The Strategic Role of Scrap Recycling and Scrap Revert Management for the Titanium Industry
AGENDA:

- ELG Utica Alloys in Words and Figures
- Why is Scrap so Important?
- The Current Situation
- Challenges
- Mission Statement of the Titanium Industry
ELG Utica Alloys in Words and Figures

ELG Los Angeles/CA, USA
ELG Duisburg, Germany
ELG Lyon, France
ELG Frankfort/NY USA
ELG Sheffield, UK
• Scrap Services for Titanium and Superalloy Manufacturing Industries

• Scrap Revert Management of Titanium and Superalloys

• 12 facilities in six countries for processing of Titanium and Superalloys and on-site-service

• Another 34 facilities of the ELG Group in the US, Europe and China are utilized for service and logistic solutions
**ELG UTICA ALLOYS**

**Mission**

- **Activities**
  - Managing Scrap Revert Programs
  - In-house Scrap Management
  - Mutilation of Life Limited Parts

- **Global Reach**
  - Utilization of the existing global ELG network
  - Development of new logistic networks if needed

- **Technology**
  - Cost & Quality Leadership through constant development of processing Technology
• Why is Scrap so Important?
  - Long Term Cost Savings
  - Scrap is a crucial Factor in the Supply Chain
  - Energy Savings and Minimizing the Environmental Impact
Although the price of Titanium scrap sometimes exceeds the price of Titanium sponge in a long term perspective scrap is a cheaper source of raw materials.

* Price history calculated using Q1/2004 level as 100%

Sources: USGS, MetalPrices, AMM, Longbow Research
Scrap is a crucial Factor in the US Supply Chain

With an average input ratio of 43% (highest worldwide) in the production of Titanium ingots scrap is already crucial for the supply chain of the US Titanium melters.

Sources: USGS, Roskill
Energy Savings and Minimizing the Environmental Impact

**Energy Consumption** for the Production of 1mt of Ti-Sponge vs. Ti-Scrap

- **Ti-Sponge**: 44,000kwh
- **Ti-Scrap**: 2,000kwh

Energy Consumption Savings: **-95.4%**

**CO² Emissions** for the Production of 1mt of Ti-Sponge vs. Ti-Scrap

- **Ti-Sponge**: 57,232lbs
- **Ti-Scrap**: 2,601lbs

CO² Emissions Savings: **-95.4%**

Using solely Scrap as the primary source of raw materials for the production of Titanium Ingots will reduce the energy consumption and the related CO² emissions by **95.4%**.

Source: Materials Handbook - F. Cardarelli
Source: IWR
The Current Situation
The Current Situation

○ **Global Scrap Ratio** = 20% (Scrap Ratio USA 43%)
  → 80% of the raw materials used for Titanium production are Sponge

○ **Sales and Purchases of Titanium Sponge** are planned strategically while scrap is predominantly sold and bought on a spot market
  → The importance of scrap is sometimes underestimated

○ **Several companies** have realized the strategic importance of scrap and have implemented their own scrap revert programs.
  → Examples include: GE, Boeing, Aubert&Duval, PCC, Snecma, RollsRoyce, Pratt & Whitney, Firth Rixson

○ **New scrap melting capacities** have been developed in the last 10 years
● Challenges

- Technical Restrictions
- Globalization / International Logistics
- Attitude towards Scrap
Technical Restrictions
Technical Limitations for the Melting of Titanium Scrap

Available EB, PA and ISM Technology in Furnaces/Country

<table>
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<td>Japan</td>
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US Scrap Ratio = 43%

Global Scrap Ratio = 20%

Access to scrap melting technology is still limited outside the USA

Source: TIMET
Technical Limitations for the Processing of Titanium Scrap

- Processing capacities are still limited
- Processing technology has not yet matured
  - Intensive need of manual labor
  - Manual piece by piece testing
  - General exclusion of certain scrap types (cracks, holes, etc.)
  - Intensive processing needed for turnings
- Qualifying processes for potential suppliers are very time consuming and complicated
  - The qualification of a potential scrap supplier is not always the number one priority
  - This turns investments into capacity or technology into uncalculated risks
Globalization / International Logistics
Most of the melting capacity for Titanium scrap is concentrated in the North America (largest capacity worldwide) with new projects in Europe, Japan and China.....

.....and Manufacturing is shifting South-East

Scrap has to be sourced globally but supplied locally – Sophisticated logistic solutions are needed to secure scrap volumes generated by the emerging manufacturing clusters all around the world.
Attitude towards Scrap
The purchase and sale of scrap is not always planned strategically but moved often on a spot market.

Scrap is sometimes considered a responsibility of the facility manager.

Titanium turnings and solids are treated and sold as a package deal with other materials like aluminum, steel, paper or plastic.

Not all industries are ready yet...are you?
Mission Statement of the Titanium Industry
Mission Statement of the Titanium Industry

- **Titanium Melters**
  - Increase scrap melting capacities
  - Further development of scrap management
  - Intensive cooperation with scrap processors in order to increase the foreseeability of Titanium scrap demand

- **Titanium Scrap Processors**
  - Increase scrap processing capacities
  - Constant improvement of the processing technology
  - Transfer from a trading to a service industry

- **Titanium Scrap Generators**
  - Define the strategic importance of Titanium scrap for your company
  - Improve in-house scrap management
Thank you for your attention