



*U.S. Metalcasting:
Competing in a
Global Marketplace*

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**American Foundry Society
MODERN CASTING & ECS**

Topics

- U.S. Metalcasting Industry Profile
- U.S. Casting Forecast
 - Macro
 - Ferrous Casting
- Global Competition

Profile of the U.S. Metalcasting Industry

- **2170 Operating Casting Facilities (2008)**
 - **700+ Ferrous; 1400+ Nonferrous**
 - **Employs More Than 200,000**
 - **80% Firms Are Small Businesses (less than 100 employees)**
 - **2007: \$32.3 Billion (prev. forecast \$34); 13.4 Million Tons (prev. forecast 14.2)**
 - **2008: \$34 Billion; 13.9 Million Tons**
 - **Global Leader in Casting Application; 2nd in Production**

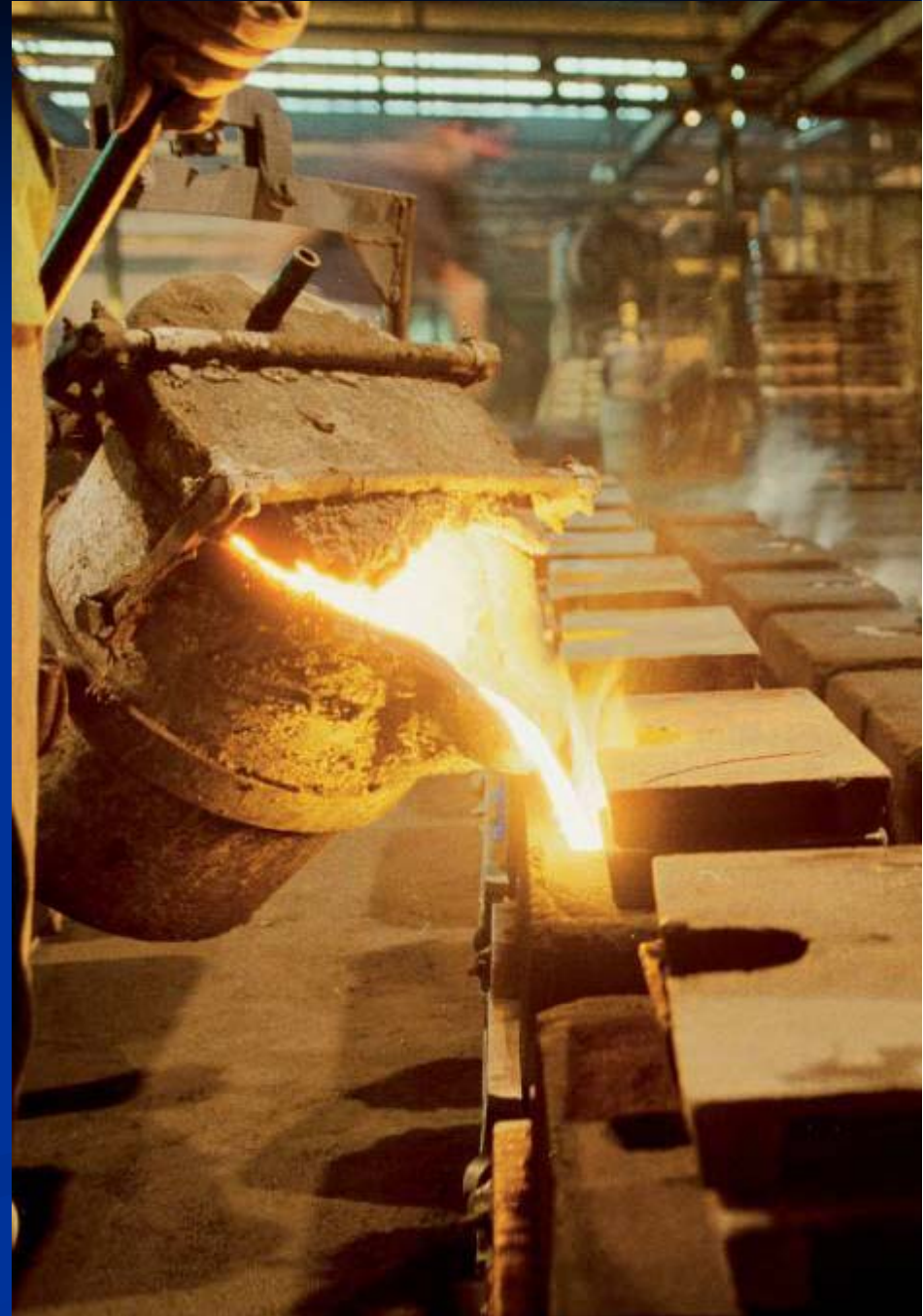


What Happened in 2007?

