



2007 Minerals Yearbook

IRON AND STEEL [ADVANCE RELEASE]

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Dramatically increasing global demand, company consolidations that decreased competition, and a weakening dollar, combined to cause a tripling of steel prices (Fletcher, 2008). By late 2007, domestic demand for steel had decreased because of the weakening housing construction and automobile markets, and steel inventories were low, which caused U.S. steel prices to decline below those in Europe and China.

Exporting steel products became attractive for U.S. producers, and U.S. steel mills responded by adding capacity and employees. In November, Thyssenkrupp Steel AG began construction of a new \$3.7 billion steel and stainless steel plant near Mobile, AL. Near Columbus, MS, SeverCorr LLC began melting steel in a new mill built by a joint venture between Russian steelmaker JSC Severstal and a group of U.S. steel executives. Indian steelmaker Essar Steel Holdings Ltd. announced in April that it would build an integrated steel mill near Duluth, MN, using locally mined iron ore to make 1.4 million metric tons (Mt) of steel slab by 2009. Efficiency also increased in U.S. steel plants. For example, 2,500 employees in ArcelorMittal's Sparrows Point, MD, mill produced almost 3.0 Mt of steel in 2007, compared with 26,500 employees producing 5.0 Mt in 1969.

The American Iron and Steel Institute (AISI) reported U.S. production of iron and steel and shipments of steel mill products. These data can be regarded as representing 100% of the raw steel producers in the United States. World production of iron and steel is reported by the International Iron and Steel Institute (IISI) and by foreign government agencies. Consistent with international usage and Federal Government policy, the U.S. Geological Survey reported all data on iron and steel in metric units unless otherwise noted.

Environment

Climate change, allegedly influenced by manmade carbon emissions, has become a significant world political issue. The steel industry accounted for only 3% to 5% of global manmade greenhouse gas emissions, which was less than that produced by transportation and power industries, according to the IISI (2007a). More than 90% of steel industry emissions come from iron production in Brazil, China, the European Union (EU), India, Japan, Republic of Korea, Russia, Ukraine, and the United States. China produces more than 50% of total carbon dioxide emitted by the steel industry (Christmas, 2007). The integrated steel mills using blast furnaces and basic oxygen furnaces to smelt iron ore produced at least three times the carbon that the minimills did using electric arc furnaces (EAF) to melt and recycle iron and steel scrap (Krouse, 2007b). However, not enough recycled steel was available to meet the world demand for steel, and both methods of steel production continued to be necessary.

The IISI approved a policy that takes a global steel sector approach to reduce carbon emissions. The IISI would collect carbon emissions data from steel plants in all the major steel-producing countries to allow production-normalized emission comparisons between regions that were not previously possible (International Iron and Steel Institute, 2007b).

The steel industry can reduce carbon emissions in several ways. The industry can encourage the application of current best practice and technology, and steel plants where energy efficiency is relatively low and carbon emissions are relatively high can be closed or retrofitted with improved technology. The industry can invest in research and development of radically new steelmaking technologies, such as ultra-high strength steels, which contribute to the energy efficiency of vehicles. Although steel is the most recycled material in the world, the recycling of obsolete steel can be maximized.

The U.S. Environmental Protection Agency (EPA) issued air emission standards at steel plants under its National Vehicle Mercury Switch Recovery Program (U.S. Environmental Protection Agency, 2007). The standards are designed to prevent the release of several toxins into the atmosphere—about 4.5 metric tons per year (t/yr) of mercury; about 47 million metric tons per year (Mt/yr) of lead, manganese, nickel, and chromium; and about 785 Mt/yr of particulates. Steelmakers using EAFs will be required to use EPA-approved motor vehicle scrap from which mercury switches had been removed.

The Chinese State Environmental Protection Administration (SEPA), a group of 39 experts, will review the environmental impact of the Chinese economy under a new pilot program to help draft environmental policies (Xiaohua, 2007). Specific regions to be studied included the middle and lower parts of the Yellow River, where energy projects were densely located, and the economic zones to the west of the Taiwan Straits, along Beibu Gulf in South China, the Bohai Rim in North China, and the Chengdu-Chongqing Corridor. Similar pilot projects had begun in 10 cities, provinces, and autonomous regions. The major industries in these areas are coal, chemicals, paper, petrochemicals, power, and steel.

Production

Raw steel production in the United States was about 98.1 Mt in 2007, about the same as in 2006 (table 1). The AISI estimated raw steel production capability to be 113 Mt, up from 112 Mt in 2006. Production represented 87.0% of estimated capacity, down slightly from 87.5% in 2006.

Integrated steel producers smelted iron ores to liquid iron in blast furnaces and used basic oxygen furnaces to refine this iron with some scrap to produce raw liquid steel. The basic oxygen process was used to make 41.1 Mt of steel in the United States

(American Iron and Steel Institute, 2008, p. 73). The use of this process decreased to 41.8% of total steel production in 2007 from 42.9% in 2006. Blast furnace operations in the United States were run by 9 companies at 16 locations (Steel Business Briefing, Ltd., 2007, p. 28).

Minimills and specialty mills are nonintegrated steel producers that use EAF to melt low-cost raw materials (usually scrap). They also employ continuous casting machines and hot-rolling mills that are often closely coupled to casting operations. Specialty mills include producers of alloy-electrical, stainless, and tool steel; high-temperature alloys; forged ingots; and other low-volume steel products. In the United States, 47 companies operated 98 EAF plant facilities (Steel Business Briefing, Ltd., 2007, p. 28). These U.S. mills used the EAF steelmaking process to produce 57 Mt of steel, a 1.7% increase from that in 2006, and accounted for 41.8% of total steelmaking (American Iron and Steel Institute, 2008, p. 73).

