

INVESTMENT CASTING MARKET OVERVIEW NORTH AMERICA

INVESTMENT CASTING INSTITUTE
SPRING MANAGEMENT MEETING

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■ Overall Industry

- **Recovery on the horizon ?**
- **Globalization**
- **Significant Offshore Sourcing (S.O.S.)**
- **Consolidation continues**
- **Inventories depleted**



▪ **Segment summary**

- **Aerospace – commercial – recovery in 2005
military – increased demand**
- **Power Generation – appears to have stabilized
overcapacity in N. America**
- **Automotive - activity in complex applications**
- **Sporting / Recreational – limited opportunities**
- **General Industry – should grow with overall economy**



- **Aerospace**
- **Industrial Gas Turbines**
- **Automotive**
- **Sporting/Recreational**
- **General Industry**



■ **Aerospace**

➤ **Jet Engine**

- ◆ **Blades & Vanes (Airfoils)**
- ◆ **Integral Wheels & Nozzles**
- ◆ **Hardware and Structures**

➤ **Airframe**

- ◆ **Hardware and Structures**

➤ **Missile & Rocket Components**

➤ **Other Military Ordnance**



- **Industrial Gas Turbines**
 - **Blades & Vanes (Airfoils)**
 - **Hardware and Structures**
 - **Turbine and Combustor Components**



■ Automotive

- **Valves**
- **Turbocharger Components**
- **Complex Powertrain Parts**
- **Chassis Applications - Passenger Car and Motorcycle**



- **Sporting/Recreational**
 - **Golf Club Heads**
 - **Other Recreational Equipment**
 - **High Performance Bicycles**
 - **Skate Boards**
 - **Roller Blades**
 - **Personal Water Craft**



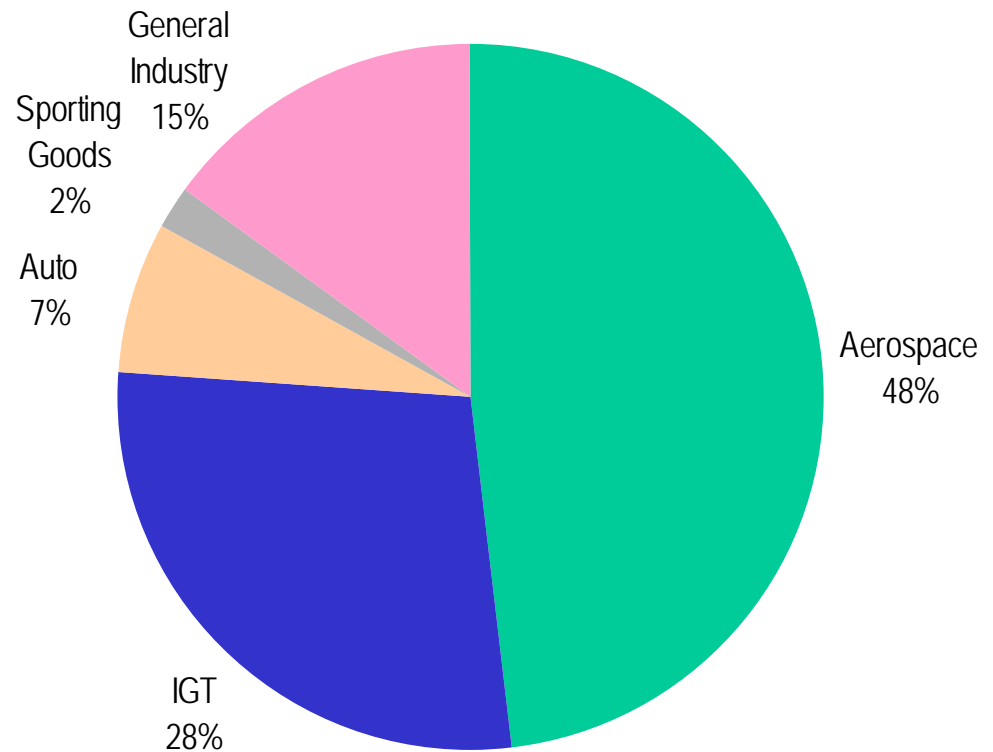
- **General Industry**
 - **Medical**
 - **Industrial Valves / Pumps**
 - **Petrochemical**
 - **Food Processing**
 - **Off-Road Equipment**
 - **Firearms**
 - **Building Equipment**
 - **Hand & Power Tools**

