



**Defense Contract Management Agency
Industrial Analysis Center**

Steel and Specialty Metals Trend Analysis

**Submitted to:
Office of the Deputy Under Secretary of
Defense for Industrial Policy**

December 2008

IAC/FY2009-0033PR

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Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE DEC 2008	2. REPORT TYPE	3. DATES COVERED 00-00-2008 to 00-00-2008			
4. TITLE AND SUBTITLE Steel and Specialty Metals Trend Analysis		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Defense Contract Management Agency, Industrial Analysis Center, 700 Robbins Ave Bldg 4-C, Philadelphia, PA, 19111-6668		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	Same as Report (SAR)	14	

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DATA DATE: DECEMBER 22, 2008

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Executive Summary:

All six primary metals (aluminum, copper, nickel, titanium, stainless steel and carbon steel) have been falling steeply in price during the second half of 2008, and are anticipated to continue thru the first half of 2009. Despite the effects of the sudden credit freeze coupled with the slowdown in the American economy, the contracted metals demand is forecasted to only be a short term condition, and current demand is not viewed sufficient enough to permanently reverse the upward trend of escalating prices. This is only seen as an economic pause or a market correction that is leaning toward overreaction within the metals industry. Global demand for infrastructure programs and aerospace replacement is expected to carry on after an estimated delayed period of 12 to 18 months, starting from October 2008.

For the past four years, manufacturers and distributors of steel products, and other strategic materials have experienced sharp price increases and availability problems. Consequently, in 2004 DCMA Industrial Analysis Center (IAC) was tasked to assess and prepare a presentation for the 2004 Army Materiel Command's Principal Assistant Responsible for Contracting (PARC) Conference, detailing the short, medium and long-term impacts of steel on the DoD Industrial Base.

Since the initial release of IAC's steel fact sheet and presentation in 2004, many DoD customers have expressed interest in periodic updates on steel and other strategic materials. Because the current cycle of price increases has lasted longer than any commodity boom of the past 50 years, and is projected to continue well into the next decade, IAC's initial steel fact sheet developed into a detailed steel and specialty metals trend analysis report. Finally, in 2007 the Office of the Deputy Under Secretary for Industrial Policy – DUSD (IP) – requested the IAC to update the report bi-annually.

The purpose of the report is to provide trends and analysis to the DoD acquisition community.

Using government and external data sources, the assessment focused on the metals involved in the manufacturing and final assembly of major DoD programs. Data on product availability, pricing and industry trends were examined. Several reliable data sources utilized for the assessment include, but not limited to, companies' annual reports, Standard & Poor's Net Advantage, American Metals Market and the Wall Street Journal. The IAC also utilized insight gained from interviews with company officials during the course of normal business operations.

The trend analysis is comprised of pricing, lead-time, capacity utilization and other industry factors that influence current and future conditions of the marketplace. The trend analysis intends to assist the DoD acquisition community in preparing budgets and program plans in an environment of increasing material prices.

The economic forecasts in this report are based on best assumptions of events, and are current as of December 1, 2008. Nevertheless, the dynamics of a global economy are unpredictable, therefore unanticipated industry and market conditions may change the premise for such assumptions.

Because of the changing fundamentals in the global economy, metal prices will probably not go back to pre-2003 levels. The BRIC nations, resource-rich Brazil and

Russia – coupled with the high demands of India and China – are now competing with Europe and North America for iron ore, scrap metals and other valuable feedstock required for the production of metal-base products.

Regardless of the downturn in the American economy projected for 2009, robust global growth in metals production and consumption is forecasted well into the next decade – possibly the next 20 years – and metal prices will remain relatively high. The world is in the beginning phase of a prolonged bull market for steel and specialty metals not seen since the end of World War II.

Steel and Specialty Metals Pricing Trend and Forecast:

The following charts and tables illustrate pricing trends, price increases/decreases and mid-2009 forecasts for the six primary specialty metals. As illustrated in Figure 1, metal prices decreased on average 20% - 60% since the beginning of 2008. Prior to the dramatic reversal in the economic condition of the United States, metal prices were projected to continue trending upward to meet increasing global demand for infrastructure investments. However, at present the six primary metals collectively are forecasted to reverse their upward swing and contract on average an additional 5-15% from December 2008 thru July 2009.

