



2009 Minerals Yearbook

IRON AND STEEL [ADVANCE RELEASE]

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The global economic recession, which caused the global and U.S. steel industries to contract during 2008, continued into 2009. The longest recession (18 months) ever to occur in the United States was declared over in June 2009 by the National Bureau of Economic Research (Aversa, 2010), but consumer demand remained weak through yearend. The contraction of the U.S. steel industry continued into 2009 with lower operating levels and additional layoffs. Capacity utilization for raw steel production dipped to a low of 41% in April and rose to 62% by the end of the third quarter of 2009. Idling blast furnaces, declining steel prices, decreasing steel-product demand, and decreasing steel service center inventories caused employee layoffs at several steel plants and downstream industries.

The U.S. steel industry suffered from the weakened demand for steel materials by the automotive industry, related to the economic recession. Greater long-term concern was based on the threat of higher Government fuel standards, which would promote substitution of aluminum, carbon fiber, magnesium, plastics, and titanium for steel. Under new proposed standards, U.S. passenger vehicles and light trucks would be required to raise fuel efficiency by 5% yearly to an average of 35.5 miles per gallon by 2016 (Crangle, 2009).

According to the World Steel Association (WSA) (2010a), China was the top steel producer in the world during 2009 [568 million metric tons (Mt)], with its leading steelmaker, Baosteel (31.3 Mt), placing second behind the world's leading steelmaker ArcelorMittal (77.5 Mt). India became the world's third-leading steel producer (56.6 Mt), followed by the United States (59.4 Mt), and Russia (59.2 Mt). China ranked first in the world for total exports and net exports of steel, followed by Japan. The United States ranked first in the world for net imports of steel and fourth for total imports of steel.

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 was reported by the WSA 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 continued to be a significant world political issue. According to the AISI (2009a), this global problem can only be addressed effectively by lowering carbon dioxide (CO₂) emissions globally. In mid-2009, the WSA announced its Climate Action recognition program, which recognized steel producers who fulfilled their commitment to participate in the organization's voluntary CO₂ emissions data collection program.

Two-thirds of the membership took part in the first round of data collection, which was a globally consistent calculation methodology that would allow production-normalized emission comparisons between plants and regions (World Steel Association, 2007, 2009).

The U.S. steel industry has reduced its energy consumption per ton of steel shipped by almost one-third since 1990 (American Iron and Steel Institute, 2009c). During the same period, CO₂ emissions were reduced by 17%. The U.S. steel industry has the lowest average CO₂ emissions per ton of steel produced in the global steel industry (American Iron and Steel Institute, 2009a). In 2008, on average, 1.19 tons of CO₂ was emitted for every ton of steel produced. The industry's commitment to improving energy efficiency and CO₂ reduction has brought steelmaking processes to an advanced level. Thus, the industry continued its CO₂ Breakthrough Program, a partnership with leading universities designed to develop new ways of making steel while emitting little or no CO₂. Research would emphasize carbon sequestration technology and alternative energy approaches (Schorsch, 2008).

The U.S. steel industry has suggested putting carbon fees on imports of steel to the United States from any country, including China, that does not regulate greenhouse gas emissions to the same degree as is done in the United States (Gardner, 2009). According to the Alliance for American Manufacturing, the Chinese steelmaking industry emits two to three times as much CO₂ as the U.S. industry does. The Chinese expressed opposition to carbon tariff policies, which it said, would provoke a trade war and would violate World Trade Organization rules (Yap, 2009).

Production

Raw steel production in the United States was about 59.4 Mt in 2009, down about 35% from that in 2008 (table 1). The AISI estimated raw steel production capability to be 116 Mt, up slightly from that in 2008. Production represented 51.2% of estimated capacity, down from 81.4% in 2008.

Integrated steel producers smelted iron ores to make liquid iron in blast furnaces and used basic oxygen furnaces to refine the liquid iron with some steel scrap to produce raw liquid steel. The basic oxygen process was used to make 22.7 Mt of steel in the United States (American Iron and Steel Institute, 2010, p. 72). The use of this process decreased to 38.2% of total steel production in 2009 from 42.6% in 2008. Blast furnace operations in the United States were operated by 5 companies at 15 locations in 2009 (Iron and Steel Technology, 2010a, p. 230).