Raw liquid steel is mostly cast into semifinished products in continuous casting machines. Only 3.2% of U.S. production was cast in ingot form and subsequently rolled into semifinished forms, about the same percentage as that of 2006. Continuous casting production was 94.9 Mt, or 96.7% of total steel production, about the same as in 2006 (American Iron and Steel Institute, 2008, p. 73).

Consumption

Steel mill products are produced at steel mills either by forging or rolling into forms normally delivered for fabrication or use. Some companies purchase semifinished steel mill products from other steel companies and use them to produce finished steel products. The accumulated shipments of all companies less the shipments to other reporting companies are identified as net shipments to avoid double counting.

U.S. apparent steel consumption, an indicator of economic growth, decreased to 114 Mt in 2007 from 120 Mt in 2006. Shipments of steel mill products by U.S. companies decreased by 2.8% to 96.5 Mt compared with those of 2006 (American Iron and Steel Institute, 2008, p. 25). Compared with shipments in 2006, shipments of construction and contractors' products, the largest single end-use market, increased by 13% in 2007; automotive product shipments decreased by 12%; shipments of agricultural and industrial machinery, equipment, and tools decreased by 12%; steel service center shipments decreased by 12%; lumbering, mining, oil and gas, and quarrying industries shipments decreased by 3%; and shipments of appliances and containers, packaging, and shipping material were about the same.

Prices

The U.S. Department of Labor, Bureau of Labor Statistics, producer price index for steel mill products was up by 5.1% to 182.9 for 2007 from 174.1 in 2006 (1982 base=100) (table 1). (U.S. Department of Labor, Bureau of Labor Statistics, 2008).

Foreign Trade

Export shipments of steel mill products by AISI reporting companies increased to 10.1 Mt from 8.8 Mt in 2006 (table 1). Canada received the largest amount of U.S. exported steel, 5.7 Mt, 3.2% more than in 2006. Mexico was again the second leading importer, receiving 2.1 Mt, 7.4% less than in 2006. Imports of steel mill products decreased by 27% to 30 Mt from 41 Mt in 2006. Brazil, Canada, China, the EU, Germany, Japan, the Republic of Korea, Mexico, Russia, and Ukraine were major sources of steel mill product imports (table 4).

For the first time in 5 years, a steel mill in Cleveland, OH, now owned by ArcelorMittal, exported steel in mid-2007 to Europe (Krouse, 2007a). Also, the first export shipment of steel in 2 years left the Port of Indiana-Burns Harbor (Erler, 2007). ArcelorMittal shipped almost 9,000 metric tons of hot-rolled steel to Spain, made economically possible because of high prices in Europe.

Imports of semifinished steel (table 6) by steel companies should be taken into consideration in evaluating apparent consumption (supply) of steel mill products in the United States and the share of the market represented by imported steel. To avoid double counting the imported semifinished steel and the products produced from it, the amount of semifinished steel consumed by companies that also produced raw steel should be subtracted from domestic consumption. Between 1993 and 2006, semifinished steel imports ranged between 2.5 Mt/yr and 8.5 Mt/yr. Prior to 1993, the amount was less than 0.2 Mt/yr. Taking the imported semifinished steel into consideration, the share of the U.S. steel market represented by imported steel was an estimated 26% in 2007 compared with 33% in 2006.

Regarding the reporting of imports and exports (table 4, 5, 6), "fabricated steel products" are produced from steel mill products but do not include products that incorporate steel products with other materials. Examples of fabricated steel products are structural steel and steel fasteners. "Other iron and steel products" refers to products that are not produced from steel mill products. Examples of other iron and steel products include iron or steel castings and direct reduced iron (DRI).

World Review

When Mittal Steel Co., the largest steel company in the world, acquired its closest rival, Arcelor SA of Luxembourg, in January 2006, the new company, ArcelorMittal controlled an estimated 10% of the world's annual raw steel output, and produced more than 91 Mt/yr of steel (Holecek, 2007). One of the world's largest steel companies, ArcelorMittal had major operations in 27 countries and employed about 320,000; its North American steelmaking capacity comprised 21 mills, 17 of which were in the United States. ArcelorMittal announced that it would expand into the \$17 billion-a-year oil tubular-goods market (Glader, 2007).

During 2007, ArcelorMittal continued to increase with new projects around the world. The company announced its plan

to spend \$35 billion to increase steelmaking capacity; \$20 billion would be used to build two plants in India, each capable of making 12 Mt/yr by about 2015 (Financial Times, 2007). ArcelorMittal, agreeing to a joint venture with Turkish steel producer Borusan Holding A.C., will invest \$500 million to build a hot strip mill in Turkey (Associated Press, 2007). Slabs for this mill would be supplied by ArcelorMittal. Chicago-based Mittal Steel USA, Inc. was expected to reopen a steel-plate rolling mill in Gary, IN, that had been idle for several years (Tita, 2007). The steel plate product would be used to make large-diameter oil and natural gas pipe, wind power towers, and electricity transmission towers. Nearby, ArcelorMittal intended to upgrade heat-treating lines in its Burns Harbor and East Chicago, IN, plants to double production of advanced high-strength steel to about 1 Mt/yr. ArcelorMittal also formed a joint venture to build, by 2009, a steel mill in Saudi Arabia, which would have a capacity of 0.5 Mt/yr of tubes and pipes for local oil producers (Steel Times International, 2007). ArcelorMittal acquired SICARTSA, a Mexican integrated steel producer, from Grupo Villacero (Advanced Materials & Processes, 2007). ArcelorMittal was awarded a license to construct, beginning in 2009, a steel plant in Egypt, which would produce 1.6 Mt/yr of steel using DRI technology and 1.4 Mt/yr of billets by EAF (MarketWatch, 2008). ArcelorMittal received approval from the Tver Region government in Russia to build a new EAF steel complex, with production capacity of 1 Mt, and two bar mills, one of which would have a capacity of 0.6 Mt of rebars and merchant bars (Reuters, 2007).