Despite contraction in production due to industry-wide apprehension to spend, and less lending by the money center banks, the prospects of nearly \$3 trillion in global public spending projects and lending guarantees by governments are likely to reverse the effects of slowing demand. Accordingly, production orders for steel and specialty metals should be more optimistic in the later half of 2009 thru early 2010. In addition to global public spending projects, the commercial aerospace industry has a projected backlog of over 20,000 aircrafts valued over \$2 trillion.

Figure 1 illustrates pricing trends for the six primary metals adjusted for inflation with January 2003 as the base year (not shown on this chart).

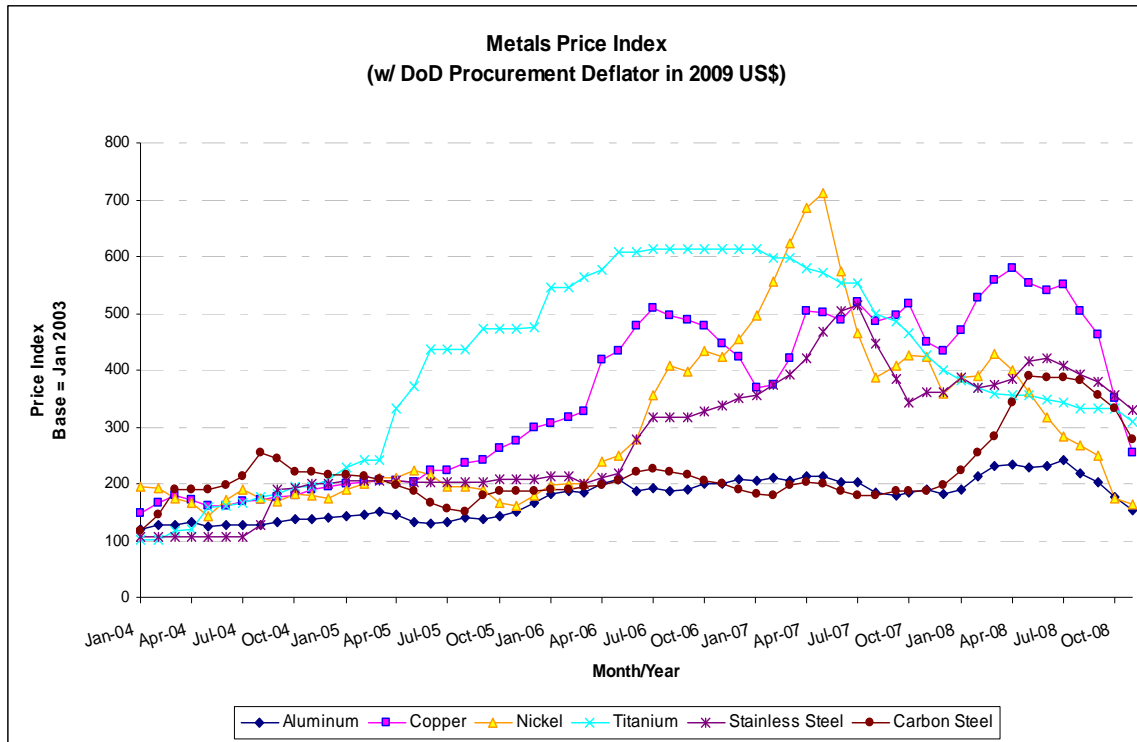


Figure 1 - Pricing Trends

Source: American Metal Market; DCMA-IAC Economists

Figure 2 shows average price increase/decrease for the six primary metals ending November 2008 with four different time periods (10, 12, 24 and 58 months respectively).