North American Investment Casting 2003 Sales (\$ Million - USD)



Aerospace	1,450
IGT	850
Automotive	200
Sporting / Recreational	70
General Industry	460

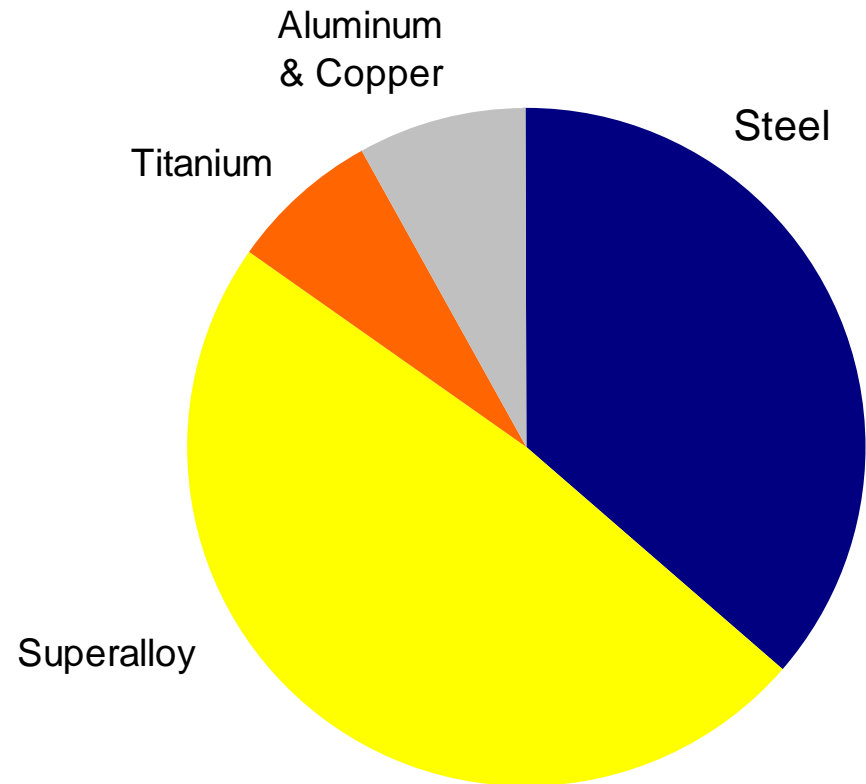
TOTAL: \$3,030



North American Investment Casting Market by Alloy Type

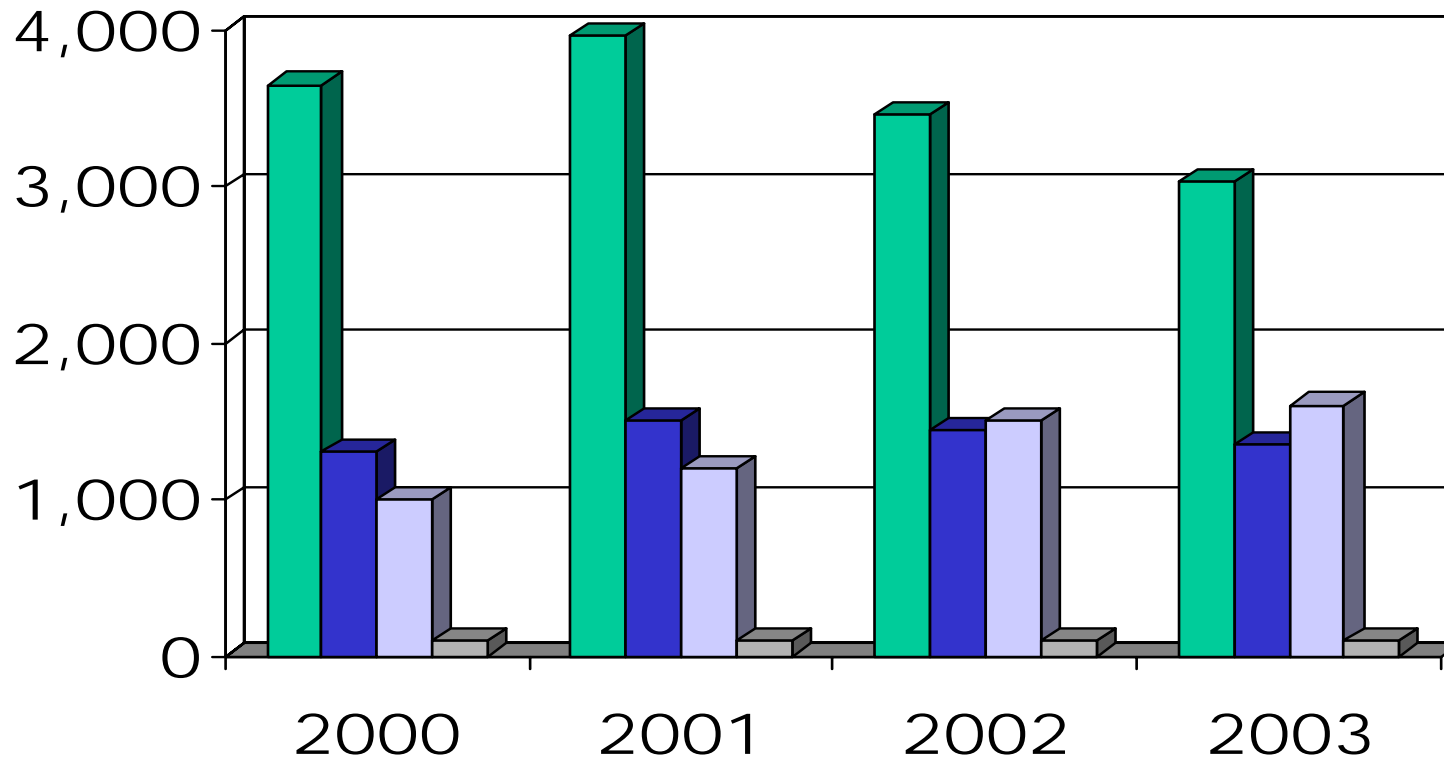


Aluminum & Copper:	8%