World production of pig iron totaled about 947 Mt, 7% more than that of 2006 (table 9). The pig iron production of the EU was about 116 Mt, about the same as in 2006. Germany was the top producer in the EU, producing about 31 Mt, 2.6% greater than in 2006. China continued to be the leading producer of pig iron in the world, producing more than 469 Mt, 14% more than that of 2006. Japan, Russia, the United States, Brazil, and Ukraine followed with 87 Mt, 52 Mt, 36 Mt, 36 Mt, and 36 Mt, respectively. The Republic of Korea's production increased nearly 7%. Russia and Ukraine were the only major pig iron producers in the Commonwealth of Independent States (CIS). In North America, the only major producer of pig iron was the United States, where production in 2007 decreased 4% from that in 2006. In South America, the only major pig iron producer was Brazil, producing about 35 Mt. India's production increased slightly in 2007 to 29 Mt.

World capacity for DRI production was estimated to be about 66 Mt/yr (Midrex Technologies, Inc., 2008). DRI production worldwide was about 65.0 Mt in 2007, an 11% increase from 58.7 Mt compared with that of 2006. The leading producer of DRI was India, followed by, in descending order of tonnage, Venezuela, Iran, and Mexico (table 9). In 2007, additional DRI capacity of almost 13 Mt/yr was under construction in Egypt, Iran, Malaysia, Oman, Pakistan, United Arab Emirates, and Venezuela. The leading technology was the Midrex process, followed by the HYL I and the HYL III processes.

World production of raw steel was 1.34 billion metric tons (Gt), 7% more than that in 2006 (table 10). As in previous years, production varied widely among major regions of the world. Asian countries produced about 56% of the world's steel;

the EU, 15%; North America, 10%; and the CIS, 9%. During 2007, China was again the world's leading steel producer, exceeding 489 Mt, a gain of 17% compared with that of 2006. In descending order, the leading producers behind China were Japan, the United States, Russia, India, and the Republic of Korea. These six countries accounted for 66% of world production. The combined steel production of the six steel-producing countries in the CIS was about 124 Mt, an increase of 3.9% from that in 2006. Russia and Ukraine remained the top producers in the CIS. U.S. steel production during 2007 was 98.1 Mt, about the same as in 2006.

Outlook

The growth of gross domestic product (GDP) may be considered a predictor of the health of the steelmaking and steel manufacturing industries, worldwide and domestically. The global economy was projected to increase by 4.1% in 2008, down from an estimated 4.9% in 2007, according to the International Monetary Fund (IMF) (International Monetary Fund, 2008).

MEPS (International) Inc. forecast world steel production in 2008 to be 1.42 Gt, a 5.7% increase compared with that in 2007 (Milnes, 2008), and 1.6 Gt in 2011 (Platt, 2008b). The IISI predicted that global steel production may reach 1.44 Gt in 2008 (International Iron and Steel Institute, 2007c). Economic activity in China, the world's leading steel producer, will probably continue to be an important influence on the world economy and steel markets. MEPS forecast steel production in China in 2008 to be 533 Mt, a 9.0% increase more than that of 2007 (Milnes, 2008). The China Iron and Steel Planning Institute forecast that China may produce about 520 Mt of raw steel in 2010 (Beveridge, 2006). MEPS predicted that 71% of the increase in iron and steel production to 2011 will occur in developing nations of Asia (Business Report, 2007). In contrast, only 7% of the higher output would be produced in the industrialized world. MEPS forecast 2008 steel production in the EU, the CIS, and Japan, as 215.5 Mt, 131.2 Mt, and 120 Mt, respectively (Milnes, 2008).

The global steel industry was expected to have another strong year during 2008, with apparent steel consumption rising to 1,282 Mt in 2008 from 1,202 Mt in 2007, an increase of 6.6%, and a growth rate of 6.3% in 2009 (International Iron and Steel Institute, 2008). MEPS forecast an increase in steel consumption of more than 1,450 Mt by 2011 (Platt, 2008a). Brazil, China, Russia, and India (known as BRIC countries) were anticipated to account for about 71% of global apparent steel use in 2008. Apparent steel consumption in China was expected to increase by 11.5% in 2008, 35% of world total, and by about 10.0% in 2009, 36.7% of world total. The China Iron and Steel Planning Institute forecast steel consumption in China to reach about 480 Mt in 2010 (Beveridge, 2006). India's steel consumption was expected to increase by about 8.9% in 2008 and by about 12.1% in 2009 (Marsh, 2007). India could be consuming 200 Mt/yr of steel, about four times higher than in 2007. Apparent steel consumption in Russia and Brazil was expected to increase by 10.2% and 11.2% in 2008 and by 10.3% and 8.9% in 2009, respectively. Apparent steel consumption in the EU and the

North American Free Trade Agreement region was expected to increase by 1.6% and 2.3% in 2008, and by 1.9% and 1.0% in 2009. The Middle Eastern steel industry was expanding rapidly, especially in the construction sector. Production and consumption of raw steel in the region were expected to increase by 65% and 44%, respectively, by 2010 from 2006 levels (Steel Trade Today, 2008). In 2007, the Middle East accounted for only 2% of global steel trade.

Significantly higher costs of raw materials could threaten the profits of global steelmakers (Matthews, 2007). Analysts forecast a 10% cost increase on most grades of steel, most of which may have to be absorbed by the steelmakers. Consolidations within the industry may continue in order to achieve additional bargaining influence with customers, and economies of scale, thereby holding costs down.

IISI has identified the need to improve the image given by the steel industry to the general public as a challenge to demonstrate that the industry provides a product that is indispensable to modern civilization in an environmentally responsible way (Christmas, 2007). A favorable image of steel in society affects the choice of steel in products, career choices of young people, political choices affecting the industry, and the availability of investment capital for new and established mills.

