Revitalization of North American Metalcasting

Alfred Spada
American Foundry Society, Schaumburg, Illinois, USA
Key Highlights

• State of North American Metalcasting
• U.S. Forecast
• Future Opportunities
U.S. Metalcasting

- 1,978 Metalcasting Facilities
- 700+ Ferrous; 1300+ Nonferrous
- Employs More Than 200,000
- 80% Are Small Businesses (less than 100 employees)
- 2nd in Production in World
- 2013 Sales: $34.8 Billion
- 2013 Shipments: 12.26 million metric tons
Canadian Metalcasting

- 190 Metalcasting Facilities
- Employs More Than 20,000
- 80% Are Small Businesses (less than 100 employees)
- 15th in Production in World
- 2013 Shipments: 750,000 metric tons
- 2013 Canada Sales=$1.9 Billion (USD)
Mexico Metalcasting

- 605 Metalcasting Facilities
- Employs More Than 50,000
- 90% Are Small Businesses (less than 100 employees)
- 9th in Production in World
- 2013 Shipments: 2.1 million metric tons
- 2013 Mexico Sales=$4.3 Billion (USD)
2012 Global Production

(metric tons)

1. China: 42.5 million—30,000 plants
2. U.S.: 11.78 million—2,010 plants
3. India: 10.57 million—4,500 plants
4. Japan: 5.34 million—2,113 plants
5. Germany: 5.21 million—605 plants
6. Russia: 4.3 million—1,240 plants
7. Brazil: 2.86 million—1,277 plants
8. Korea: 2.44 million—897 plants
9. Italy: 1.96 million—1,111 plants
10. Ukraine: 1.53 million—805 plants
## Global Production

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray Iron</td>
<td>40,435</td>
<td>42,958</td>
<td>43,258</td>
<td>45,130</td>
</tr>
<tr>
<td>Duc. Iron</td>
<td>18,706</td>
<td>23,841</td>
<td>23,451</td>
<td>24,108</td>
</tr>
<tr>
<td>Steel</td>
<td>6,594</td>
<td>10,538</td>
<td>10,215</td>
<td>10,919</td>
</tr>
<tr>
<td>Cu-base</td>
<td>1,239</td>
<td>1,808</td>
<td>1,652</td>
<td>1,763</td>
</tr>
<tr>
<td>Alum.</td>
<td>10,357</td>
<td>12,932</td>
<td>10,879</td>
<td>13,844</td>
</tr>
<tr>
<td>Mag</td>
<td>134</td>
<td>268</td>
<td>196</td>
<td>217</td>
</tr>
<tr>
<td>Zinc</td>
<td>907</td>
<td>664</td>
<td>528</td>
<td>549</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>79,745</strong></td>
<td><strong>93,449</strong></td>
<td><strong>91,673</strong></td>
<td><strong>98,269</strong></td>
</tr>
</tbody>
</table>

Global Forecast to 110 million tons by 2015
Casting End-Use Markets

- Car/Truck: 31%
- Constr., Mining, Oil Field: 6%
- Pipelines & Fittings: 15%
- Valves: 5%
- Int Comb Eng: 5%
- Municipal: 3%
- Spec Ind: 3%
- Farm Mach: 4%
- Railroad: 6%
- Valves: 5%
- Other: 19%
U.S. Metalcasting Forecast *

From 2010 to 2015:
- 2010: $25.46 Billion
- 2011: $29.64 Billion
- 2012: $34 Billion
- 2013: $34.8 Billion
- 2014: $36.9 Billion
- 2015: $37.4 Billion

*Forecast based on GDP, housing starts, auto, railcar and truck production, construction activity, end-user and supplier interviews.
Metalcasting Forecast

From 2010 to 2015:

- Sales Growth in
  - Ductile Iron
  - Aluminum
  - Magnesium
  - Copper-Base

- No Growth
  - Gray Iron
  - Steel
Why the Resurgence?

Reasons:

- Low Energy Costs
- Low Labor vs. High Productivity
- Shipping Costs
- Global sourcing not for everyone...
- Regionalized Globalization
- Reshoring
Why?

“Is the US manufacturing situation more competitive than it has been in the past? The answer is yes. There are a number of drivers: in high tech manufacturing, material innovation is happening; there’s a lot of innovation in advanced manufacturing. The cost of materials is higher compared to labor. The energy advantages being created by shale gas. We are probably at our most competitive in my thirty years on a global relative basis at any other time.”

GE CEO Jeff Immelt in 2013
Why?

“Manufacturing cost competitiveness around the world has changed dramatically over the past decade...so dramatically that many old perceptions of low-cost and high-cost nations no longer hold. Mexico now has lower manufacturing costs than China whose manufacturing-cost advantage over the U.S. has shrunk to less than 5%. Costs in eastern European nations are at parity or above costs in the U.S.”

Boston Consulting Group
Global Mfg. Cost Competitiveness Index April 2014
Casting Imports to U.S. 2013

- 3 million tons
- 21% of demand
- Increased from 7% in 1998
- Declined from 24% in 2008
How Do We Continue to Thrive?
Strength: Technology Development

• Easy Automation:
  – Automated Pouring for Job Shops
  – Auto Grinding for Job Shops
  – Simulation Modeling that Optimizes Casting Design

• High Technology:
  – Ablation Process for Sand Casting
  – Additive Manufacturing
  – Simulation Modeling Interfacing with Design

• New Materials:
  – Nanoparticle Casting
  – Self-Healing Alloys
Combat Threats: Alternative Processes/Materials & Industry Perception

Powder Metal

Weldments
Work with Threat: Government Regulation

- Silica Permissible Exposure Limit Reduction
- Safety Culture
Seize Opportunity: New Markets
Seize Opportunity: *Conversions to Casting*

3-piece steel weldment for ag equip. redesigned to ductile iron sand casting at $10,000 annual savings.

4-lb gray iron nobake casting converted from a 5-piece stainless steel weldment.
It is about... Opportunity

- North America May Be the Low-Cost Supplier Globally
- Our Customers Need Our Help
- Can We Be the Solution?
YOUR METALCASTING RESOURCE

ADVOCATE. EDUCATE. INNOVATE.

AFS
AND THE INSTITUTE