- Imports for Light Vehicles: Forecasted at 21% of Demand; Reality is 24% of Demand
- Med. To Heavy Trucks & Trailers: Forecasted 15% reduction (420,000 trucks/260,000 trailers); Reality is 25% reduction (370,000 trucks/229,000 trailers)
- Housing Starts: Forecasted 3% growth; Reality 8% decline
- Ductile Iron Pipe: Forecasted 2.3 million tons; Reality 2.07 million tons

U.S. Production

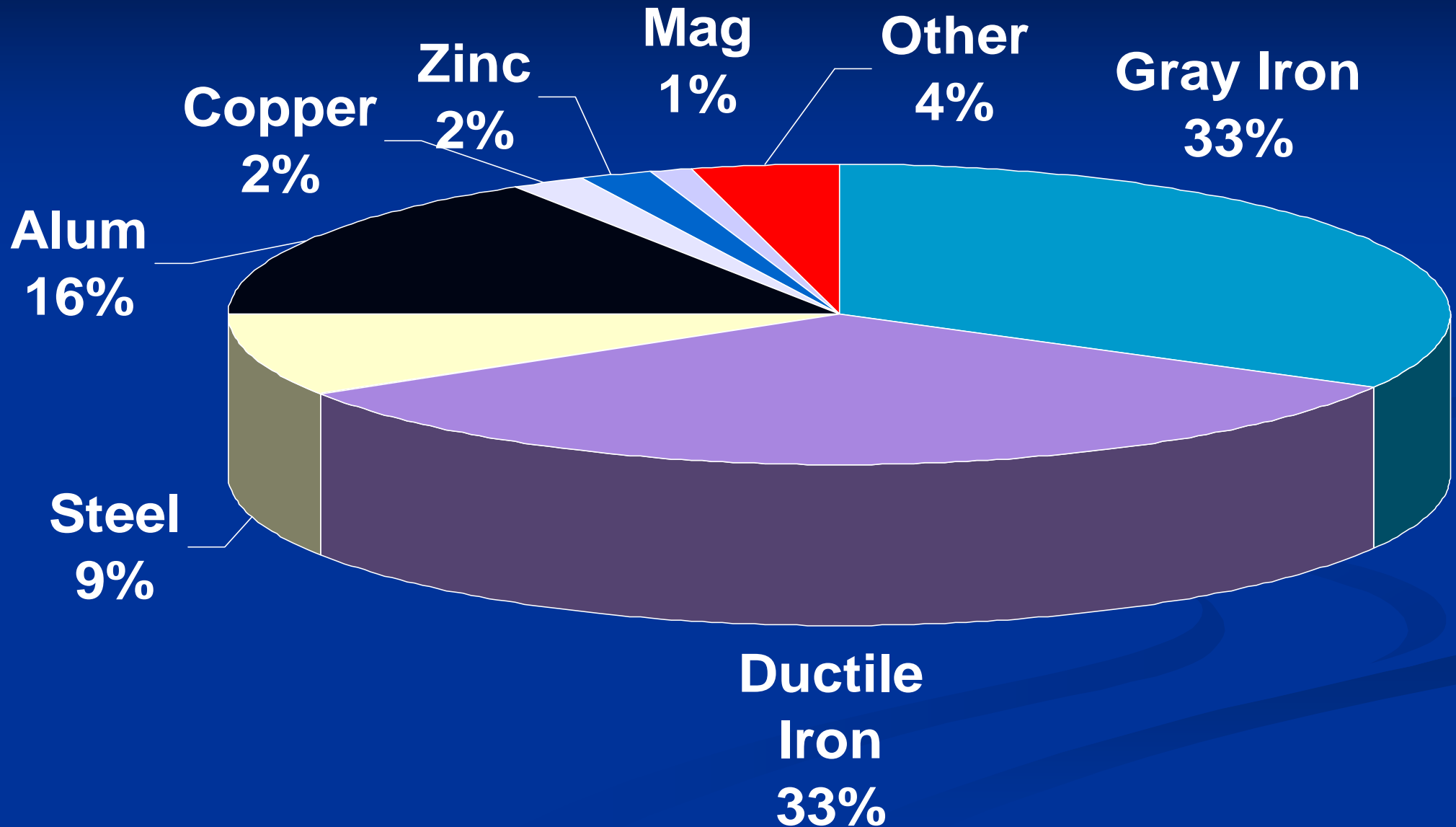
- 1955—6150 Plants
- 1991—3200 Plants
- 2008—2170 Plants
- From '91-'07, production capacity off only 4%
- From '91-'07, Alum growth at 91% (1.1 to 2.1 mil. Tons)
- From '91-'07, Mg growth at 331% (29,000 to 125,00 tons)
- Greater number of castings produced today than in '91



