

Titanium Sponge Outlook

Amazing T!tanium

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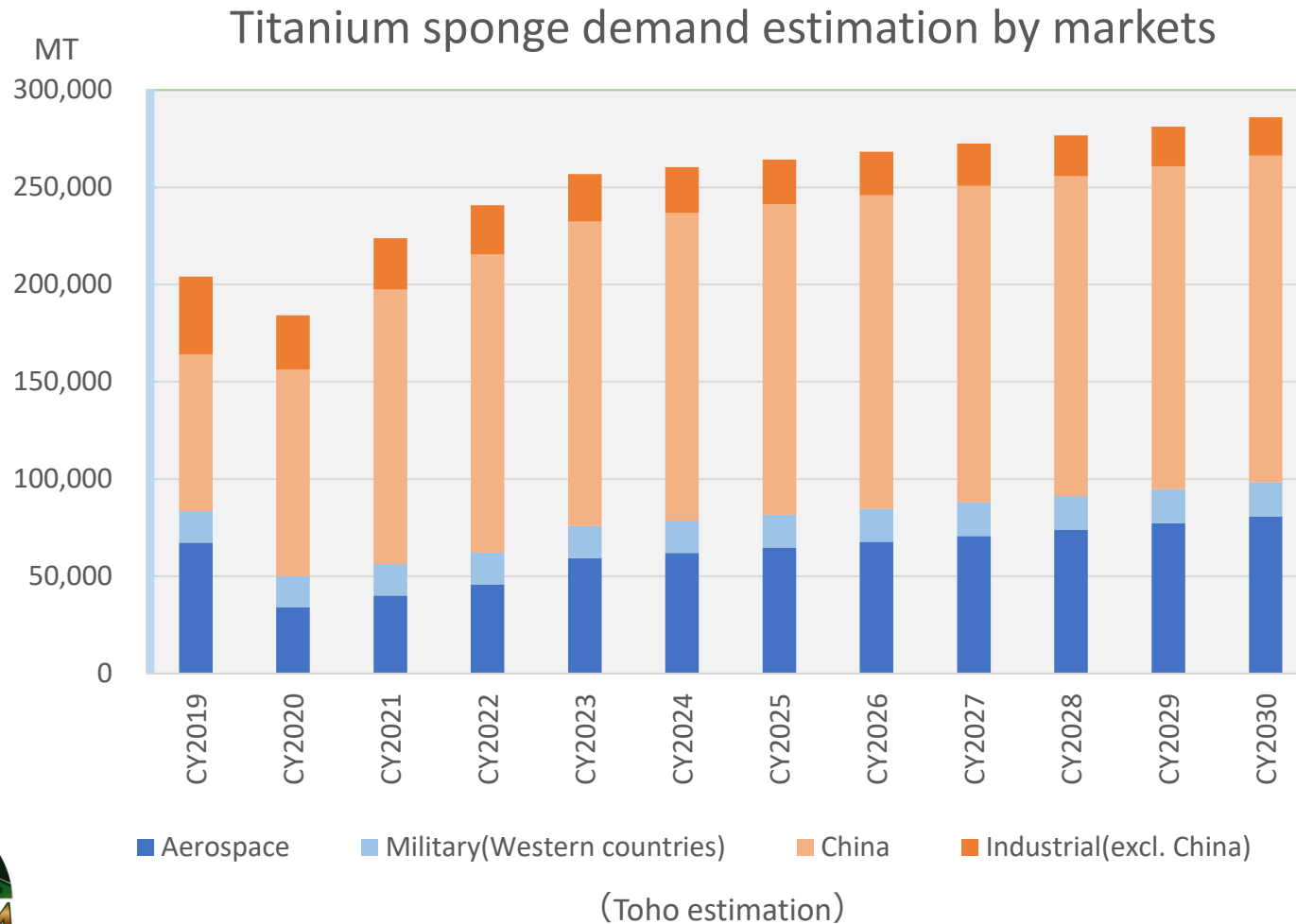
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May 8, 2024

Titanium sponge demand outlook

- Sponge demand for Aerospace market continues to grow steadily while demand for Industrial market grows slower than before.
 - In February 2024, the airline industry achieved full recovery in total passenger traffic, surpassing the 2019 level by 5.7%.
 - In 2023, Airbus achieved a high A320 build rate while Boeing's 737 build rate remains constrained. However, both OEMs are confident about higher build rates in the future.
 - Chinese statistical data shows that mill products shipments for the industrial market increased by 6% last year. The growth rate is still high but lower than previous results.