Titanium:	7%
Steel:	37%
Superalloy:	48%

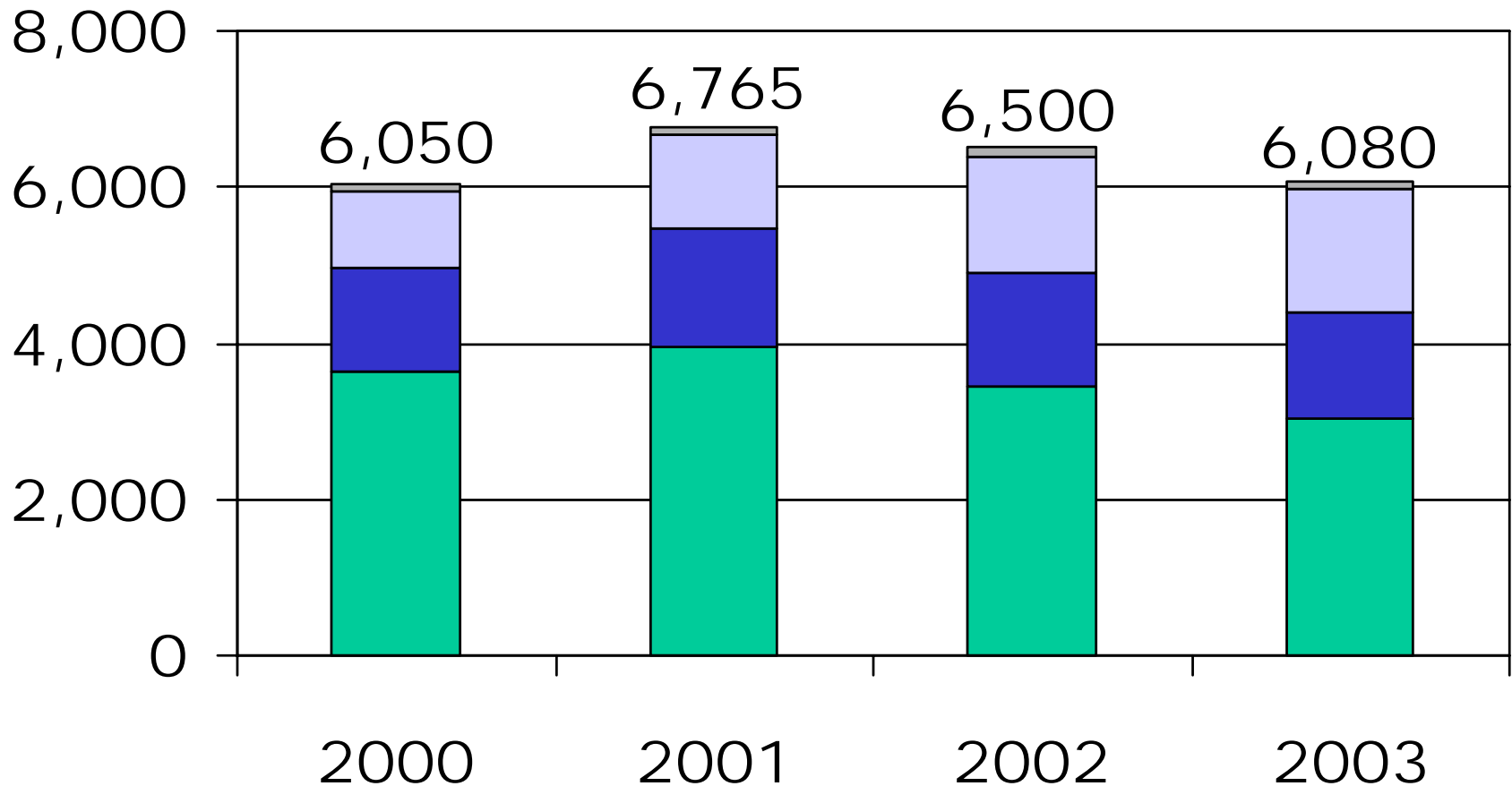


**2003 Casting Dollars
\$3.030M**

Investment Casting Worldwide - \$(million)