Minimills and specialty mills are nonintegrated steel producers that use the electric arc furnace (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. About 93 companies operated about 112 EAF facilities in the United States during 2009 (Iron and Steel Technology, 2010b, p. 122). These U.S. mills used the EAF steelmaking process to produce 36.7 Mt of steel, a 30% decrease from that in 2008, and accounted for 61.8% of total steelmaking (American Iron and Steel Institute, 2010, p. 73).

Raw liquid steel is mostly cast into semifinished products in continuous casting machines. Only 2.5% of U.S. production was cast in ingot form in 2009, and subsequently rolled into semifinished forms, a slightly lower percentage than that of 2008. Continuous casting production was 57.9 Mt, or 97.5% of total steel production, slightly higher than in 2008 (American Iron and Steel Institute, 2010, p. 73).

During 2008 in the United States, 564 iron casting plants and 239 steel casting plants were operating (Modern Casting, 2009). U.S. casting production in 2008 for gray iron, ductile iron, malleable iron, and steel were 3.5 Mt, 3.6 Mt, 0.1 Mt, and 1.2 Mt, respectively. Casting production for gray iron, ductile iron, malleable iron, and steel decreased during 2008 compared with that of 2007 by 10%, 8%, 10%, and 6%, respectively.

Essar Steel Minnesota, LLC (a subsidiary of Essar Steel Ltd.) continued development of a low-grade iron ore open pit mine, concentrator, and pellet plant operation to supply a new direct reduced iron (DRI) plant. The new steel manufacturing facility was to include EAFs, thick slab casters, thin soft-reduction slab casters, and vacuum degassing/ladle treatment furnaces. This operation, located on the western end of the Mesabi Iron Range in northeastern Minnesota and adjacent to the community of Nashwauk, will be the first integrated mine through steelmaking facility in North America. Having all processes on one site was to minimize product movement and maximize energy savings.

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 63 Mt in 2009 from 102 Mt in 2008. Net shipments of steel mill products by U.S. companies decreased by 37% to 56.4 Mt compared with those of 2008 (American Iron and Steel Institute, 2010, p. 25). Compared with those in 2008, shipments of construction and contractors' products, the leading single end-use market of steel, decreased by 27% in 2009; automotive product shipments decreased by 37%; shipments of agricultural and industrial machinery, equipment, and tools decreased by 57%; steel service center shipments decreased by 40%; lumbering, mining, oil and gas, and quarrying industries shipments decreased by 62%; and shipments of appliances and containers, packaging, and shipping material decreased by 26% (American Iron and Steel Institute, 2010, p. 29).

Prices

The U.S. Department of Labor, Bureau of Labor Statistics (2010), producer price index for steel mill products decreased by 25% to 165.2 in 2009 from 220.6 in 2008 (1982 base=100) (table 1). The price of hot-rolled steel sheet decreased steadily from \$509 per ton in January to a low of \$380 per short ton in June, before increasing steadily to a high of \$535 in September and October, and then decreasing to \$500 per short ton in December (Purchasing Magazine, 2010).

Foreign Trade

Export shipments of steel mill products by AISI reporting companies decreased to 8.4 Mt from 12.2 Mt in 2008 (table 1). Canada received the largest amount of U.S. exported steel, 4.3 Mt, 32% less than in 2008 (table 4). Mexico was again the second leading importer, receiving 1.8 Mt, 31% less than in 2008. Imports of steel mill products decreased by 49% to 14.7 Mt from 29.0 Mt in 2008. Canada, China, the European Union (EU), Japan, the Republic of Korea, and Mexico, were major sources of steel mill product imports in 2009 (table 5).

Imports of semifinished steel (table 6) by steel companies are 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 are subtracted from domestic consumption. Between 1993 and 2006, semifinished steel imports ranged between 2.5 million metric tons per year (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 25% in 2009 compared with 28% in 2008.