Average Price Increase	Aluminum	Copper	Nickel	Titanium	Stainless Steel	Carbon Steel
Jan 08 - Nov 08 (10 months)	-19%	-46%	-58%	-19%	-14%	25%
Nov 07 - Nov 08 (12 months)	-20%	-44%	-61%	-27%	-8%	49%
Nov 06 - Nov 08 (24 Months)	-24%	-43%	-61%	-49%	-2%	40%
Jan 04 - Nov 08 (58 Months)	28%	72%	-15%	202%	212%	138%

Figure 2 - Metals Price Increase

Source: American Metal Market; DCMA-IAC Economists

Figure 3 shows price projections thru July 2009 and associated twelve months percentage increase/decrease.

Price	Aluminum	Copper	Nickel	Titanium	Stainless Steel	Steel
Price based on: \$ per Metric Ton	COMEX spot close	COMEX spot close	Nickel Melting Spot Close	Titanium 6/4 Ingot	North American Cold Rolled 304	North American Hot Rolled Sheet
November - 07	\$ 2,403	\$ 6,634	\$ 30,941	\$ 40,059	\$ 4,479	\$ 567
November - 08	\$ 1,924	\$ 3,739	\$ 12,004	\$ 29,179	\$ 4,116	\$ 843
Projected Price						
July - 09	\$ 1,700	\$ 3,500	\$ 11,000	\$ 27,500	\$ 3,800	\$ 650
Projected price increase/decrease Nov - 08 thru July - 09:	-12%	-6%	-8%	-6%	-8%	-23%

Figure 3 - Metals Price Forecast

Source: American Metal Market; DCMA-IAC Economists; Purchasing Magazine; COMEX=Commodity Exchange

Steel and Specialty Metals Lead-times:

Lead-time for military applications can be 3-6 times longer than for commercial usages, due primarily because of stringent specifications required for military grade metals. Differences between commercial and military lead-times are also attributed to the level of administrative and government oversight requirements (e.g. Level I sub-safe, safety of flight). Lead-time can be defined as MLT (Manufacturing Lead Time). This takes into account the administrative time period from the initiation of a purchase request to the date the product is delivered. Lead-time can also be defined as PLT (Production Lead Time). PLT only takes into account the time period from the date of firm contract order to the product's readiness for shipment. MLT can be 2-5 times longer than PLT. Figure 4 analysis is based on a simple weighted average lead-time based on commercial production lead time.

Figure 4 illustrates the average production lead-time information for commercial applications. Figure 4 also represents an analysis of the lead-time for the six leading metals trending downward. As of March 2008, lead-times began to shortening in length of weeks.

Figure 4 illustrates (PLT) for the six primary metals. Carbon steel is represented by flat products (plate, sheet, and strip) and round products (steel pipes and tubes). Figure 4 is for informational purposes only and should not be used to benchmark against production performance and indexing for long-term contracts.