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TABLE 1
 SALIENT IRON AND STEEL STATISTICS¹

(Thousand metric tons)

	2003	2004	2005	2006	2007
United States:					
Pig iron:					
Production ²	40,600	42,300	37,200	37,900	36,300
Exports ³	86	48	51	813	71
Imports for consumption ³	3,890	6,400	6,030	6,730	5,220
Direct-reduced iron:					
Production ⁴	210	180	220	240	250
Exports ³	5	13	--	(5)	(5)
Imports for consumption ³	1,940	2,450	2,170	2,610	2,610 ^e
Raw steel production: ⁶					
Carbon steel	86,100	90,700	85,900	89,500	89,800
Stainless steel	2,220	2,400	2,240	2,460	2,170
All other alloy steel	5,350	6,560	6,710	6,190	6,140
Total	93,700	99,700	94,900	98,200	98,100
Capability utilization, percent	84.9	94.6	87.5	87.5	87.0
Steel mill products:					
Net shipments ²	96,100	101,000	95,200	99,300	96,500
Exports ²	7,460	7,200	8,520	8,830	10,100
Imports ²	21,000	32,500	29,100	41,100	30,200
Producer price index (1982=100.0) ⁷	109.5	147.2	159.7	174.1	182.9
World production: ⁸					
Pig iron	673,000 ^f	720,000 ^f	802,000 ^f	883,000 ^f	947,000 ^e
Direct-reduced iron ⁴	46,800 ^f	52,700 ^f	56,200 ^f	58,700 ^f	65,000 ^e
Raw steel	974,000	1,060,000	1,140,000 ^f	1,250,000 ^f	1,340,000

^eEstimated. ^fRevised. -- Zero.

¹Data are rounded to no more than three significant digits, except producers price index; may not add to totals shown.

²Data are from the American Iron and Steel Institute (AISI).

³Data are from the U.S. Census Bureau.

⁴Data are from Midrex Technologies, Inc., government, and companies.

⁵Less than ½ unit.

⁶Raw steel is defined by AISI as steel in the first solid state after melting, suitable for rolling.

⁷Data are from the U.S. Department of Labor, Bureau of Labor Statistics.

⁸Data are from the U.S. Geological Survey and the International Iron and Steel Institute.

TABLE 2
MATERIALS CONSUMED IN BLAST FURNACES AND PIG IRON PRODUCED¹

(Thousand metric tons)

Material	2006	2007
Iron oxides: ²		
Ores	36	--
Pellets	49,300	46,300
Sinter ³	6,990	6,830
Total	56,400	53,100
Scrap ⁴	2,510	2,510 ^c
Coke ²	14,700	14,700 ^c
Pig iron, produced	37,900	36,300

^cEstimated. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²American Iron and Steel Institute.

³Includes sintered ore and pellet fines, dust, mill scale, and other revert iron-bearing materials; also some nodules.

⁴Mainly briquetted turnings and borings, shredded scrap, etc.; scrap produced at blast furnaces and remelt not included.

TABLE 3
DISTRIBUTION OF SHIPMENTS OF STEEL MILL PRODUCTS, BY STEEL TYPE, PRODUCT, AND MARKET¹

	Quantity		Percentage	
	(thousand metric tons)		2006	2007
	2006	2007		
Shipments by steel type:				
Carbon steel	92,700	90,500	93.33	93.73
Alloy steel	4,740	4,350	4.77	4.50
Stainless steel	1,890	1,700	1.90	1.76
Total	99,300	96,500	100.00	100.00
Steel mill products:				
Ingots, blooms, billets and slabs	1,500	1,920	1.51	1.99
Wire rods	1,840	2,180	1.86	2.26
Structural shapes, heavy	7,220	6,890	7.26	7.14
Steel piling	582	551	0.59	0.57
Plates, cut lengths	6,490	6,730	6.53	6.97
Plates, in coils	3,150	3,720	3.17	3.85
Rails	726	800	0.73	0.83
Railroad accessories	225	192	0.23	0.20
Bars, hot-rolled	7,060	6,590	7.11	6.82
Bars, light-shaped	1,490	1,800	1.50	1.86
Bars, reinforcing	6,830	7,280	6.87	7.54
Bars, cold finished	1,420	1,320	1.43	1.37
Tool steel	16	16	0.02	0.02
Pipe and tubing, standard pipe	1,140	981	1.15	1.02
Pipe and tubing, oil country goods	2,100	1,940	2.12	2.01
Pipe and tubing, line pipe	503	573	0.51	0.59
Pipe and tubing, mechanical tubing	966	908	0.97	0.94
Pipe and tubing, pressure tubing	43	29	0.04	0.03
Pipe and tubing, stainless	15	13	0.01	0.01
Pipe and tubing, structural	141	135	0.14	0.14
Pipe for piling	10	12	0.01	0.01
Wire	681	350	0.69	0.36
Tin mill products, blackplate	136	127	0.14	0.13
Tin mill products, tinplate	1,840	1,770	1.85	1.83
Tin mill products, tin-free steel	544	508	0.55	0.53
Tin mill products, tin coated sheets	93	91	0.09	0.09
Sheets, hot-rolled	19,400	18,000	19.55	18.67
Sheets, cold-rolled	12,000	11,400	12.13	11.85
Sheets and strip, hot dip galvanized	14,800	13,800	14.94	14.27
Sheets and strip, electrogalvanized	2,370	2,320	2.39	2.40
Sheets and strip, other metallic coated	1,890	1,560	1.90	1.61
Sheets and strip, electrical	481	456	0.48	0.47
Strip, hot rolled	38	38	0.04	0.04
Strip, cold rolled	1,500	1,510	1.51	1.56
Total	99,300	96,500	100.00	100.00
Shipments by markets:				
Service centers and distributors	27,300	24,000	27.49	24.86
Construction	19,000	21,600	19.13	22.32
Automotive	14,100	12,400	14.20	12.81
Machinery	1,380	1,270	1.39	1.31
Containers	2,820	2,640	2.84	2.74
All others	34,700	34,700	34.94	35.96
Total	99,300	96,500	100.00	100.00