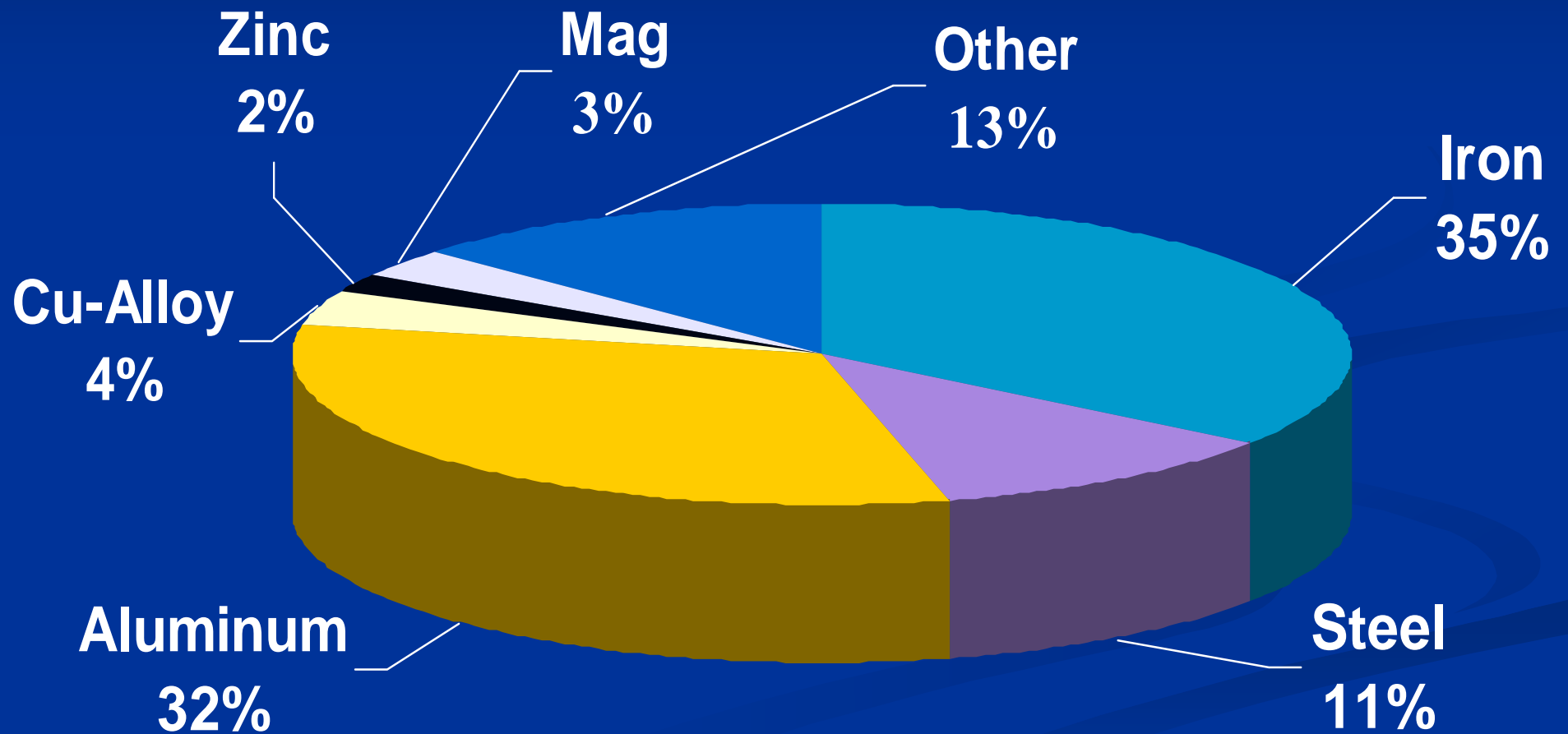
2008 Capacity & Utilization

Metal	Capacity (Tons)	Utilization (%)
Iron	11,250,000	84
Steel	1,680,000	82
Aluminum	2,600,000	81
Copper Base	380,000	87
Magnesium	170,000	74
Zinc/Lead	370,000	88
Other Nonferrous	70,000	87
Investment	200,000	74
TOTAL	16,720,000	83

