A Review of Titanium’s Emerging Markets

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ITA’s Titanium 2008 Conference
September 22, 2008

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Emerging Markets

- Automotive
- Architectural
- Biomedical
- Consumer
- Defense
- Oil & Gas
The Book On Titanium

- Engineering Properties
- Light Weight
- Corrosion Resistance
- Biocompatible
- Availability

Titanium Sponge
**Market Segments:** Automobiles, light trucks, motorcycles

**Benefits:** Improved fuel efficiency, corrosion resistance, marketing appeal

**Est. Consumption:** 2,200T

**Trends:** Applications grow as cost declines

<2% historical growth rate
• Exhaust Components
• Suspension Springs
• Intake Valves
• Connecting Rods
• Turbochargers

ITA Speakers on Automotive Applications:
• Tomaz Bucar, “Lightweight and High Performance Titanium Exhaust Systems for Porsche”
• Gary Latham, “Titanium in the Automotive Racing Industry”
• **Market Segments**: Roofs, domes, cladding, facades
• **Benefits**: Aesthetic, corrosion resistance
• **Est. Consumption**: <2000T
• **Trends**: Growth where total life costs considered
Architectural

- Roofing
- Cladding, facades
- Railings, columns
- Private residences

Color Spectrum

Guggenheim Museum
Bilbao, SP.

National Grand Theatre
Beijing, China
Market Segments: Joint replacements, bone screws, dental
Benefits: Biocompatibility, low modulus
Est. Consumption: 2,200T
Trends: Steady growth with aging population
ITA Speakers on Biomedical Applications:

- Rod McMillan, “Titanium Usage for Medical Devices and Instruments – A Designer’s View”
- Corby Anderson, “Corrosion Resistant Titanium Alloys for Medical Tools and Implants”
- Mark Koike, “Cast Ti Alloys for Dental Applications”
- C. McNamara, “Bacteria Adhesion to Ti Surfaces…”

- Knee and Hip Replacements
- Dental Applications
- Prosthetics
- Stents
Market Segments: Sporting goods, watches and jewelry
Benefits: Marketing appeal, strength-to-weight, corrosion
Est. Consumption: 7000T
Trends: Historical growth rate < 2% with periodic growth spurts
ITA Speakers on Consumer Applications:

• Edward Rosenberg, “All the Glitter, From Kryptonite to Tiffany”
• Kenji Hirashima, “Consumer Applications in Japan”
• Todd Bacalja, “Lightweight and High Performance Titanium in the Lacrosse Sporting Good Market”

• Sporting Equipment
• Camping Equipment
• Jewelry
Market Segments: Armored vehicles, troop carriers, ships
Benefits: High strength-to-weight, damage tolerance, corrosion
Est. Consumption: 1000T
Trends: Growing; driving alternative low-cost technologies
Major Platforms

- M1A2 Tank
- Bradley Fighting Vehicle
- HMMWV
- M777A1 Howitzer
Developing Platforms

- Future Rapid Effect System - FRES
- Future Combat Systems - FCS
- Expeditionary Fighting Vehicle - EFV
- Joint Light Tactical Vehicle - JLTV
- Naval Destroyer Variant

EFV

DDV
Developing Technologies

- Alloy Development
  ATI 425®
  ATI 64-MIL™
- Cold Hearth Single Melt
- Linear Friction and Friction Stir Welding
- Powder-to-Parts

ITA Speakers on US Army Defense Applications:

- Stephen Luckowski, USAARDEC “New Ti Armor Application…”
- Matt Burkins, US Army “Titanium Alloys for Armor Applications”
- Jane Adams, USARL “Ti Powder Metallurgy for Armor and Structural Applications”
Market Segments: Exploration, drilling, production
Benefits: Corrosion resistant, strength-to-weight, non-magnetic
Est. Consumption: 1,000T
Trends: Deeper, corrosive environments creating interest in Ti
Oil and Gas

• Drilling Components
• Down Hole Tools
• Tubular Goods/Tubing
• Risers

ITA Speakers on Oil and Gas Applications:
• Mitch Dziekonski, Titanium Engineers: “The Influence of Titanium on Downhole Oil and Gas Equipment”
A Review of Titanium’s Emerging Markets

- Titanium’s properties driving growth
- Capacity for Emerging Markets
- Defense and Oil & Gas growth opportunities
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Thank You