¹Data are rounded to no more than three significant digits, except percentages; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 4
U.S. IMPORTS AND EXPORTS OF STEEL MILL PRODUCTS, BY COUNTRY¹

(Thousand metric tons)

Country	2006		2007	
	Imports	Exports	Imports	Exports
Argentina	148	3	91	10
Australia	1,060	13	782	22
Brazil	2,630	37	2,080	107
Canada	5,400	5,530	6,110	5,710
China	4,890	89	4,180	155
European Union ²	5,690	348	5,140	845
Germany	1,220	43	1,100	83
Japan	1,910	23	1,540	34
Korea, Republic of	2,540	47	1,820	70
Mexico	3,300	2,000	2,860	2,150
Russia	3,300	--	1,080	--
South Africa	426	10	131	11
Sweden	255	4	276	7
Taiwan	1,700	16	999	20
Turkey	2,180	--	521	--
Ukraine	1,590	--	1,130	--
Venezuela	180	54	149	87
Other	2,670	603	171	807
Total	41,100	8,830	30,200	10,100

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Excludes Germany and Sweden.

Source: American Iron and Steel Institute.

TABLE 5
U.S. EXPORTS OF IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2006	2007
Steel mill products:		
Ingots, blooms, billets, slabs	199	383
Wire rods	137	95
Structural shapes, heavy	777	990
Steel piling	32	36
Plates, cut lengths	1,050	1,150
Plates, in coils	587	537
Rails, standard	82	107
Rails, other	17	24
Railroad accessories	49	39
Bars, hot-rolled	477	540
Bars, light-shaped	82	84
Bars, concrete reinforcing	273	304
Bars, cold-finished	147	175
Tool steel	21	16
Pipe and tubing, standard pipe	113	136
Pipe and tubing, oil country goods	399	340
Pipe and tubing, line pipe	226	226
Pipe and tubing, mechanical tubing	31	36
Pipe and tubing, stainless	72	46
Pipe and tubing, nonclassified	318	393
Pipe and tubing, structural	188	189
Pipe for piling	2	46
Wire	165	175
Tin mill products, blackplate	4	4
Tin mill products, tinplate	196	191
Tin mill products, tin-free steel	18	22
Sheets, hot-rolled	612	1,010
Sheets, cold-rolled	585	695
Sheets and strip, hot-dip galvanized	757	916
Sheets and strip, electrogalvanized	290	240
Sheets and strip, other metallic coated	196	230
Sheets and strip, electrical	156	167
Strip, hot-rolled	258	252
Strip, cold-rolled	302	323
Total	8,830	10,100
Fabricated steel products:		
Structural shapes, fabricated	357	431
Rails, used	22	33
Railroad products	95	59
Wire rope	16	18
Wire, stranded products	31	37
Wire, other products	81	86
Springs	123	134
Nails and staples	38	35
Fasteners	540	465
Chains and parts	27	27
Grinding balls	51	59
Pipe and tube fittings	33	36
Other ²	119 ^r	150
Total	1,540	1,570
Grand total	10,400	11,700

See footnotes at end of table.

TABLE 5—Continued
 U.S. EXPORTS OF IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2006	2007
Cast iron and steel products:		
Cast steel pipe fittings	33	37
Cast iron pipe and fittings	80	74
Cast steel rolls	10	3
Cast grinding balls ^c	30	22
Granules, shot and grit ^c	50	37
Other castings	65	63
Total	268	236

^cEstimated. ¹Revised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes shapes cold formed, sashes and frames, fence and sign post, architectural and ornamental work, and conduit.

Source: American Iron and Steel Institute.

TABLE 6
U.S. IMPORTS OF MAJOR IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2006	2007
Steel mill products:		
Ingots, blooms, billets, and slabs	8,460	6,040
Wire rods	2,760	1,400
Structural shapes-heavy	943	771
Steel piling	97	100
Plates, cut lengths	1,520	1,290
Plates, in coils	1,580	939
Rails and railroad accessories	319 ^r	371
Bars, hot-rolled	1,470	1,200
Bars, light-shaped	285	217
Bars, reinforcing	2,350	1,690
Bars, cold-finished	377	313
Tool steel	160	145
Pipe and tubing, standard pipe	1,460	1,290
Pipe and tubing, oil country goods	1,890	1,760
Pipe and tubing, line pipe	1,810	2,710
Pipe and tubing, mechanical tubing	754	643
Pipe and tubing, pressure tubing	100	110
Pipe and tubing, stainless	142	155
Pipe and tubing, nonclassified	17	21
Pipe and tubing, structural	640	615
Pipe for piling	35	37
Wire	820	732
Tin mill products-blackplate	76	44
Tin mill products-tinplate	494	471
Tin mill products-tin-free steel	109	111
Sheets, hot-rolled	4,610	2,430
Sheets, cold-rolled	3,320	1,630
Sheets and strip, hot-dip galvanized	3,310	1,820
Sheets and strip, electrogalvanized	175	181
Sheets and strip, other metallic coated	671	549
Sheets and strip, electrical	81	100
Strip, hot-rolled	76	82
Strip, cold-rolled	178	180
Total	41,100	30,200
Fabricated steel products:		
Structural shapes, fabricated	1,380	1,360
Rails, used	185	83
Railroad products	214	210
Wire rope	134	138
Wire-stranded products	357	323
Springs	495	423
Nails and staples	943	782
Fasteners	1,500	1,360
Chains and parts	154	158
Pipe and tube fittings	243	294
Other	323	635
Total	5,930	5,760
Grand total	47,000	36,000

See footnotes at end of table.