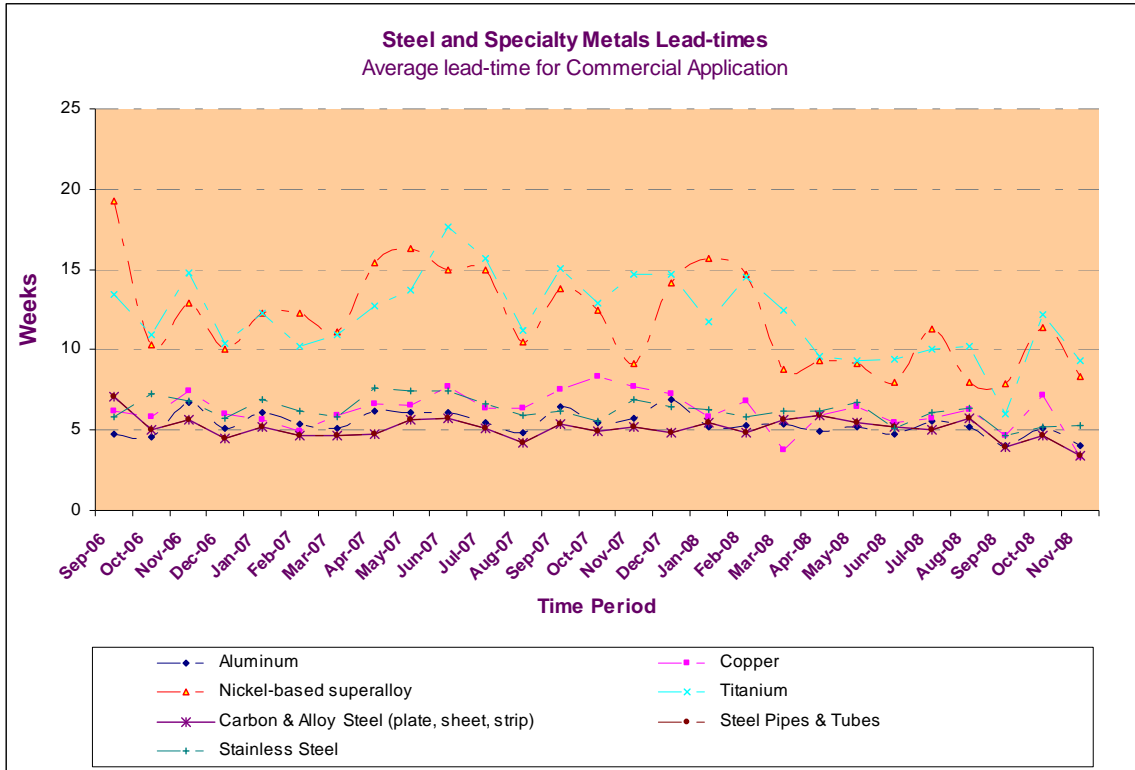


Figure 4 - Steel and Specialty Metals Availability

Source: Purchasing Magazine -Purchaingdata.com

I. Steel and Specialty Metals Assessment

A. Aluminum:

Exposure to the automotive, construction and transportation industries has caused the major aluminum companies to abruptly adjust their current capacity expansion programs, re-evaluate future project and curtail production output.

Aluminum prices were approximately \$3,000 per metric ton in July 2008, and appeared to be moving higher toward \$3,500 per metric ton for the fall of 2008, in line with escalating aluminum product demand and energy prices.

However, the sudden credit freeze to the industry's main customers, aluminum prices are now approximately \$2,000 per metric ton. Aluminum prices decreased 34% for the trailing six months ending November 2008, and are back to fiscal year 2005 levels. Industry analysts were confident that prices were going to hover around \$3,500 for the beginning of fiscal year 2009; at this moment, industry analysts are readjusting their aluminum pricing forecast, and are currently estimating \$1,500 - \$1,700 per metric ton by July 2009. This forecast is mainly attributed to the effects of the current credit freeze on aluminum inventory levels and the uncertainty in the direction aluminum's main customer – the automotive industry.

Despite the current economic downturn, the aluminum industry is still primed for global growth. In regards to the automotive and construction industry, aluminum is a substitute for steel, therefore once weak capital and business inefficiencies shake away from the automotive industry, aluminum is projected to see more market penetration into the lighter fuel-efficient vehicle market – especially to offset the heavy weight of hybrid and/or lithium ion car batteries.

B. Carbon Steel:

After the pricing peak of nearly \$1,200 per metric ton during the summer of 2008 and the expectation that it would level off at \$1,300 per metric ton for the remainder of the year, carbon steel dropped drastically to \$843 per metric ton for hot-rolled steel in November 2008 and is forecasted to decrease to \$650 per metric ton the first half of 2009. Despite the current economic pause in the global economy, carbon steel demand is still strong enough to maintain an \$800 plus price level going forward into 2010. The carbon steel price drop fared better than the other metals for the twelve trailing months ending November 2008. The expected return to growth in China will be the catalyst for carbon steel prices return to an upswing after 2009.

C. Copper:

Prior to fall 2008, copper demand exceeded production, thus creating a deficit in supply and contributing to the escalation in prices. Currently, copper prices are hovering around \$3,700 per metric ton, and it appears will drop further for the rest of the year (see Figure 3). A 53% decrease in price from June 2008 is evidence that global copper demand froze in correlation with the overall global economy, as rising inventory levels contributed to an unexpected production glut.