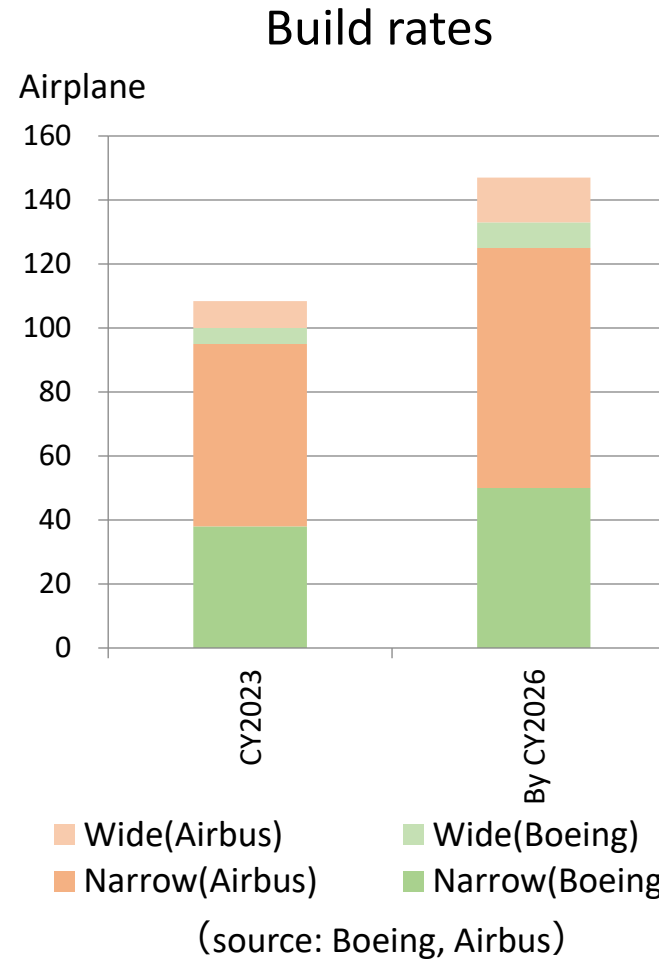
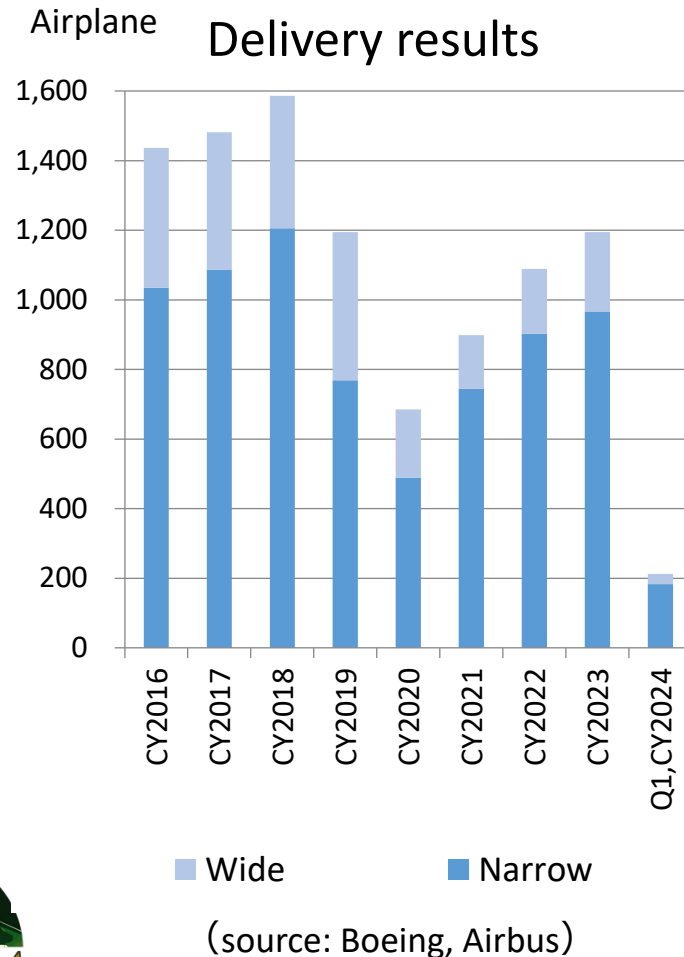
Titanium sponge demand estimation