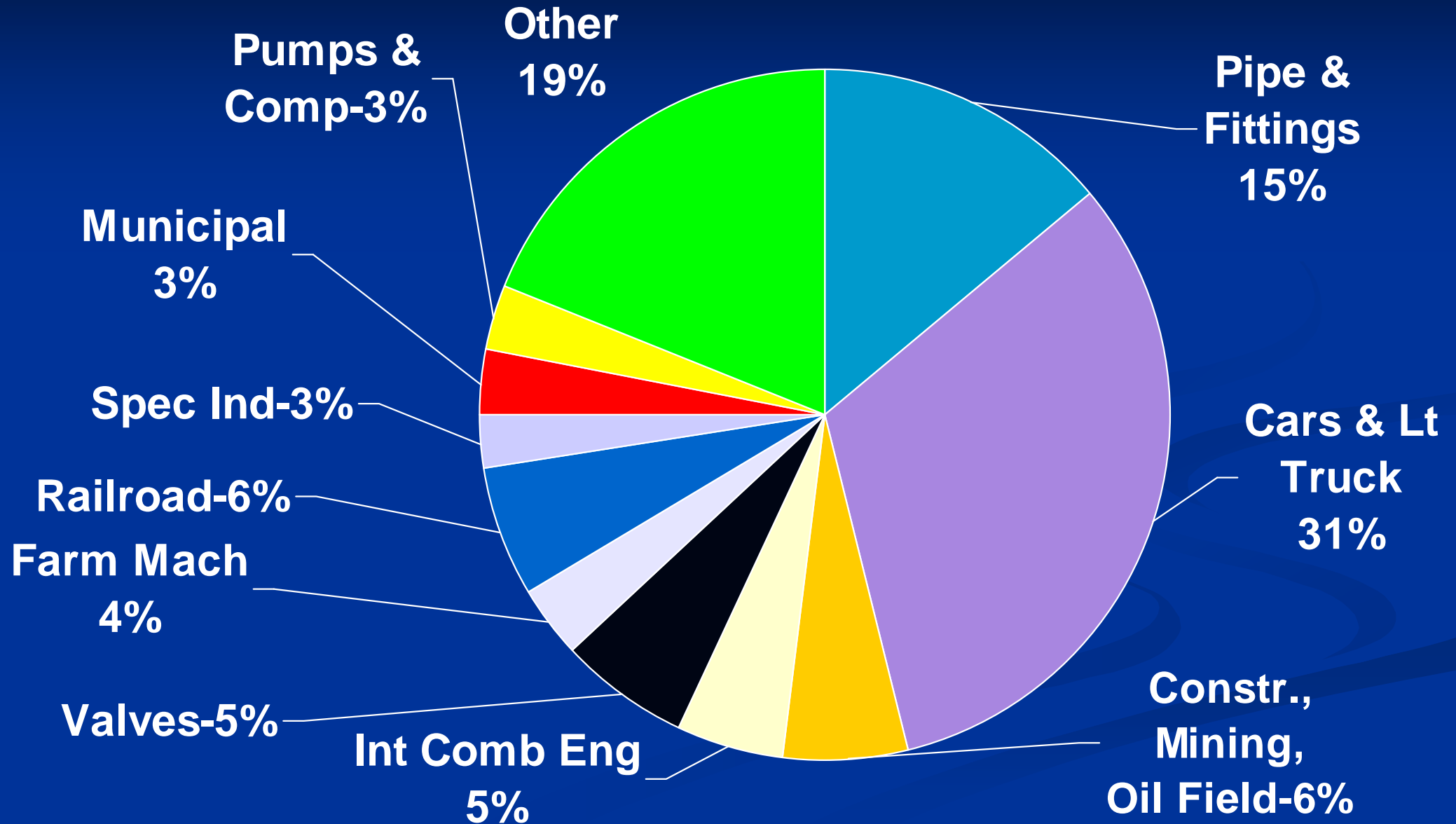
2008 Shipment Mix: Tons



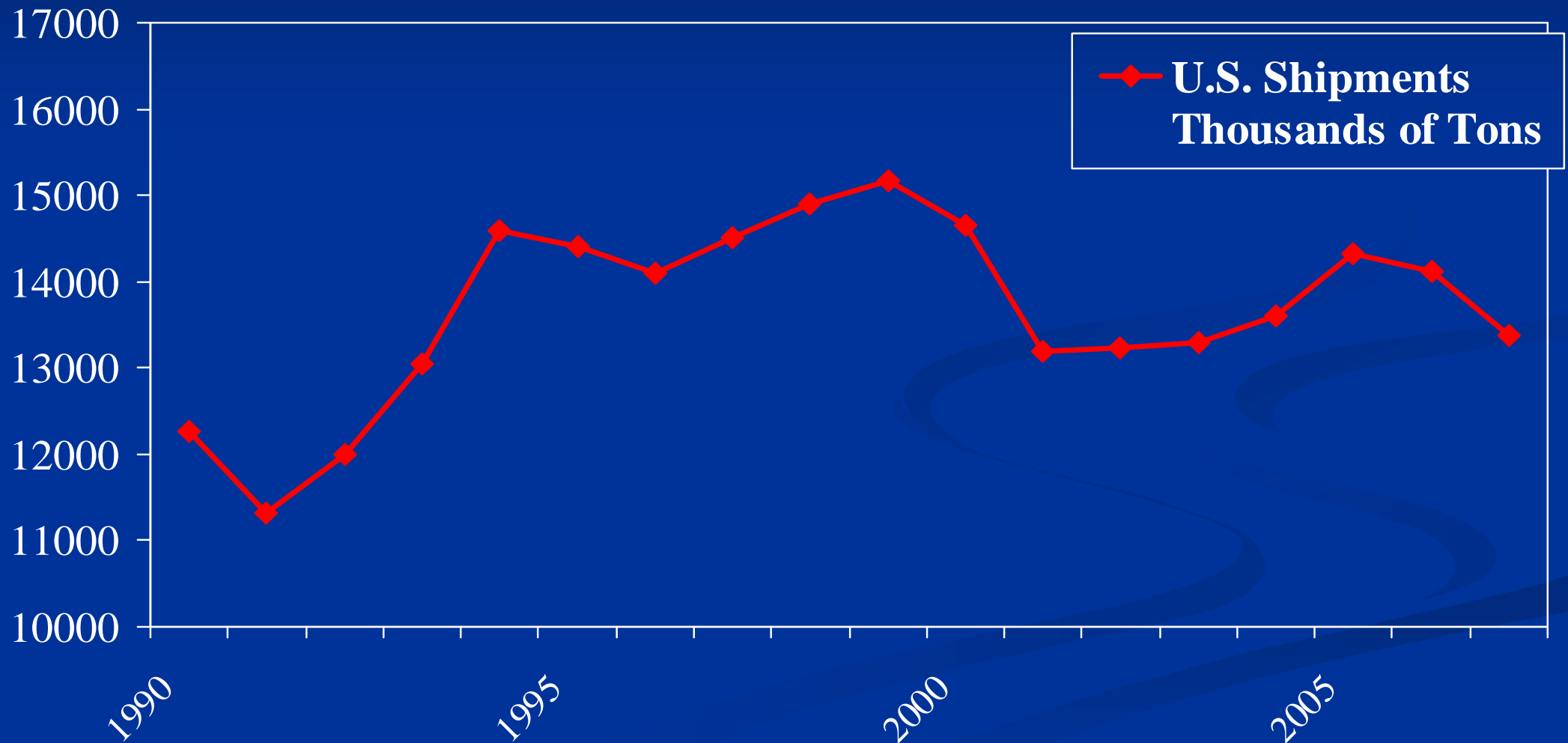
2008 Shipment Mix: Sales



Casting End-Use Markets



Casting Shipments 1990-2007





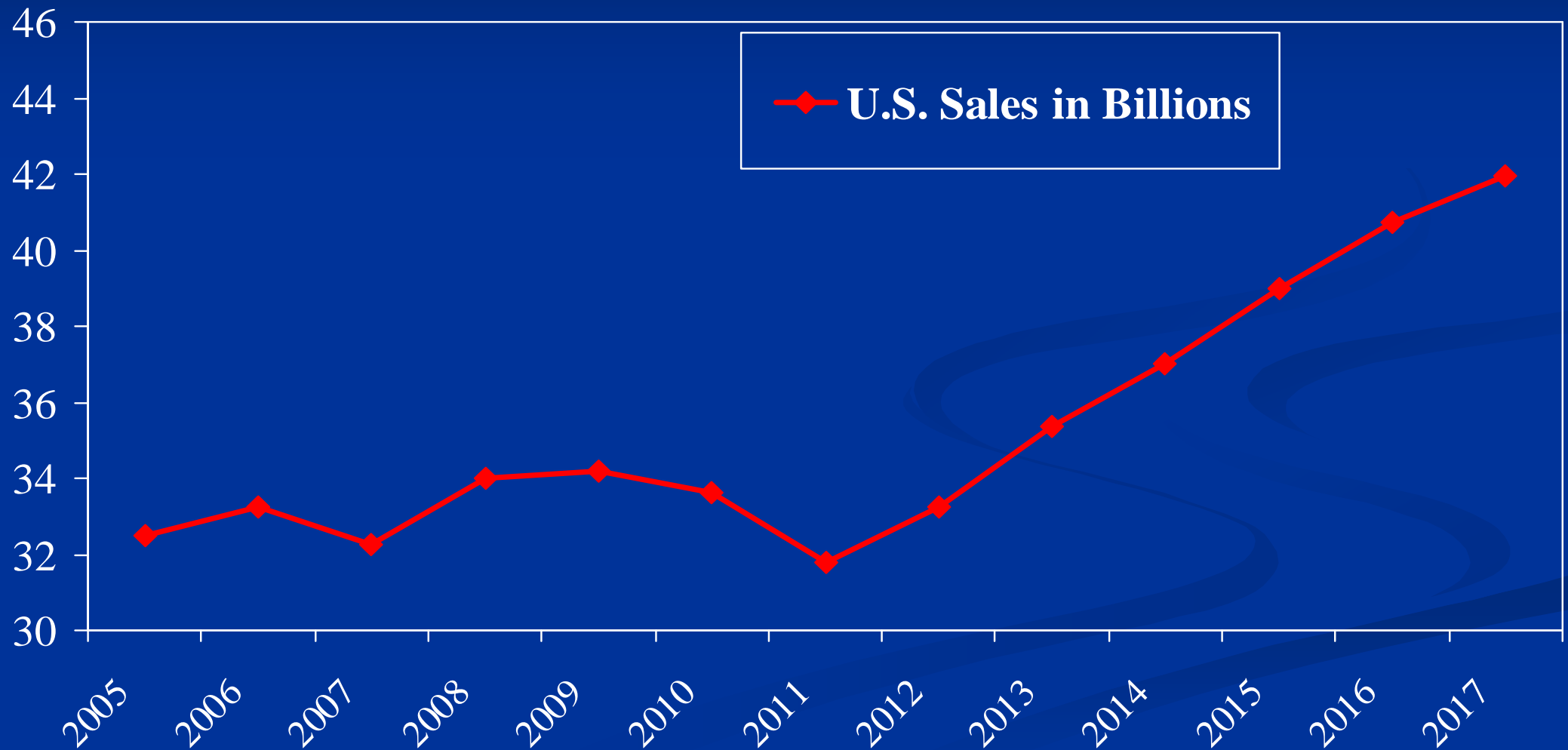
I'm the company troubleshooter. Today I've got to take care of the economic reality. It doesn't fit our economic forecast!

Projected Shipments (all metals)

- 2009: 13.6 million tons
\$34.2 Billion in sales
- 2011: 12.3 million tons;
\$31.8 Billion in sales
- 2017: 14.14 million tons
\$42 billion in sales

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

Sales Forecast Through 2017



What Happens in 2010-13?

- Cyclical economic recession is expected every 10 years, affecting auto, railcar, heavy truck, construction, etc.
- Happened in 2001, 1991, 1981, 1971, etc.
- Forecasted by economic experts for 2011
- Similar Shipment tonnage as 2001
- Sales hit a low of \$31.7 billion in 2011
- Truck/Trailer: 300,000/190,000 in 2012
- Freight Cars: 40,000 in 2012
- GDP: -0.2% growth in 2010-11



Gray & Ductile Iron Trends

- **2007 Shipments:** 4.47 million tons gray iron; 4.38 million tons ductile iron
- **2008 Forecast:** 4.61 million tons gray; 4.6 million tons ductile
- **2017 Forecast:** 4.23 million gray (-0.5% AGR); 4.94 million ductile (1.2% AGR)

Iron Markets (STG '07-'09/LTG to '17)

Gray Iron

- Municipal (4%/1.3%); Med to Hvy Truck (8.3%/0.8%); Pumps/Compress. (0%/0.6%)
- Household Appliances (5.3%/-6.2%), Ingot Molds (-20%/-5%); Soil Pipe (-8.4%/-4%); Electrical (-5.7%/-3.5%)
- 270 lb of gray iron castings/vehicle in 2005 to 140 by 2012 (down from 650 lb in '81).