In the summer of 2008, industry analyst projected that the new copper price support level to be \$7,000 per metric ton with the implication that copper prices should

not drop below \$7,000 per metric ton anytime in the foreseeable future. It is obvious now, that this forecast was incorrect. Firms that used \$7,000 as a cost structure base to increase production capacity are now hastily curtailing capacity and readjusting their cost structure to minimize losses or maintain a certain level of profitability. The current copper price of \$3,000 per metric ton is low and considered an overreaction to the slowing global market. Copper market fundamentals are still strong, but industry analysts affirm that it is too soon to forecast a protracted bearish market. Currently, one can call this market condition an economic pause until global infrastructure stimulus packages are put into effect.

D. Nickel:

The marketplace for nickel is primarily driven by the overwhelming demand for stainless steel and to a lesser extent demand for super alloy. In November 2008, the average price for nickel on the COMEX was \$12,004 per metric ton; down 48% since June 2008. After two years of volatile market fluctuation in nickel, analysts were projecting market stabilization to commence mid-2008 into 2009. That stabilization was to be attributed to industry consolidation. Prior to 2008 nickel price volatility contributed to a jump of over 200% from May 2006 to May 2007, followed by a 45% price drop through August 2007. Since August 2007, nickel prices have oscillated approximately 10%-15% every few months.

Now, a global economic slowdown has the nickel industry hastily freezing projects, and rapidly trying to curtail their inventory levels as means of lowering cost structure. The last time the nickel market experienced prices in the range of \$12,000 per metric ton were in fiscal year 2004. Nevertheless, despite the current industry pause due to a slowdown in the top three economies (North American, Japanese, and European economies), there is still strong global demand for stainless steel, which implies that nickel demand will remain strong for years to come. Although nickel prices are around \$12,000, the industry will likely not sustain lower prices, and will readjust to support higher prices. Nickel is forecast to reach a low of \$11,000 per metric ton for mid-2009 before climbing back up toward \$14,000 per metric ton for fiscal year 2010.

E. Stainless Steel:

Price for the industry's standard product, cold-rolled stainless 304 coil was \$4,115 in November 2008; compared to \$5,241 reported for a June 2008. Early 2008, industry analysts' projected stainless steel prices were to remain stable in the \$5,100 to \$5,500 range through the end of 2008. There are two factors contributing to the stainless steel market contraction, the inventory availability and increased production capabilities of the stainless steel producers; and the downward pressure on growth in the domestic automobile and construction industry. Going forward, future forecasts suggest continued fall in prices until their main industrial customers reach an inflection point suggesting upward demand. Because of the unexpected economic downturn, the stainless steel market will continue to show some weakness going forward thru 2009, with revised forecast of \$3,400 - \$3,800 per metric ton.

F. Titanium:

The average price for Titanium ingot (*Titanium - aerospace grade 6/4*) during the month of November 2008 was approximately \$29,179 per metric ton; down 11% from the \$32,724 per metric ton reported in June 2008. As with the other primary metals, a rising inventory and a softening of demand contributed to the continued relaxations of the titanium marketplace. Despite the current economic downturn, the three domestic titanium producers are still satisfied with the decision to boost production capacity to support the upcoming growth in the aerospace market and more capacity will come on line through 2010. The continued delays in Airbus A380, Boeing 787 and Lockheed Martin Joint Strike Fighter have actually given extra breathing space for buyers that were anticipating a shortfall in titanium availability. The titanium manufacturers are somewhat protected from the effects of this downturn because of Long-Term Agreements that were signed over the past two years. These LTA required the buyers to purchase a steady quantity of titanium products at fixed rates. *Titanium - aerospace grade 6/4* prices are projected to stabilize around \$27,500 per metric ton for mid 2009. Titanium suppliers are adjusting accordingly to the current hold on demand by cutting back on production. The turmoil in the automotive industry has brought back a fresh look into having more titanium parts penetrate the automotive market as a way to reduce weight in order to build more fuel-efficient vehicles.

