
</tr>
</tbody>
</table>

Source: USGS
Titanium Sponge Stocks

*metric tons, end of year*

Source: USGS for US inventory

Asian inventory does not include China.
CONCLUSION

• Supply of sponge has been increasing in line with demand in spite of a tight availability of Ti feedstock.

• Decreasing inventory of sponge in the US shows increase of demand.

• In 2018 production capacity of sponge was used at 75%. Chinese sponge being used in its domestic market, is not available to the rest of the world. Production capacity usage of non-Chinese sponge producers is actually 79% in 2018.

• In 2019 non-Chinese sponge capacity usage goes to 87% demonstrating the tightness of sponge supply in the future.

• It is expected that 2020 will follow the same trend as 2019.

• Titanium feedstock availability to sponge producers is a serious challenge to the stability of Titanium market.
THANK YOU FOR YOUR ATTENTION!