Ductile Iron

- Construction (2.2%/1.9%); Special Ind. Machine (2.7%/1.8%); Gears/Power Transmission (6.7%/1.6%); Farm Equip (5.4%/1.4%) Light Vehicles (5.6%/0.7%)
- All Major markets show long-term growth
- 190 lb of ductile iron per vehicle in 2003 to 150 lb. by 2016

Iron Trends: ADI & CGI

- ADI: finding new inroads replacing forgings, steel weldments in farm and construction
 - 170,000 tons in 2007
 - 250,000 tons in 2017
- CGI: Markets in motor vehicles and internal combustion engines (engine blocks and heads in diesel engines, bedplates, gear covers)
 - 120,000 tons in 2007
 - 200,000 tons in 2017



Rangeland Planter
Boot Casting
redesigned from fab



Switch to Aluminum, Mag

<u>Part</u>	<u>2005</u>	<u>2008</u>	<u>2009</u>
Engine Block	50%	65%	75%
Cylinder Head	93%	97%	98%
Intake Manifold	33%	24%	17%
Wheels	75%	70%	70%
Suspension	30%	50%	60%

130 lb Al Castings/vehicle in 1992; 260 lb. in 2007; 280 lb by 2016
Overall Al Casting Growth 2.5% AGR to 2017

MAGNESIUM

- 4.3% AGR to 2017
- To grow from 15 lb/vehicle in '06 to 40 lb/vehicle by 2017
- New Mag Apps: Seat Frames, Instrument Panels, Steering Column Supports, Wheels, Transmission Cases, Engine Valve Covers

Steel Trends (STG/LTG)

- **2007 Shipments:** 1.39 million tons
- **2008 Forecast:** 1.37 million tons
- **2017 Forecast (-1.2% AGR)**
 - Pumps (2.6%/1%)
 - Trucks/Military (-1.8%/-7.2%);
 - Railroad (-26.4%/-3.2%)
 - Oil Field (-9.4%/-1.2%)



Locomotive Axle Housing



Diving
Helmet

Globalization & Imports



Imports 2008

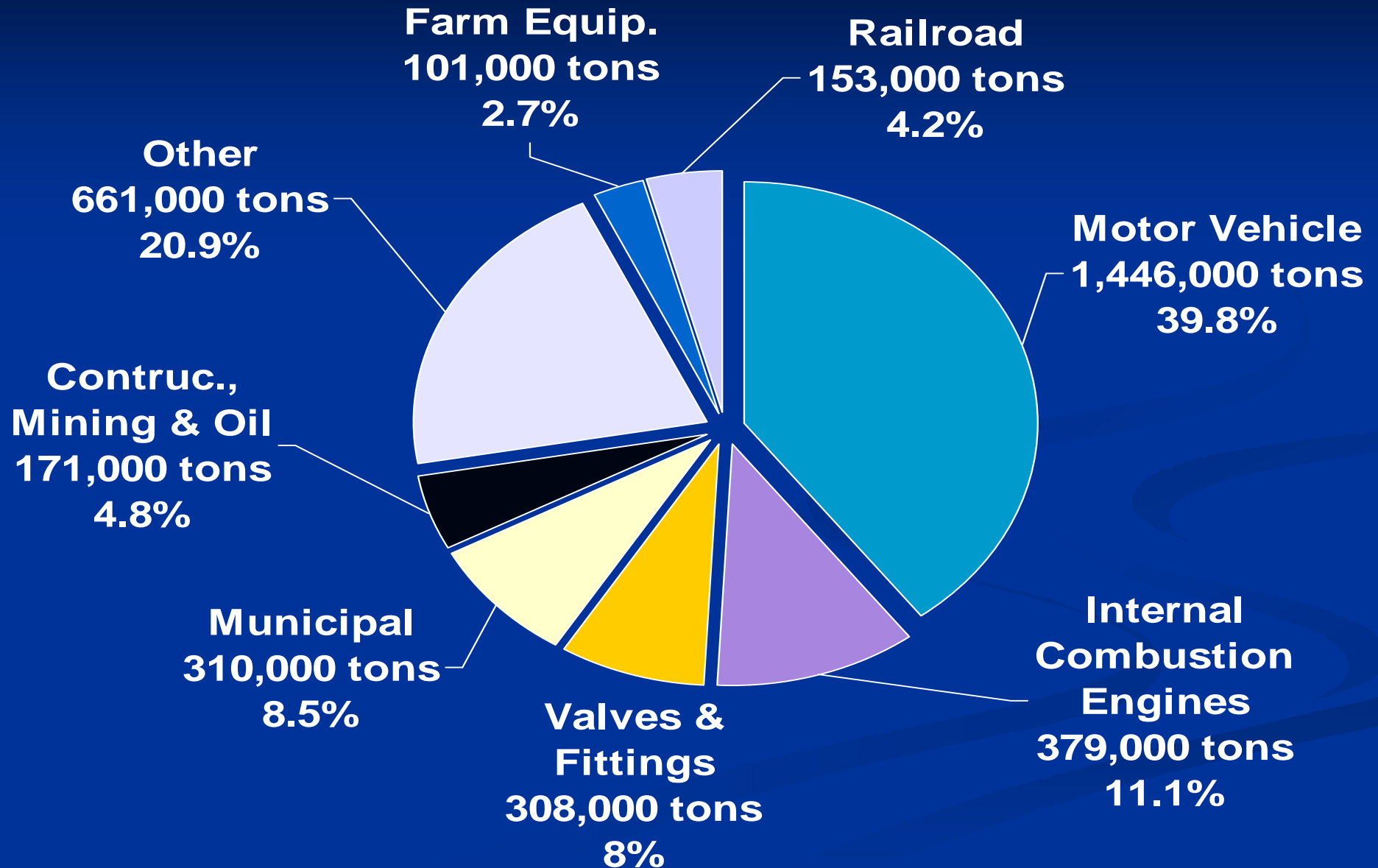
3,681,000 tons of castings

23.4% of demand (from 7% in 1998)