II. Influences on the Metal Markets:

a. Root Cause for Price Downswing:

Economists, industry analysts and business executives underestimated the downside risk associated with the extreme leverage position in the mortgage financing market. Throughout 2008, analysts were forecasting that the American economy was leaning toward a slowdown; however no one could have predicted the abrupt stop in the credit markets and rapid speed of its effects on the global economy.

The root cause of the current economic crisis includes the slow reaction in dealing effectively with the increasingly unsustainable mortgage origination market and its derivative products. The effects from foreclosures overwhelmed the banking sector and spilled over into the general economy. Consequently, the effects are now being felt in the metals market.

World economic growth, particularly Chinese and other emerging economies have not subsided; the current situation is viewed only as an economic pause until the credit markets defrost. In fact, the Chinese economic is expected to growth at 7%-8% in 2009, instead of pre-slowdown growth projection of 10% -11%. Nevertheless, upward metals demand should be back on track in fiscal year 2010. This economic slowdown has only conditioned firms to catch their breath while reassessing and fine tune their business projection for the upcoming infrastructure projects. Overall, this downturn is viewed as a deep correction, in the middle of a long term global commodities bull market.

b. Specific Factors for Fiscal Year 2008 Price Downward Trend:

- **2008 Credit Freeze.** Prior to September 2008, inflation, price escalation of key commodities, and overheating of economic growth were the major economic concerns. The bankruptcy filings of several money center financial institutions during the second half of 2008 have brought a shock of uncertainty in the marketplace going forward into 2009. Banks worldwide abruptly went into defensive positions to preserve their assets and cash, this translated into an immediate global credit freeze of inter-bank and business lending.
- **Slowdown of US economy.** The U.S. economy had a sluggish GDP growth rate – an average of 1% for the past three quarters, business inventory has increased because merchandise could not be sold, and unemployment was 6.5% for October 2008. The combined underperformance of the financial, insurance, real estate, automobile and construction industries has adversely impacted the overall US economy. Moreover, the National Bureau of Economic Research declared the U.S. recession began in December 2007
- **Global Contagion of Slowdown.** Causes of the global slowdown include limited access for capital project financing and the uncertainty of the severe slowdown within the U.S., E.U., and Japan and the credit freeze sweeping through key trading countries as foreign banks continue to limit their exposure by slowing down inter-bank lending and preserving their cash reserves.

- **Cautious Buyers.** The sudden pause in the upward trend of the business cycle led to higher inventory levels throughout the supply chain. Metal suppliers are cautious in planning full capacity mill runs because buyers are cautious about placing full capacity orders. However, there is cautious optimism going forward as Boeing and Airbus still have combined firm order backlog of direct delivery of 1,400 aircrafts – as of December 1, 2008 airlines have not canceled orders.

c. Domestic Capacity Utilization:

According to the U.S. Federal Reserve, typically, capacity utilization rates below 70% are a signal that deflation will follow. It is also a signal that recessionary pressures will trickle throughout the U.S. economy.

- Primary Metal products – NAICS 331
 - For the second half of 2008 (July - November) capacity utilization for primary metals, the first stage of metal manufacturing was 81.5%, compared to the historical average of 81.1%. For the month of November 2008, it was 80.3%.
- Fabricated Metal products – NAICS 332
 - For the second half of 2008 (July - November) capacity utilization for fabricated metals, the second stage of metal manufacturing was 77.7%, compared to its historical average of 78.1%. For the month of November 2008, it was 76.9%.

The current economic downturn has reduce capacity utilization to the normal historical level, however continued economic downturn pressure will reduce the metals industry sector capacity utilization rates further thus deflating metal pricing even more.