On December 30, 2009, the U.S. International Trade commission ruled unanimously in favor of U.S. steelmakers who were injured by high levels of unfairly traded oil country tubular goods into the U.S. market between 2006 and the middle of 2009 (American Iron and Steel Institute, 2009b). U.S. steelmakers had been advocates of complete and strict enforcement of laws against dumping and subsidized steel imports from China in order to maintain a viable U.S. manufacturing sector. China is said to have illegally spent more than \$15 billion on energy subsidies for its steel industry in 2007 (New York Times, The, 2009).

At the beginning of 2009, a Buy America provision was added to the proposed \$900 billion American Recovery and Reinvestment Act, which would require use of domestically produced steel in any government-funded infrastructure projects (Napsha, 2009). Supporters of this provision argued that in a time of severe economic recession, when the U.S. steel industry has cut output and laid off thousands of workers since mid-2007, the Government must curb imports from China, whose shipments of finished steel to the United States doubled in the second half of 2008. An estimated 77,000 new jobs would be created by the Buy American provision. Opponents of the provision claimed that only 1,000 new steel industry jobs

would be created while as many as 65,000 jobs might be lost throughout the economy (Palmer, 2009). Debate also focused on the possibility that the Buy American provision would induce other countries to retaliate with trade restrictions that would adversely affect U.S. export activity (Smith, 2009).

Regarding the reporting of imports and exports (tables 4, 5, 6), “fabricated steel products” are those products 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 DRI.

World Review

World production of pig iron totaled about 935 Mt, slightly more than that in 2008 (table 9). The pig iron production of the EU was about 77 Mt, 29% less than that in 2008. Germany was the leading producer in the EU, producing about 20 Mt, 31% less than that in 2008. China continued to be the leading producer of pig iron in the world, producing almost 544 Mt, 16% more than that of 2008. Japan, Russia, Brazil, the Republic of Korea, India, and the Ukraine, followed with 86 Mt, 44 Mt, 35 Mt, 30 Mt, 30 Mt, and 26 Mt, respectively. 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 2009 decreased by 44% from that in 2008. In South America, the only major pig iron producer was Brazil.

World capacity for DRI production in 2009 was estimated to be about 82 Mt/yr (Midrex Technologies, Inc., 2010). DRI production worldwide was about 64 Mt in 2009, 3% less than that in 2008 (table 9). The leading producer of DRI was India, followed by, in descending order of tonnage, Iran, Venezuela, and Mexico. In 2009, additional DRI capacity of almost 20 Mt/yr was under construction in China, Egypt, India, Iran, Oman, Pakistan, the 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 1.24 billion metric tons (Gt), 6% less than the revised production in 2008 (table 10). Steel production declined during 2009 in North America (33%), the EU (27%), the CIS (16%), and South America (2%). However, positive growth occurred in China (13%) and India (3%). China produced 46% of world total crude steel in 2009. As in previous years, production varied widely among major regions of the world. Asian countries produced about 65% of the world’s steel; the EU, 12%; the CIS, 8%; and North America, 7%.

During 2009, China was again the world’s leading steel producer, almost 568 Mt, a gain of 13% compared with that of 2008. In descending order of production, the leading producers behind China were Japan, the United States, Russia, India, and the Republic of Korea. These six countries accounted for 71% of world production. The combined steel production of the seven steel-producing countries in the CIS was about 97 Mt, a decrease of 16% from that in 2008. Russia and Ukraine

remained the leading producers in the CIS. U.S. steel production during 2009 was 59.4 Mt, a decrease of 35% from that in 2008.

MEPS (International) Ltd. determined that the world steel capacity utilization was 74% during the first half of 2009. During 2009, world maximum steelmaking production potential was 1.68 Gt; also in 2009 steel capacity utilization in the Middle East, Asia, Africa, the CIS, South America, the EU, and North America, was 88%, 86%, 69%, 65%, 58%, 53%, and 50%, respectively (Steel-grips Online, 2009).