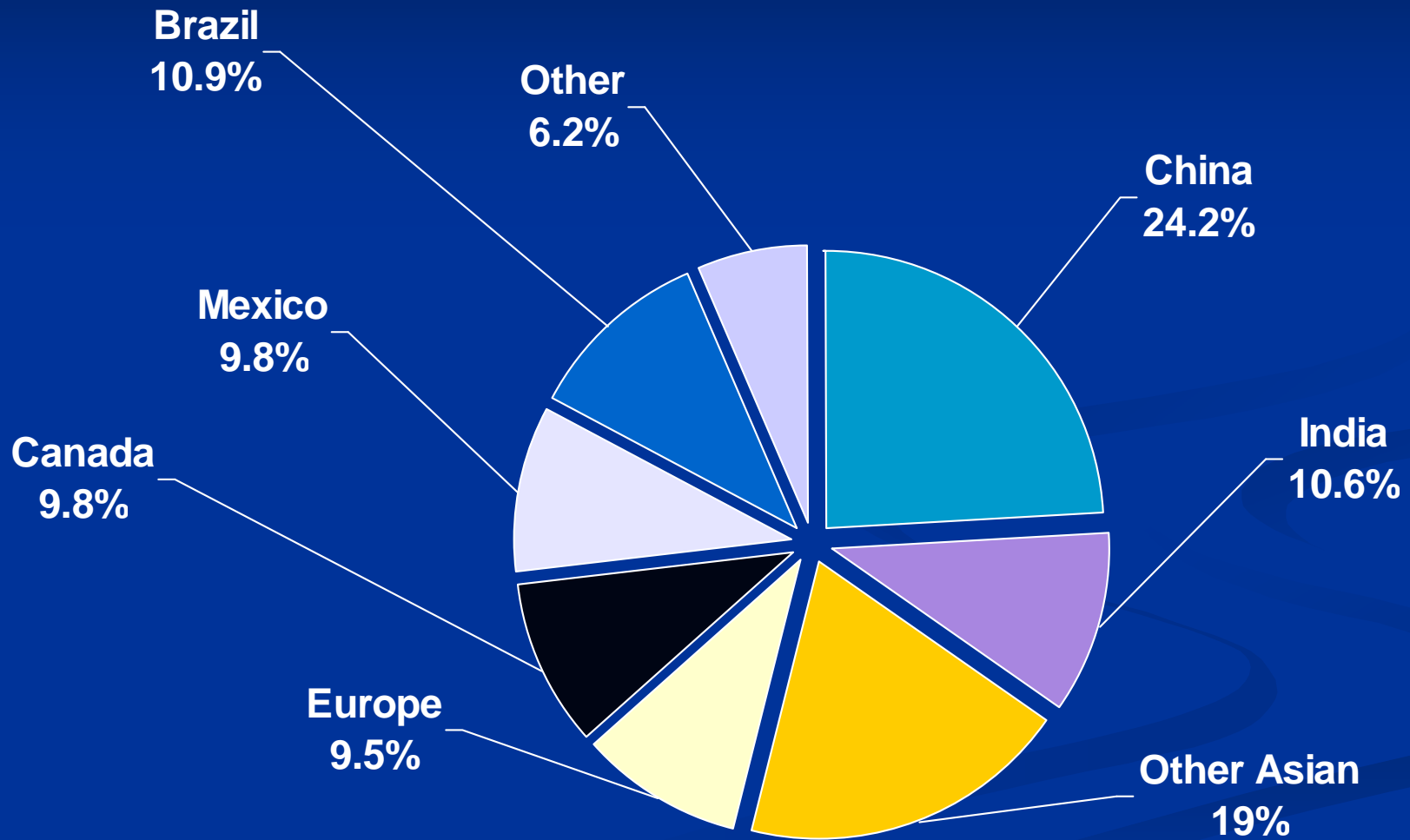
- Gray Iron: 1,630,000 tons (29% of demand)
- Ductile Iron: 576,000 tons (12% of demand)
- Carbon and Low Alloy Steel: 266,000 tons (21% of demand)
- Aluminum Die Castings: 334,000 tons (25% of demand)
- Aluminum Permanent Mold/Sand: 566,000 tons (44% of demand)
- Copper-Base: 67,000 tons (19% of demand)



Forecast of Imports By Market: 2008



Imports of Castings into the U.S.: 2008



Global Production (in 000s metric tons)

	2004	2005	2006
Gray Iron	40,435	40,788	42,539
Ductile Iron	18,706	19,591	21,685
Mall. Iron	1,122	1,233	1,150
Steel	6,594	9,002	9,938
Cu-base	1,239	1,511	1,485
Aluminum	10,357	11,718	12,278
Mag	134	239	1,256
Zinc	907	936	941
TOTAL	79,745	85,741	91,368

Global Production

2006 (metric tons)

1. China: 28.1 million—26,000 plants
2. U.S.: 12.5 million—2190 plants
3. Japan: 7.9 million—1701 plants
4. India: 7.2 million—4750 plants
5. Russia: 6.9 million—1900 plants
6. Germany: 5.5 million—619 plants
7. Brazil: 3.1 million—1372 plants
8. Italy: 2.6 million—1171 plants
9. France: 2.4 million—469 plants
10. Korea: 1.9 million—851 plants



Global Production: 2006 (metric tons)

Iron

1. China: 21.2 million
2. U.S.: 8.4 million
3. Japan: 4.9 million
4. India: 5.6 million
5. Russia: 4.5 million
6. Germany: 4.2 million
7. Brazil: 2.5 million
8. France: 2 million
9. Korea: 1.6 million
10. Italy: 1.5 million