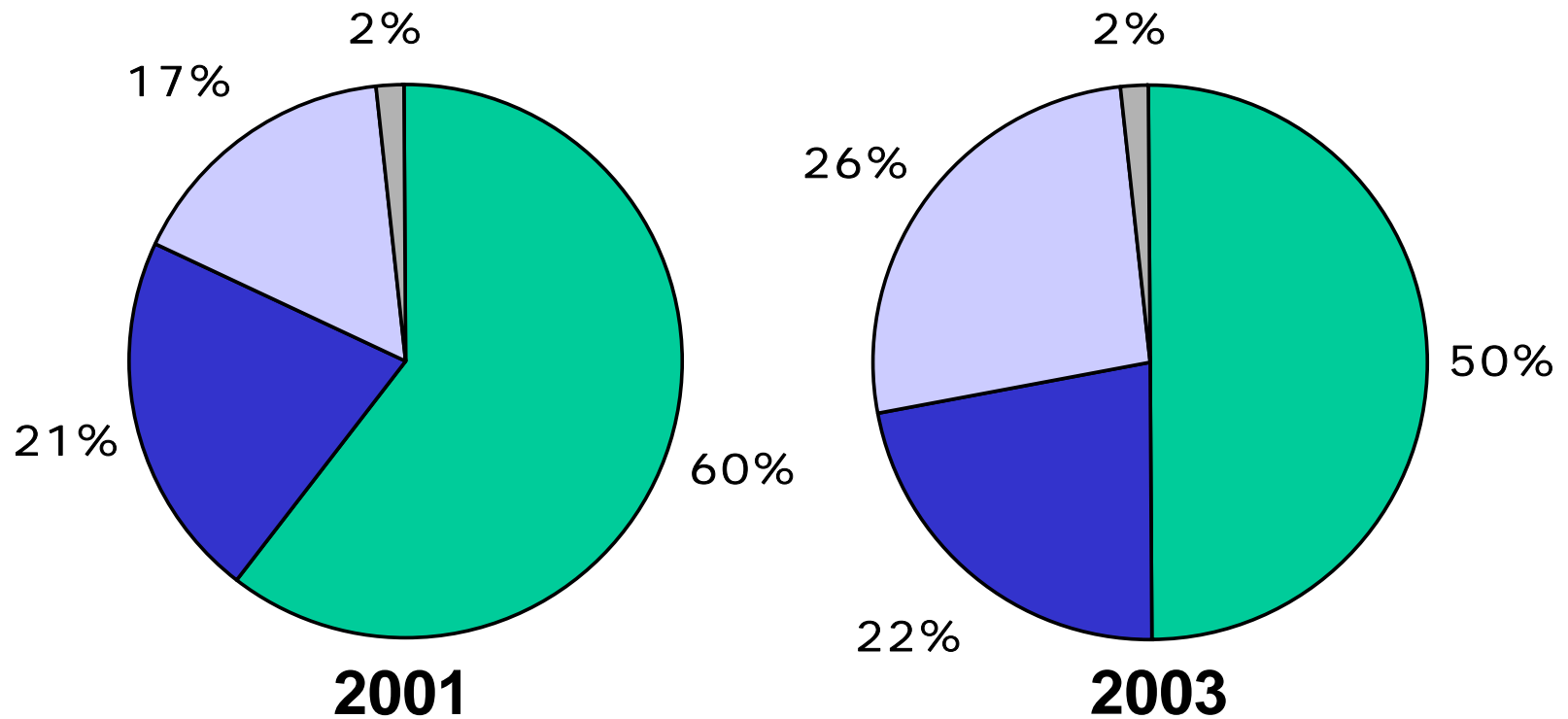


Investment Casting Worldwide - \$(million)



■ N. America ■ Europe ■ Asia ■ Other

Investment Casting Worldwide

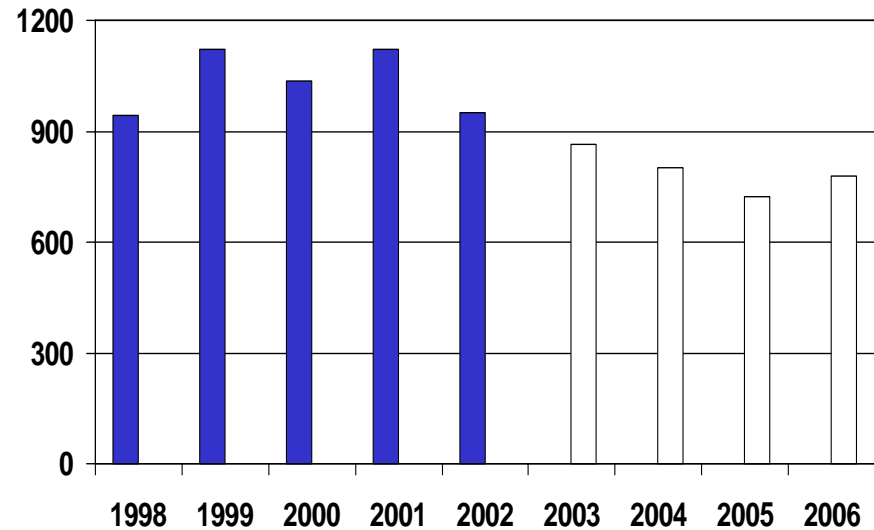




Some positive signs

- Increase in traffic
- Increase in load factor
- Decrease in Parked Aircraft
- 2004-2008 build forecast avg. 800 / year
- Large Asian Market
- New Programs
 - A380
 - 7E7
 - China Regional