Outlook

The expansion or contraction of gross domestic product (GDP), the broadest measure of a nation’s economic activity, may be considered a predictor of the health of the steelmaking and steel manufacturing industries, worldwide and domestically. The World Bank’s forecast of global GDP growth for 2009, 2010, and 2011, was 2.2%, 2.7%, and 3.2%, respectively (World Bank, The, 2010). The International Monetary Fund’s forecast of world GDP growth for 2009, 2010, and 2011 was -0.6%, 4.2%, and 4.3%, respectively (International Monetary Fund, 2010). The U.S. Federal Reserve’s forecast for the U.S. 2009 GDP growth rate was between -1.5 and -1.0%, and between 2.1% and 3.3% for 2010 (U.S. Federal Reserve Bank, 2009). The 2009 GDP growth for China was 8.7%, and was projected to be 10% and 9.9% in 2010 and 2011, respectively, and that of India was 5.7%, 8.8%, and 8.4% for those years, respectively (International Monetary Fund, 2010, p. 2).

MEPS forecast total world steel production in 2010 to be 1,395 Mt, up 14% from that in 2009, and 1,625 Mt for 2014 [MEPS (International) Ltd., 2010]. MEPS also forecast increasing steel production in 2010 in the EU, South America, Asia, China, the CIS, and Africa of 22%, 13%, 12%, 10%, 8%, and 6%, respectively. For China, MEPS forecast a 31% increase in steel production by 2014 compared with that in 2009 (Locker Associates, 2010).

The progression of the U.S. financial downturn into a global economic downturn brought about a global decline of steel demand in late 2008 and throughout 2009. Improvement through 2010 will depend on the effects of government stimulation packages, stabilization of financial systems, and a return of consumer confidence.

World apparent steel consumption (ASC) was expected to increase by 11% to 1,241 Mt during 2010, after decreasing by 6.7% in 2009, and then increase by 5.3% in 2011, to reach a historic high of 1.3 Gt (World Steel Association, 2010). China’s ASC was expected to increase by 6.7% to 579 Mt in 2010, and then by 2.8% in 2011. China was expected to account for 46% of world steel consumption. ASC in India was expected to increase by 14% in 2010 and 2011, respectively. The U.S. ASC was expected to increase by 27% in 2010, and by 7.5% in 2011. The EU’s ASC was expected to increase by 14% in 2010 and increase by 7.9% in 2011. In Japan and the CIS, the 2010 ASC was expected to increase by 10% and 11%, respectively. Japan’s ASC was expected to decrease slightly in 2011 while that of the CIS was expected to increase by 8%. Turkey’s ASC was expected to increase by 13% in 2010 and 2011.

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TABLE 1
 SALIENT IRON AND STEEL STATISTICS¹

(Thousand metric tons)

	2005	2006	2007	2008	2009
United States:					
Pig iron:					
Production ²	37,200	37,900	36,300	33,700	19,000
Exports ³	51	813	71	51	11
Imports for consumption ³	6,030	6,730	5,220	4,980	2,420
Direct-reduced iron:					
Production ⁴	220	240	250	260	--
Exports ³	--	(5)	(5)	(5)	(5)
Imports for consumption ³	2,170	2,610	2,330	2,340 ^r	1,020
Raw steel production: ⁶					
Carbon steel	85,900	89,500	89,800	84,100	55,100
Stainless steel	2,240	2,460	2,170	1,930	1,620
All other alloy steel	6,710	6,190	6,140	5,810	2,620
Total	94,900	98,200	98,100	91,800	59,400
Capability utilization, percent	87.5	87.5	87.0	81.4	51.2
Steel mill products:					
Net shipments ²	95,200	99,300	96,500	89,400	56,400
Exports ²	8,520	8,830	10,100	12,200	8,420
Imports ²	29,100	41,100	30,200	29,000	14,700
Producer price index (1982=100.0) ⁷	159.7	174.1	182.9	220.6	165.2
World production: ⁸					
Pig iron	802,000	881,000	955,000 ^r	931,000 ^r	935,000
Direct-reduced iron ⁴	56,300	58,800 ^r	64,700 ^r	66,500 ^r	64,500
Raw steel	1,140,000	1,250,000	1,350,000	1,330,000	1,240,000

^rRevised. -- 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 World Steel Association.