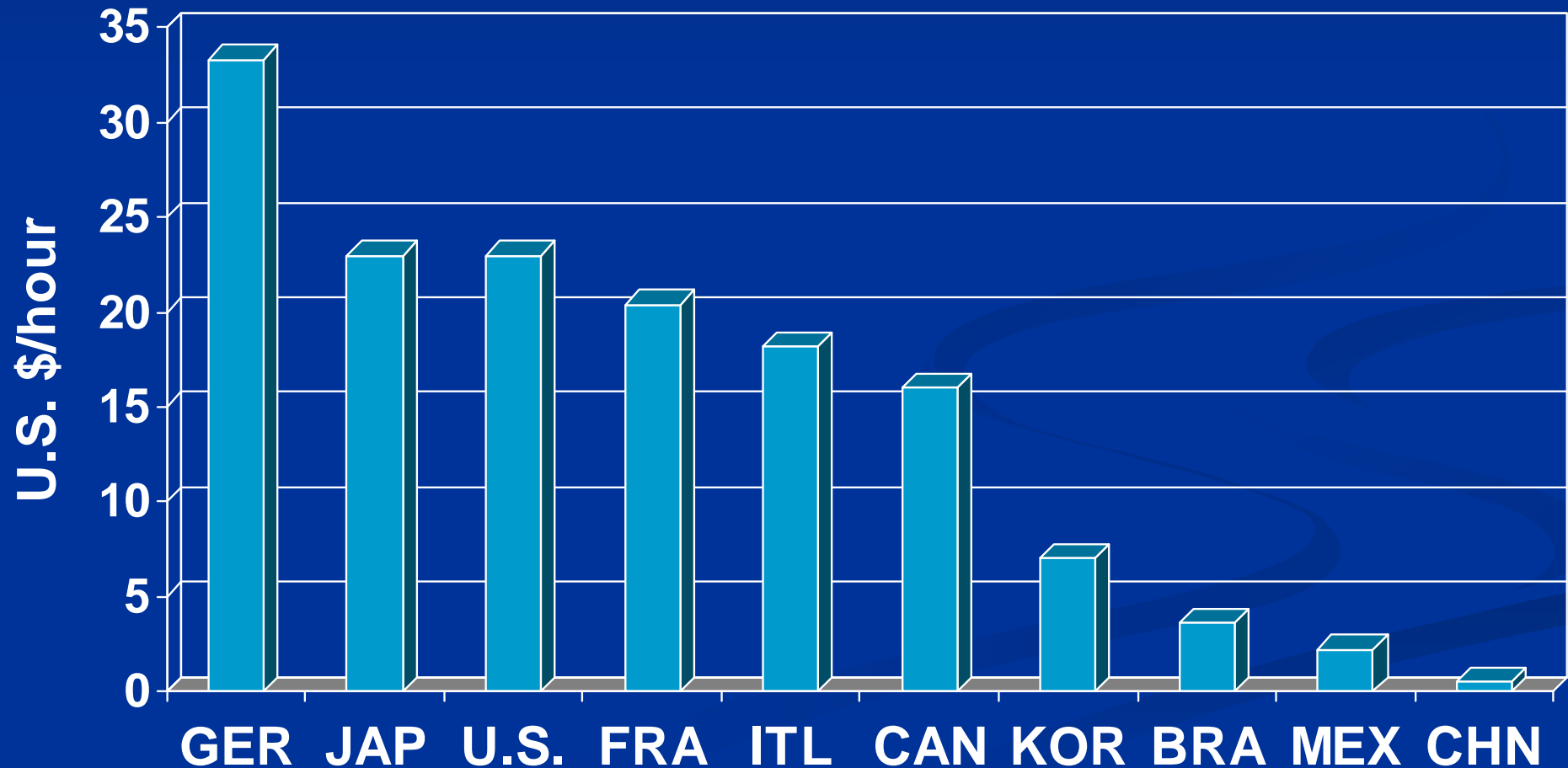
Steel

1. China: 3.8 million
2. U.S.: 1.4 million
3. Russia: 1.2 million
4. India: 914,000
5. Japan: 281,000

Aluminum

1. China: 2.3 million
2. U.S.: 2 million
3. Japan: 1.6 million
4. Russia: 920,000
5. Italy: 897,000
6. Germany: 772,000
7. Mexico: 696,000
8. India: 571,000
9. France: 291,000
10. Canada: 282,000

Comparison of Foundry Labor/Benefit Rates 2008



CRIB + 1

China

- 28 million tons and growing
- Capacity Utilization: 67% gray iron and 75% for ductile iron and aluminum
- Export 3.2 million tons in 2007

Russia

- Capacity Utilization: 59% gray iron and 67% for ductile iron
- Produced 26 million tons in 1991
- Suppliers love, but unknown





CRIB + 1

- India
 - 7.2 million tons
 - Love potential, next China
 - Capacity Utilization: 80-85%
- Brazil
 - 3 million tons
 - Currency issues keep uncompetitive
 - Engineering World Class
- Mexico
 - 1.7 million tons
 - Labor rates at \$2/hr for casting
 - Giants and small plants



U.S. Casting Exports: 2008

- Gray Iron (non pipe/municipal): 580,000 tons
- Ductile Iron: 310,000 tons
- Carbon Low Alloy Steel: 132,000 tons
- Aluminum Die: 203,000 tons
- Fluctuates Based on the Value of the Dollar
- Opportunities for Growth

Thank you!

Questions???

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