- 2023 sponge demand for Aerospace was strong although slightly lower than the previous estimation.
- Global sponge demand for military might rise more than this estimation due to the growing geo-political risks. (Chinese and Russian military demand should be included in “China” and “Industrial” in this graph.)
- It is hard to estimate Chinese sponge demand due to the huge gap in growth rates between sponge production and mill products shipments.

Airplane deliveries and build rates

- Airplane deliveries increased steadily, although Q1 2024 results were relatively low.
- Both Boeing and Airbus still have very aggressive building plans. 2026 delivery results should exceed the previous historical record set in 2018.

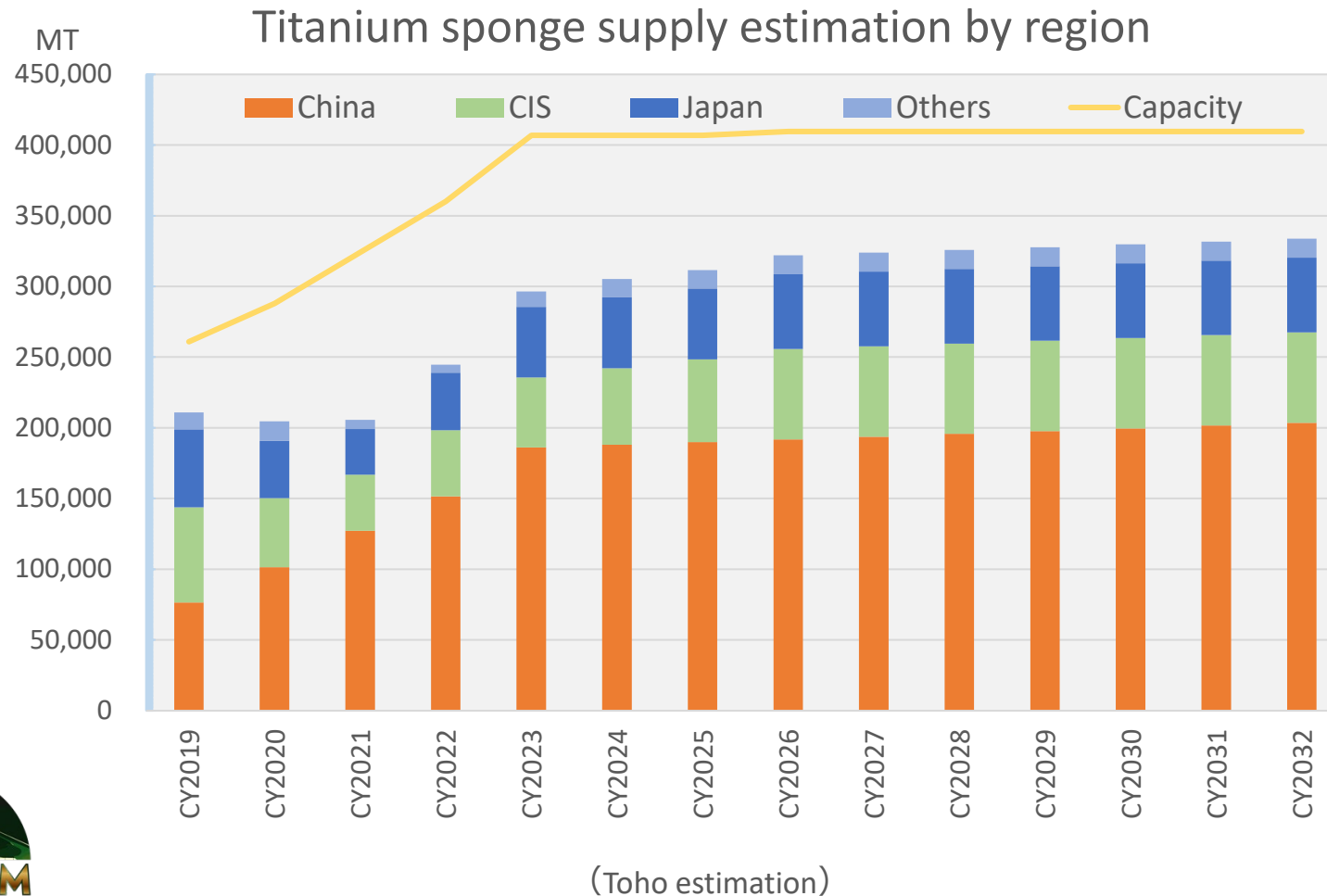


Titanium sponge supply outlook

- Sponge suppliers' situation in 2023 and 2024;
 - Japanese suppliers (including Saudi Arabia) run their factories at more than 90% of capacity.
 - UKTMP (Kazakhstan) has hardly ramped up their sponge production due to a delay in importing equipment from Russia.
 - VSMPO-AVISMA seems to produce sponge at full capacity for Airbus and Russian domestic demand.
- While there has not been an announcement of sponge capacity expansion from any Aerospace-grade sponge supplier, it is believed that Japanese sponge suppliers are studying the possibility of expansion.