TABLE 6—Continued
U.S. IMPORTS OF MAJOR IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2006	2007
Cast iron and steel products:		
Cast steel pipe fittings	243	293
Cast iron pipe and fittings	68	81
Other products	440	407
Total	751	781

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 7
U.S. IMPORTS OF STAINLESS STEEL¹

(Metric tons)

Product	2006	2007
Semifinished	130,000	131,000
Plate	102,000	137,000
Sheet and strip	67,500	57,600
Bars and shapes	114,000	117,000
Wire and wire rods	70,500	68,900
Pipe and tube	142,000 ^r	159,000
Total	627,000 ^r	669,000

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 8
COAL AND COKE AT COKE PLANTS^{1,2}

(Thousand metric tons)

	2006	2007
Coal, consumption	20,800	20,600
Coke: ³		
Production	14,900	14,700
Exports	1,470	1,310
Imports	3,690	2,230
Consumption, apparent	17,000	15,700

¹Data are rounded to no more than three significant digits.

²Includes furnace and merchant coke plants.

³Coke production and consumption do not include breeze.

Source: Energy Information Administration, Quarterly Coal Report, DOE/EIA-0121 (2007/04Q).

TABLE 9
 PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY^{1, 2, 3, 4}

(Thousand metric tons)

Country ⁵	2003	2004	2005	2006	2007 ^c
Algeria ^c	1,300	994 ⁶	952	1,100	1,200
Argentina:					
Pig iron	2,402	2,392	2,646	2,481 ^r	2,593 ^{p, t}
Direct-reduced iron	1,736	1,755	1,823 ^r	1,947 ^r	1,810 ^{p, t}
Australia	6,116	5,735	6,203 ^r	6,276 ^r	6,369 ⁶
Austria	4,677 ^r	4,847 ^r	5,444 ^r	5,547 ^r	5,907 ⁶
Belgium	7,813 ^r	8,224 ^r	7,254 ^r	7,516 ^r	6,576 ⁶
Bosnia and Herzegovina ^c	60	60	60 ^r	60 ^r	60
Brazil:					
Pig iron	32,036	34,579	34,382	34,975 ^r	35,500 ⁶
Direct-reduced iron ^c	410	440	411	420	420
Bulgaria	1,386	1,158	1,081	1,147 ^r	1,069 ⁶
Burma: ^c					
Pig iron	-- ^r	-- ^r	-- ^r	-- ^r	--
Direct-reduced iron	40	40	40	40	40
Canada:					
Pig iron	8,554 ^r	8,828 ^r	8,274 ^r	8,305 ^r	8,577 ⁶
Direct-reduced iron	504 ^r	1,091 ^r	591 ^r	446 ^r	910 ⁶
Chile	988	1,137	1,074	1,115 ^r	1,135 ^{p, t}
China ⁷	213,660	251,850	343,750	412,450 ^r	469,440 ⁶
Colombia	288	316	325 ^r	360 ^r	350
Czech Republic	5,207	5,384	4,627	5,191 ^r	5,300 ⁶
Egypt:					
Pig iron	1,080 ^r	1,000 ^r	1,100 ^r	1,100 ^r	1,000
Direct-reduced iron ^c	2,870 ⁶	2,800	2,800	2,800	2,800
Finland	3,092 ^r	3,037 ^r	3,056 ^r	3,158 ^r	2,914 ⁶
France	12,756	13,198	12,705	13,013	12,426 ⁶
Germany:					
Pig iron	29,481	30,018	28,854	30,360	31,150 ⁶
Direct-reduced iron ^c	590	593 ^r	440	580	590 ^{p, t}
Hungary	1,333	1,351	1,329 ^r	1,335	1,394 ⁶
India:					
Pig iron	26,550 ^r	25,117 ^r	27,125 ^r	28,300 ^r	28,800
Direct-reduced iron	7,670	9,370	12,040	14,740	18,100 ⁶
Indonesia, direct-reduced iron ^c	1,230	1,470	1,390	1,290 ⁶	1,400
Iran:					
Pig iron	2,709	2,136	2,300	2,041 ^r	2,118 ⁶
Direct-reduced iron ^c	5,620	6,410	6,850	6,850	7,500
Italy	10,604 ^r	10,664 ^r	11,423	11,535	11,100
Japan	82,092	82,974	83,058	84,270	86,771 ⁶
Kazakhstan	4,140 ^c	4,283	3,581	3,400	3,240 ⁶
Korea, North ^c	900	900	900 ⁶	900	900
Korea, Republic of	27,314	27,556	27,309	27,559 ^r	29,437 ⁶
Libya, direct-reduced iron ^c	1,340	1,580	1,650	1,630	1,650
Malaysia, direct-reduced iron	1,600	1,710	1,349	1,540 ^r	1,840
Mexico:					
Pig iron	4,183	4,278	4,047	3,800	4,077 ⁶
Direct-reduced iron	5,473	6,345	5,973	6,167 ^r	6,200
Morocco ^c	15	15	15	15	15

See footnotes at end of table.

TABLE 9—Continued
 PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY^{1,2,3,4}

(Thousand metric tons)

