Outlook of Titanium Industry In China
Synopsis:

1. The situation for manufacturer
2. Overview on domestic market
3. New alloy and new development
4. Existing problems
1、The situation for manufacturer
1. The situation for titanium sponge manufacturer

- Massive over-capacity but shortage on aerospace level titanium sponge supply.
- In 2016, the overall output of titanium sponge in China is around 67,000 tons, but the capacity utilization is only 76%;
- Currently, the top ten companies almost share whole market but only four could produce the aerospace qualified titanium sponge;
1. The situation for titanium sponge manufacturer

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Output in 2016 (Unit: ton)</th>
<th>Sharing: %</th>
</tr>
</thead>
<tbody>
<tr>
<td>攀钢钛业</td>
<td>14297</td>
<td>21.3</td>
</tr>
<tr>
<td>洛阳双瑞万基</td>
<td>11000</td>
<td>16.4</td>
</tr>
<tr>
<td>朝阳金达</td>
<td>8700</td>
<td>13</td>
</tr>
<tr>
<td>朝阳百盛</td>
<td>8321</td>
<td>12.4</td>
</tr>
<tr>
<td>贵州遵钛</td>
<td>8239</td>
<td>12.3</td>
</tr>
<tr>
<td>宝钛华神</td>
<td>8220</td>
<td>12.2</td>
</tr>
<tr>
<td>鞍山海亮</td>
<td>4800</td>
<td>7.2</td>
</tr>
<tr>
<td>山西卓峰</td>
<td>2000</td>
<td>3</td>
</tr>
<tr>
<td>锦州华泰金属工业</td>
<td>1500</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>67077</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
2. The situation for titanium material manufacturer

- Contradiction between excess capacity in low end and lack of high-end product supply.

- Currently, titanium material supply in China is quite disperse. More than 400 titanium companies locate in Chinese titanium valley—BAOJI city. Except BAOTI, majority of them lack of high level manufacturing capacity and discourse right in market.
2. The situation for titanium material manufacturer

- In 2016, the market sharing of the top three companies (BAOTI, WMM and WST) is 34% in total and they cover the big part of high level capacity.

The domestic titanium material market share in 2016
3. Titanium material price level

- The titanium material price continue to rise since 2016. Analyzed the data sheet from Asian Metal Web, the price rising for titanium plate is over than 12% and 25% for titanium tube if compared with the situation before 2016. As titanium material is downstream of the whole supply chain, the rising caused by the improving demands situation and higher raw material cost.
- The price in 2018 will keep steady-state growth.
2、Overview on domestic market
1. Aerospace Market

- Since 2015, Chinese government have proposed to build the strong air force. The demands for J20, J31 and Y20 military aircraft increased highly.
- For civil aircraft, each ARJ21 will need 1.3 tons titanium material and C919 will need 3.92 tons titanium material.
- The aerospace demands in 2018 will keep high growth.
## Aerospace Market

AirCraft order will push titanium demands increase

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Empty weight (ton)</th>
<th>Titanium sharing (%)</th>
<th>Titanium demands (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y-20</td>
<td>82</td>
<td>10%</td>
<td>8.2</td>
</tr>
<tr>
<td>J20</td>
<td>17</td>
<td>20%</td>
<td>7.14</td>
</tr>
<tr>
<td>ARJ21</td>
<td>27</td>
<td>4.8%</td>
<td>1.3</td>
</tr>
<tr>
<td>C919</td>
<td>42</td>
<td>9.3%</td>
<td>3.9</td>
</tr>
</tbody>
</table>
2、Industry market

· Since the end of 2016, the government have issued a series of environmental protection laws and have toughened environmental supervision.

· The environmental supervision not only increase the cost but also eliminate the outdated capacity.
Meanwhile, titanium material demands in nuclear power, desalination, refining & chemical, medical instruments, environmental protection markets increase highly.

The industrial demands in 2018 will keep stable. But some new applications like construction and marine industry would be the growth points.
➢ Sightseeing platform——Beijing Shi Lin Gorge.

➢ All structural&support components were manufactured by titanium alloy, the total 20 tons material supplied by BAOTI;
DSV (deep-sea submersible vehicle)
3、New alloy and new development
1. Low-cost titanium alloy

- The constraint is high cost;
- Increase recycling percentage;
- Develop the new alloy;
- Improve titanium sponge manufacturing technology;
- Improve titanium machining technology;
2、High temperature and high strength titanium alloy

- Working temperature.
- Replace high-strength steel and nickel base alloy;
4、Existing problems
• Massive over-capacity in low end and disordered competition.
• The current technical specifications are not suitable for new alloy and new application.
• Need to build the complete titanium material apply system for marine and naval market.
• Need to invest the special equipment&facility for heavy titanium alloy plate, big size seamless pipe, sectional material and complex casting.
• Quality for titanium sponge and ingot should be improved;
Thank You