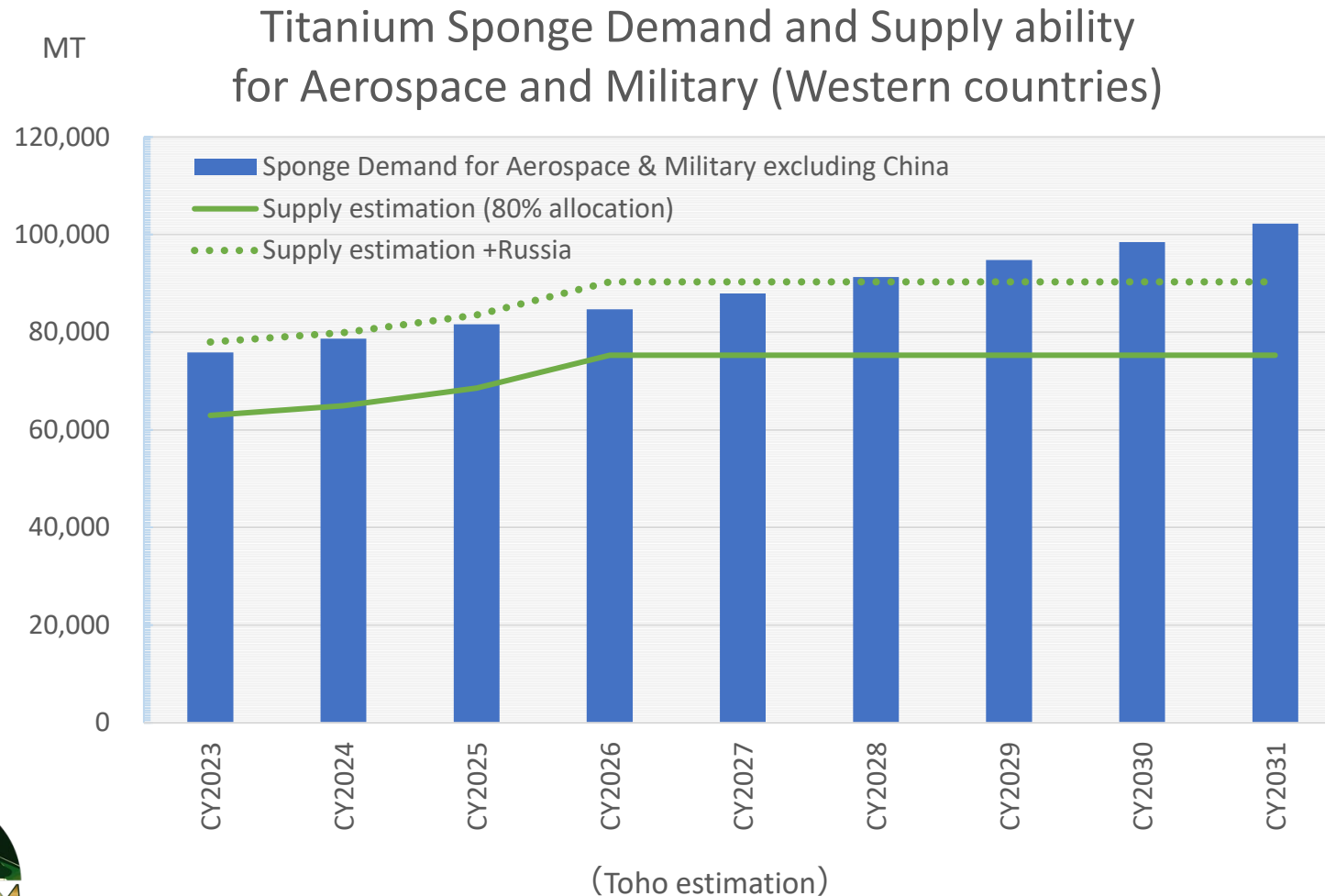


Titanium sponge supply estimation



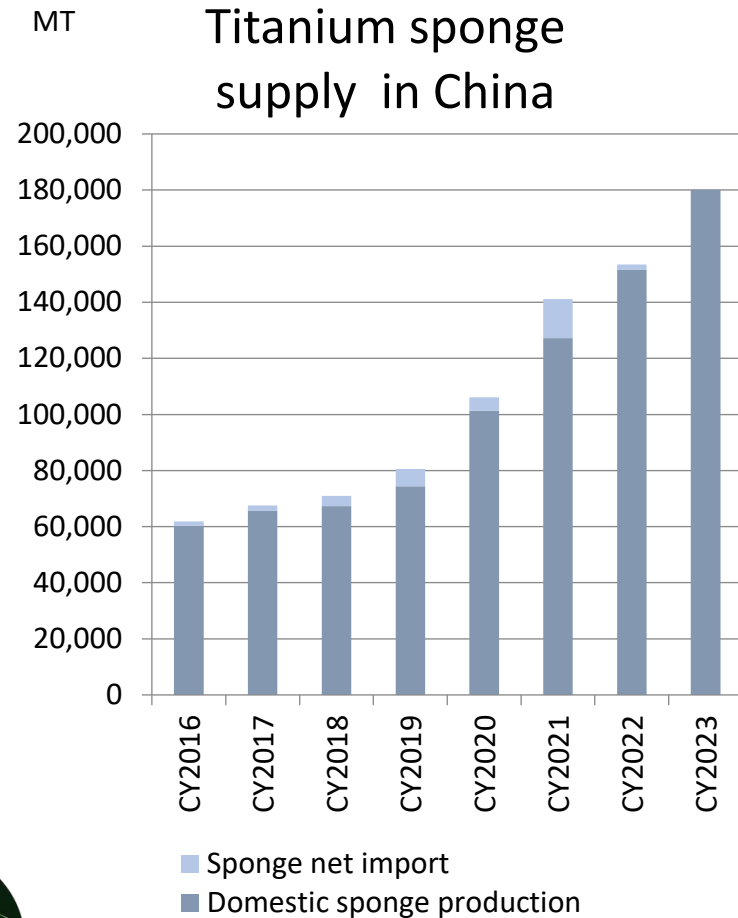
- The global sponge supply is still increasing due to Chinese sponge capacity expansion.
- Supply estimates from CIS and Japan have been revised from last year based on their latest situation.
- It was assumed that Chinese sponge suppliers would stop their capacity expansion and start production adjustment, however, they kept expanding capacity and increasing sponge production.