New Aircraft Builds > 50 Passenger



ROM Associates: 2- 04



Still some concern

- **Airline losses continue**
- **Fuel prices still high**
- **Future of several large carriers in doubt**
- **USA Regional retrofit complete**
- **Recovery assumes no additional external shocks**



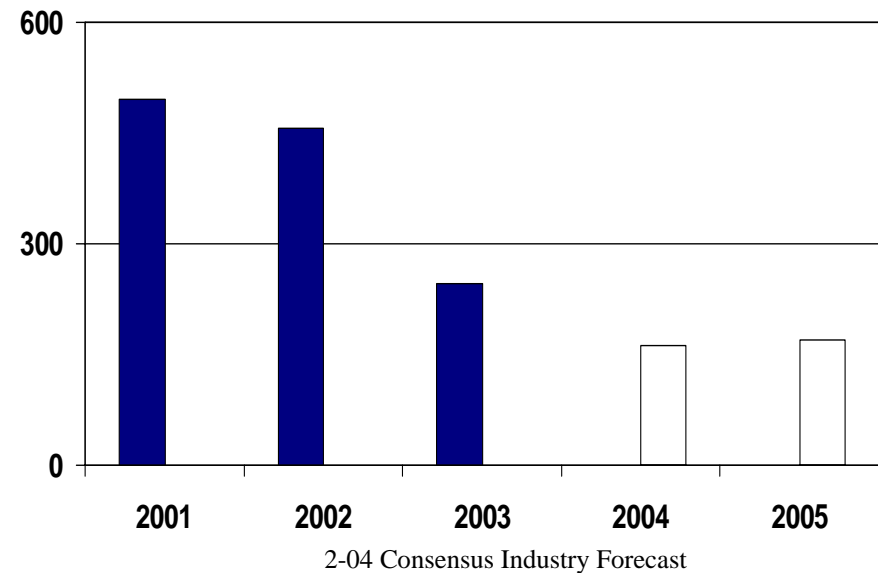
- **Iraq War increases demand**
- **Inventories Depleted**
- **Activity in engine spare parts for Fighter, Helicopter and Transport aircraft**
- **Advanced Missile programs, Smart Munitions / UCAVs**
- **Rapid Deployment**
 - **Lightweight Armament**





- **Casting Market has bottomed out**
- **Modest growth forecasted**
- **Overcapacity in N. America**
- **Spare parts increasing with installed base**
- **Short term – Iraq requirements – 50Hz**
- **Long term growth in Asia**

**New Land-based
Turbine Builds – 50MW +**





- **Growing market for new casting applications**
- **Driven by new emission standards and fuel efficiency**
- **Significant Turbocharger activity**
- **Trend toward complete assemblies with design & warranty responsibility**
- **Increasing interest in Titanium and Titanium Aluminide alloys**
- **Long time required to introduce new castings**



- **Primarily stainless steel & titanium golf club heads**
- **Business continues to migrate to Asian sources**
- **“Fad” market**
- **Recent trend toward forged designs**



- **Widely dispersed among many casting suppliers**
- **Significant sourcing activity in Asia, Mexico and Eastern Europe**
- **Overall, should improve with growth in economy**
- **Inventories need to be replenished**
- **Need to find Niche market applications**
- **Need to develop new casting applications with Value Added operations**

North American Investment Casting 2004 Estimated Sales (\$ Million - USD)



		<u>% Change</u>
Aerospace	1,500	3
IGT	900	6
Automotive	220	10
Sporting / Recreational	70	-
General Industry	480	4
TOTAL:		+4.6%

2004 Forecast Comparison



	<u>% Change</u>
ICI	+ 4.6
GDP	+ 4.2
Ind. Production	+ 4.7
*Metal Casting	+ 5.1

* Stratecasts, Inc. forecast



- **Overall North American market will show modest growth**
- **Specific market segment growth opportunities**
- **Globalization and Industry consolidation continues**
- **Off-Shore Sourcing effect on N. American foundries?**
- **Opportunities for new casting applications**



The Investment Casting Institute wishes to acknowledge the following Member Companies for their contribution to this report.

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- Hitchiner Mfg. Co.**
- Howmet Corporation**
- Wyman Gordon**