TABLE 2
MATERIALS CONSUMED IN BLAST FURNACES AND PIG IRON PRODUCED¹

(Thousand metric tons)

Material	2008	2009
Iron oxides: ²		
Ores	--	--
Pellets	43,800	26,200
Sinter ³	6,380	3,720
Total	50,100	29,900
Scrap ⁴	2,630 ^r	1,460
Coke ²	14,200	7,650
Pig iron, produced	33,700	19,000

^rRevised. -- 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)			
	2008	2009	2008	2009
Shipments by steel type:				
Carbon steel	83,400	53,000	93.29	93.97
Alloy steel	4,560	2,140	5.10	3.79
Stainless steel	1,380	1,200	1.54	2.13
Total	89,400	56,400	100.00	100.00
Steel mill products:				
Ingots, blooms, billets and slabs	1,120	801	1.25	1.42
Wire rods	2,100	1,490	2.35	2.64
Structural shapes, heavy	6,040	3,380	6.76	5.99
Steel piling	462	382	0.52	0.68
Plates, cut lengths	6,730	4,100	7.53	7.27
Plates, in coils	3,170	2,110	3.55	3.74
Rails	854	712	0.96	1.26
Railroad accessories	247	190	0.28	0.34
Bars, hot-rolled	6,710	3,100	7.51	5.50
Bars, light-shaped	1,600	1,090	1.79	1.93
Bars, reinforcing	7,010	4,610	7.84	8.17
Bars, cold finished	1,490	827	1.67	1.47
Tool steel	16	7	0.02	0.01
Pipe and tubing, standard pipe	919	535	1.03	0.95
Pipe and tubing, oil country goods	2,170	945	2.43	1.68
Pipe and tubing, line pipe	432	169	0.48	0.30
Pipe and tubing, mechanical tubing	821	387	0.92	0.69
Pipe and tubing, pressure tubing	47	22	0.05	0.04
Pipe and tubing, stainless	13	9	0.01	0.02
Pipe and tubing, structural	112	62	0.13	0.11
Pipe for piling	14	0	0.02	0.00
Wire	564	288	0.63	0.51
Tin mill products, blackplate	202	62	0.23	0.11
Tin mill products, tinplate	1,610	1,580	1.80	2.80
Tin mill products, tin-free steel	526	453	0.59	0.80
Tin mill products, tin coated sheets	91	66	0.10	0.12
Sheets, hot-rolled	17,800	12,100	19.91	21.45
Sheets, cold-rolled	10,300	6,780	11.52	12.02
Sheets and strip, hot dip galvanized	11,600	7,350	12.98	13.03
Sheets and strip, electrogalvanized	1,500	1,020	1.68	1.81
Sheets and strip, other metallic coated	1,220	654	1.36	1.16
Sheets and strip, electrical	481	326	0.54	0.58
Strip, hot rolled	39	28	0.04	0.05
Strip, cold rolled	1,340	693	1.50	1.23
Total	89,400	56,400	100.00	100.00
Shipments by markets:				
Service centers and distributors	23,100	13,800	25.84	24.47
Construction	18,500	13,500	20.69	23.94
Automotive	11,700	7,300	13.09	12.94
Machinery	1,040	642	1.16	1.14
Containers	2,560	2,040	2.86	3.62
All others	32,500	19,200	36.35	34.04
Total	89,400	56,400	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	2008		2009	
	Imports	Exports	Imports	Exports
Argentina	129	12	75	74
Australia	636	33	258	15
Brazil	1,200	318	654	135
Canada	6,430	6,290	3,880	4,270
China	4,380	263	1,330	194
European Union ²	2,620	653	1,760	278
Germany	1,080	85	450	43
Japan	1,600	32	1,110	13
Korea, Republic of	2,090	92	1,200	55
Mexico	2,900	2,670	1,590	1,840
Russia	1,020	--	492	--
South Africa	81	16	30	9
Sweden	255	10	150	61
Taiwan	600	56	336	92
Turkey	750	--	446	--
Ukraine	1,260	--	46	--
Venezuela	38	118	69	66
Other	1,900	1,570	839	1,280
Total	29,000	12,200	14,700	8,420