Country ⁵	2003	2004	2005	2006	2007 ^c
Netherlands ⁸	5,845 ^r	5,846 ^r	6,031 ^r	5,417 ^r	5,500
New Zealand ^c	600	650 ^r	652 ^r	664 ^r	679
Nigeria	--	--	--	150	150
Norway ^c	110 ^r	100 ^r	100 ^r	100 ^r	100
Pakistan ^c	1,500	1,500	1,500	1,200 ^r	1,000
Paraguay	98	119	124 ^r	136 ^r	137 ^p
Peru: ^c					
Pig iron	226 ^r	272 ^r	263 ^r	306 ^r	351 ⁶
Direct-reduced iron	80	80	80	80	80
Poland	5,632	6,399	4,477	5,333 ^r	5,804 ⁶
Portugal	100	100	100	100	100
Qatar, direct-reduced iron	780 ^e	830 ^e	820	880	1,200
Romania	4,101	4,244 ^r	4,098 ^r	3,946 ^r	3,923 ⁶
Russia:					
Pig iron	48,368	50,427	49,175	51,683	51,523 ⁶
Direct-reduced iron ^c	2,900	3,140	3,340	3,340	4,000
Saudi Arabia, direct-reduced iron	3,290	3,141	3,630 ^e	3,580	4,100
Serbia	635 ⁹	959 ^{r,9}	1,115 ^{r,9}	1,529 ^r	1,485 ⁶
Slovakia	3,892	3,765	3,618	4,145	4,012 ⁶
South Africa:					
Pig iron	6,234	6,011	6,130	6,159 ^r	5,358 ⁶
Direct-reduced iron	1,542	1,633 ^r	1,781	1,754	1,736 ⁶
Spain	3,645 ^r	4,036 ^r	4,160 ^r	3,432 ^r	3,974 ⁶
Sweden	3,710 ^r	3,871 ^r	3,730 ^r	3,577 ^r	3,815 ⁶
Switzerland	-- ^r	-- ^r	-- ^r	-- ^r	--
Taiwan	10,799	10,198	9,854	10,500	10,550 ⁶
Trinidad and Tobago, direct-reduced iron	2,275	2,337	2,055	2,000	2,000
Tunisia	36	-- ^e	-- ^e	--	--
Turkey	5,707 ^r	5,836 ^r	5,970 ^r	5,952 ^r	6,234 ⁶
Ukraine	29,570	31,000	30,747	32,926	35,647 ⁶
United Kingdom	10,228	10,180	10,236 ^r	10,736	11,000
United States:					
Pig iron	40,600	42,300	37,200	37,900	36,300 ⁶
Direct-reduced iron	210	180	220	240	250 ⁶
Venezuela, direct-reduced iron	6,645	7,800 ^r	8,900 ^r	8,400	8,400
Zimbabwe ^c	182	125 ^r	129 ^r	38 ^r	45
Grand total	719,000 ^r	773,000 ^r	858,000 ^r	942,000 ^r	1,010,000
Of which:					
Pig iron	673,000 ^r	720,000 ^r	802,000 ^r	883,000 ^r	947,000
Direct-reduced iron	46,800 ^r	52,700 ^r	56,200 ^r	58,700 ^r	65,000

^cEstimated. ^pPreliminary. ^rRevised. -- Zero.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Production is pig iron unless otherwise specified.

³Direct-reduced iron is obtained from ore by reduction of oxides to metal without melting.

TABLE 9—Continued
PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY^{1, 2, 3, 4}

(Thousand metric tons)

⁴Table excludes ferroalloy production except where otherwise noted. Table includes data available through August 10, 2008.

⁵In addition to the countries listed, Vietnam has facilities to produce pig iron and may have produced limited quantities during 2003–07, but output is not reported and available information is inadequate to make reliable estimates of output levels.

⁶Reported figure.

⁷Figures reported by State Statistical Bureau that the Chinese Government considers to be official statistical data.

⁸Includes blast furnace ferroalloys.

⁹Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

TABLE 10
RAW STEEL: WORLD PRODUCTION, BY COUNTRY^{1,2,3}

(Thousand metric tons)

Country ⁴	2003	2004	2005	2006	2007
Albania	86	98	87 ^r	100 ^r	100 ^e
Algeria	1,051	1,014	1,007	1,158 ^r	1,278
Argentina	5,033	5,133 ^r	5,386 ^r	5,533	5,387 ^p
Australia	9,678	8,353	7,788	7,937	8,047
Austria	6,261	6,530	7,031	6,487 ^r	6,871
Azerbaijan	56	90	286	54	273
Bangladesh ^{6,5}	25	25	20	20	-- ⁶
Belarus	1,570	1,900	2,076	2,100 ^r	2,214
Belgium	11,114	11,698	8,906 ^r	11,238 ^r	11,000 ^e
Bosnia and Herzegovina	166 ^r	117 ^r	283 ^r	469	550
Brazil ⁷	31,150	32,918	31,631	30,900 ^r	31,800
Bulgaria	2,317	2,106	1,969	2,124 ^r	2,050 ^e
Burma ^c	25	25	25	25	25
Canada	15,928 ^r	16,305 ^r	15,327 ^r	15,493 ^r	15,569
Chile ⁷	1,377	1,579	1,536	1,627	1,666 ^p
China ⁸	222,340	272,450	353,240	419,150 ^r	489,240
Colombia	668	730 ^e	842 ^r	1,221 ^r	1,260 ^p
Croatia	434 ^r	80 ^r	74 ^r	81 ^r	75 ^e
Cuba	210	193	245	257 ^r	260 ^e
Czech Republic	6,783	7,033	6,189	6,862 ^r	7,059
Dominican Republic ^c	-- ^r	-- ^r	-- ^r	-- ^r	-- ⁶
Ecuador	80	72 ^r	84 ^r	85 ^r	87 ^p
Egypt	4,368 ^r	4,777 ^r	5,565 ^r	6,004 ^r	6,182
El Salvador	57	59	48	72 ^r	73 ^p
Ethiopia, all from scrap ^c	6	30	60	60	110
Finland	4,766	4,833	4,738 ^r	5,052 ^r	5,000 ^e
France	19,803 ^r	20,770	19,481	19,857 ^r	19,252
Germany	44,809	46,374	44,524	47,224 ^r	48,550
Ghana, all from scrap ^c	25 ^r	25 ^r	25 ^r	25 ^r	25
Greece	1,701	1,967	2,266	2,416 ^r	2,400 ^e
Guatemala	226	232	207 ^r	292	349 ^p
Hong Kong ^c	500	500	500	550	550
Hungary	1,983 ^r	1,957 ^r	1,962	2,029 ^r	2,227
India	31,779	32,600	45,800 ^r	49,500 ^r	53,100
Indonesia	2,042	2,412	3,675 ^r	3,800	3,900
Iran	7,869	8,682 ^r	9,405	9,800 ^e	10,100 ^e
Israel ^c	180 ^r	370 ^r	480 ^r	480 ^r	480
Italy	26,832	28,317	29,061	31,550	31,990
Japan	110,511	112,718	112,471	116,266 ^r	120,203
Jordan ^c	135 ⁶	140 ⁶	150 ^r	150 ^r	150
Kazakhstan	5,069 ^r	5,372 ^r	4,477 ^r	4,245 ^r	4,784
Korea, North ^c	1,090	1,070	1,070	1,180 ^r	1,230
Korea, Republic of	46,310	47,521	47,820	48,455 ^r	51,517
Latvia ^c	546 ⁶	554 ⁶	550	550	550
Libya	1,007	1,026	1,260	1,151 ^r	1,250 ^e
Luxembourg	2,675	2,684	2,194	2,802 ^r	2,800 ^e
Macedonia	291	315 ^r	321 ^r	326 ^r	359
Malaysia	3,960	5,698	5,296	5,834 ^r	6,000 ^e
Mauritania	5 ^e	5 ^e	1 ^r	1 ^r	1 ^e