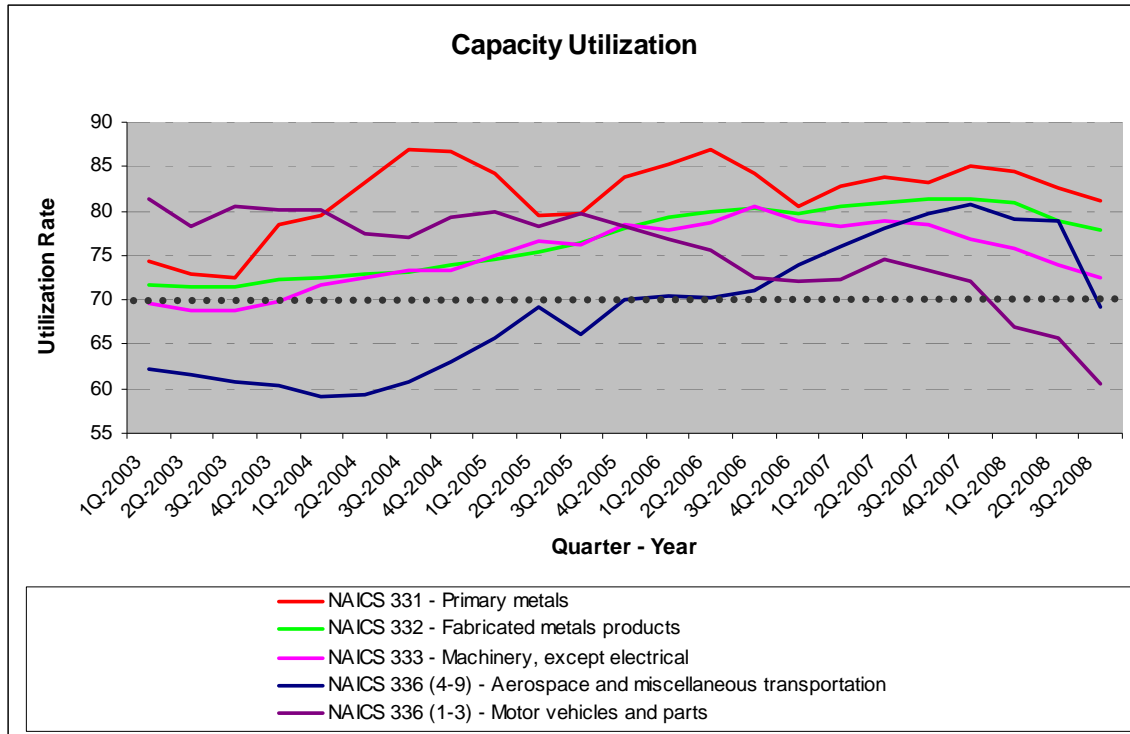


Figure 5 - Capacity Utilization

Source: Federal Reserve

Figure 5, illustrate that with today’s U.S. economic conditions, all five key industries have decreasing capacity utilization rates. Analysts have adjusted their previous inflection points from the past summer and now are forecasting lower capacity utilization rates trending toward deflation of prices. Analysts are suggesting that these downward pressures will continue well into 2009. Moreover, the sharp downturn in NAICS 336(4-9) capacity utilization rate can also be attributed to the prolonged Boeing strike.

d. Forecast:

i. Near-term (January 2009 – June 2009)

- Pricing for metal products have decrease on average 20% - 60%, and are back to late 2005 and early 2006 levels. During the period of escalating metal prices – late 2005 to late 2007 – many firms petitioned the DoD for economic price adjustment clauses.
- An estimated 5% - 15% additional reduction in prices overall, followed by the industry’s anticipation of stabilized prices across the board after June 2009. Metal prices in 2009 will resemble what they were in fiscal year 2005 however; the economic slowdown will limit or erode many of the metal firms’ profit margins.

ii. Mid-term (July 2009 – December 2010)

- The U.S. economy will continue to be in an economic slowdown and as will most of the key trading partner countries.

iii. Long-term (2011 and beyond)

- Global stimulus packages should restart the upward trend in the business cycle. Most metals expansion projects, especially titanium should come online in time for full rate production of Boeing's, Airbus' and Lockheed Martin's aerospace programs. Whose full rate production timeframe begins in 2012.
- The global push for fuel efficiency and finding substitutes for hydrocarbon fuel products will drive up the demand for more specialty metals and super alloys that are closely associated to battery manufacturing.