Titanium Demand and Trends in the Commercial Aero Engine Market

Martin Pike, Director of Product Management
May 15, 2018
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Factors Influencing Commercial Aero Engines

- Global Economy
- Changing Demographics and Emerging Economies
- Larger Global Fleet (Spares)
Development Trends in Aero Engine

Next Generation Engines:

- **Green Technology**
  - Reduced Emissions
  - Noise Reductions

- **Enhanced Performance:**
  - Improved Fuel Efficiency
  - Higher Thrust
  - Increased Bypass Ratio and Pressure

- **Lower Operating Cost**
  - Reduced Maintenance
  - Extended Service Intervals
Development Trends Aero Engine

Source: Journal of Propulsion and Power
Titanium Trends in Aero Engines

- Premium Melted Titanium
- Complex and New Ti-Based Materials
  - TiAl Alloys
    - ATI 6-2-4-2™
    - ATI 6-2-4-6™
- Additive Manufacturing
  - Titanium Powders
- Advanced Manufacturing Processes
  - Linear Friction Welding, Flowforming
Market Drivers

Traffic (RPMs)

Commercial Aerospace Market Forecast

Source: Airline Monitor
Market Drivers

Traffic (RPMs)

Capacity (ASMs)

Source: Airline Monitor
Market Drivers

- Traffic (RPMs)
- Capacity (ASMs)
- Airline Profitability

[Graph showing Global Commercial Airline Profitability]

Source: IATA Economics

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Market Drivers

- Traffic (RPMs)
- Capacity (ASMs)
- Airline Profitability
- Fuel Costs

Jet Fuel and Crude Oil Price

Source: eia – https://www.eia.gov/dnav/pet_pri_spt_s1_m.htm
Market Drivers

- Traffic (RPMs)
- Capacity (ASMs)
- Airline Profitability
- Fuel Costs
- Economic Uncertainty
Market Drivers

- Traffic (RPMs)
- Capacity (ASMs)
- Airline Profitability
- Fuel Costs
- Global Uncertainty
Aero Engine Forecast

Source: IATA and Airline Monitor
Engine Builds by Aircraft Type

Source: IATA and Airline Monitor
Commercial Aero Engine Titanium Demand

Source: Airline Monitor, ICFSH&E
Commercial Aero Engine Titanium Demand

Source: Airline Monitor, ICFSH&E
Commercial Aero Engine Titanium Demand

Source: Airline Monitor, ICFSH&E

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