See footnotes at end of table.

TABLE 10—Continued
RAW STEEL: WORLD PRODUCTION, BY COUNTRY^{1,2,3}

(Thousand metric tons)

Country ⁴	2003	2004	2005	2006	2007
Mexico	15,159	16,737	16,202 ^r	16,313	16,300 ^e
Moldova	886	1,013	1,016 ^r	675	995
Montenegro	(9) ¹⁰	(9) ¹⁰	(9) ¹⁰	50	174
Morocco	5 ^e	5 ^e	205 ^r	314 ^r	314
Netherlands	6,571	6,848	6,919	6,372 ^r	6,400 ^e
New Zealand	750	850	889 ^r	862 ^r	845
Norway ^c	698	695	701 ^r	679 ^r	680
Pakistan	1,000 ^r	1,145 ^r	825 ^r	1,040 ^r	1,090
Paraguay	91 ^r	107 ^r	101 ^r	115 ^r	105 ^e
Peru	669 ^r	725 ^r	790 ^r	896 ^r	750 ^e
Philippines	500 ^r	400 ^r	470 ^r	558 ^r	590
Poland	9,107	10,578 ^r	8,336	9,992 ^r	10,631
Portugal	730 ^r	730 ^r	1,400 ^r	1,400 ^r	1,400 ^e
Qatar	1,054	1,089	1,057	1,003 ^r	1,147
Romania	5,692 ^r	6,077 ^r	5,632 ^r	6,266 ^r	6,261
Russia	62,710	65,646	66,186	70,816 ^r	72,389
Saudi Arabia	3,944	3,902	4,185	3,974 ^r	4,600 ^e
Serbia	(9) ¹⁰	(9) ¹⁰	(9) ¹⁰	1,837	2,000 ^e
Serbia and Montenegro	576	1,197 ^r	1,314 ^r	XX ^{r,1}	XX ¹⁰
Singapore ^c	561 ^r	610 ^r	572 ^r	607 ^r	620
Slovakia	4,709 ^r	4,564 ^r	4,242 ^r	4,848 ^r	4,800
Slovenia	541	566 ^r	583 ^r	627	638
South Africa	9,481	9,500 ^r	9,494 ^r	9,718 ^r	9,100
Spain	16,287	17,684	17,711	18,400 ^e	18,400 ^e
Sri Lanka ^c	30	30	30	30	30
Sweden	5,707	5,949	5,692 ^r	5,435 ^r	5,500 ^e
Switzerland	1,000 ^e	1,000 ^e	1,158 ^r	1,252 ^r	1,264
Syria ^c	70	70	70	70	70
Taiwan	18,832	19,604	18,567	19,203	20,450
Thailand	3,572	4,533	5,161	5,210 ^r	5,470
Trinidad and Tobago	923	815 ^r	711 ^r	674 ^r	670 ^e
Tunisia	86 ^e	70 ^r	66 ^r	68 ^r	61
Turkey	18,298	20,478	20,960	23,308 ^r	25,750
Uganda	30 ^r	30 ^r	30 ^r	30 ^r	30
Ukraine	36,900 ^e	38,740	38,636	40,899	42,830
United Arab Emirates ^c	50	70	70	70	90
United Kingdom	13,128	13,766	13,210	13,931 ^r	14,300
United States	93,700	99,700	94,900	98,200	98,100
Uruguay	41	58	64	57 ^r	71
Uzbekistan ^c	472	602 ⁶	607 ⁶	730	740
Venezuela	3,930	4,575	4,907	4,900 ^e	4,864
Vietnam	544	689	890	1,400 ^r	2,000 ^e
Zimbabwe	152	135 ^r	107 ^r	24 ^r	23
Total	974,000	1,060,000	1,140,000	1,250,000 ^r	1,340,000

See footnotes at end of table.

TABLE 10—Continued
RAW STEEL: WORLD PRODUCTION, BY COUNTRY^{1, 2, 3}

(Thousand metric tons)

⁶Estimated. ⁹Preliminary. ⁵Revised. XX Not applicable. -- Zero.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Steel formed in solid state after melting, suitable for further processing or sale; for some countries, includes material reported as "liquid steel," presumably measured in the molten state prior to cooling in any specific form.

³Table includes data available through July 28, 2008.

⁴In addition to the countries listed, Mozambique is known to have steelmaking plants, but available information is inadequate to make reliable estimates of output levels.

⁵Data for year ending June 30 of that stated.

⁶Reported figure.

⁷Excludes castings.

⁸Figures reported by the State Statistical Bureau that Chinese Government considers as official statistical data.

⁹Country listed separately, but data is included in "Serbia and Montenegro". In 2003-05, Montenegro's steel production figures, in thousand metric tons, are as follows: 2003—6; 2004—30; and 2005—28. Serbia's steel production figures are for 2003-05, in thousand metric tons, as follows: 2003—569; 2004—1,167; and 2005—1,286.

¹⁰Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.