Titanium sponge outlook for Aerospace market

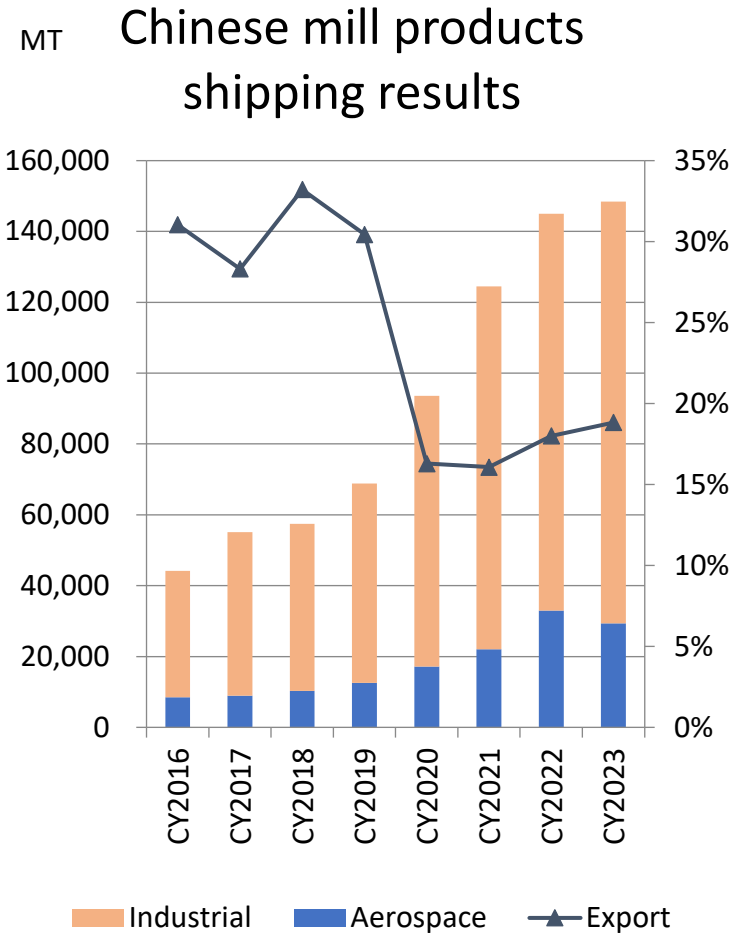


- Airbus still keeps purchasing Titanium products from Russia, which balances current sponge demand and supply in Aerospace market.
- If Airbus tried to reduce or suspend Titanium products procurement from Russia, the sponge shortage would be serious.
- Even if Airbus continues procurement from Russia, there will be a sponge shortage. Only if Aerospace-grade sponge production capacity expands, will it be avoided.

Chinese Titanium industry outlook



(source : Toho estimation, China import data)



(Toho estimation)

- Sponge production increased by 19% while mill products shipments increased by 2% last year. The growth of mill products shipments somewhat slowed last year.
- Mill products shipments for the Aerospace market decreased last year.
- The export ratio of mill products slightly increased but still is lower than before COVID.

Chinese Titanium sponge industry situation

- Chinese surplus sponge supply will have only a limited influence on the Aerospace industry.
 - Quality concerns and geopolitical risk still exist.
- The Chinese sponge supplier need to reduce a demand and supply gap for healthier industry growth.
 - It looks as if many Chinese sponge suppliers consider an increase of their running rate has the highest priority.
 - It is uncertain if Chinese sponge suppliers can start reducing their production to avoid surpass supply.

Aerospace-grade Sponge supply increase possibility

- Fundamentals leaning towards sponge production capacity expansion are improving for Aerospace-grade sponge suppliers.
 - The US market looks more attractive to sponge suppliers.
 - The Japanese government is trying to improve Aerospace industry supply chain resilience, including Titanium sponge, which may provide financial support policies for Japanese sponge suppliers.
- However, current sponge suppliers still hesitate to expand capacity.
 - Construction of a new sponge factory will cost hundreds of millions of dollars in capex.
 - Sponge suppliers have hardly enjoyed their business due to the unfavorable conditions of agreements with customers.

Titanium sponge outlook – future direction

- Only capacity expansion of Aerospace-grade sponge suppliers can solve the looming sponge shortage in Aerospace industry.
 - There will be a demand and supply gap in the future due to the growing requirements of the industry.
- Aerospace supply chain including OEMs should consider how to convince sponge suppliers to approve new investments.
 - Sponge suppliers want assurances of successful investment before deciding on capacity expansions.
- Aerospace supply chain would secure sponge supply if they could assure sponge suppliers of **stable sponge demand** as well as **reasonable and favorable conditions of agreement!**



Thank you

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