-- 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)

	2008	2009
Steel mill products:		
Ingots, blooms, billets, slabs	517	589
Wire rods	139	144
Structural shapes, heavy	1,140	515
Steel piling	44	30
Plates, cut lengths	1,350	813
Plates, in coils	1,020	703
Rails, standard	86	88
Rails, other	31	29
Railroad accessories	60	14
Bars, hot-rolled	722	390
Bars, light-shaped	136	92
Bars, concrete reinforcing	629	390
Bars, cold-finished	190	109
Tool steel	18	13
Pipe and tubing, standard pipe	193	74
Pipe and tubing, oil country goods	419	273
Pipe and tubing, line pipe	382	198
Pipe and tubing, mechanical tubing	49	37
Pipe and tubing, stainless	44	29
Pipe and tubing, nonclassified	438	309
Pipe and tubing, structural	197	181
Pipe for piling	66	25
Wire	199	143
Tin mill products, blackplate	5	3
Tin mill products, tinplate	241	220
Tin mill products, tin-free steel	24	13
Sheets, hot-rolled	958	717
Sheets, cold-rolled	788	582
Sheets and strip, hot-dip galvanized	896	726
Sheets and strip, electrogalvanized	279	290
Sheets and strip, other metallic coated	296	174
Sheets and strip, electrical	278	205
Strip, hot-rolled	205	157
Strip, cold-rolled	190	144
Total	12,200	8,420
Fabricated steel products:		
Structural shapes, fabricated	529	319
Rails, used	51	34
Railroad products	100	41
Wire rope	21	18
Wire, stranded products	43	31
Wire, other products	88	85
Springs	129	100
Nails and staples	37	27
Fasteners	625	678
Chains and parts	34	28
Grinding balls	92	83

See footnotes at end of table.

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

(Thousand metric tons)

	2008	2009
Cast iron and steel products:		
Pipe and tube fittings	42	27
Other ²	112	84
Total	1,900	1,560
Grand total	14,100	9,970
Cast steel pipe fittings	46	27
Cast iron pipe and fittings	120	101
Cast steel rolls	4	2
Cast grinding balls	18	27
Granules, shot and grit	34	26
Other castings	82	55
Total	304	238

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)

	2008	2009
Steel mill products:		
Ingots, blooms, billets, and slabs	5,420	1,850
Wire rods	1,120	692
Structural shapes-heavy	655	337
Steel piling	95	49
Plates, cut lengths	1,120	481
Plates, in coils	1,100	645
Rails and railroad accessories	305	259
Bars, hot-rolled	1,350	612
Bars, light-shaped	151	78
Bars, reinforcing	881	380
Bars, cold-finished	283	169
Tool steel	148	52
Pipe and tubing, standard pipe	1,070	538
Pipe and tubing, oil country goods	3,610	1,450
Pipe and tubing, line pipe	2,920	1,450
Pipe and tubing, mechanical tubing	551	302
Pipe and tubing, pressure tubing	128	57
Pipe and tubing, stainless	127	81
Pipe and tubing, nonclassified	15	13
Pipe and tubing, structural	442	231
Pipe for piling	17	14
Wire	643	441
Tin mill products-blackplate	21	38
Tin mill products-tinplate	291	293
Tin mill products-tin-free steel	96	78
Sheets, hot-rolled	2,510	1,580
Sheets, cold-rolled	1,310	1,030
Sheets and strip, hot-dip galvanized	1,650	937
Sheets and strip, electrogalvanized	170	85
Sheets and strip, other metallic coated	455	270
Sheets and strip, electrical	110	60
Strip, hot-rolled	44	41
Strip, cold-rolled	158	112
Total	29,000	14,700
Fabricated steel products:		
Structural shapes, fabricated	1,440	965
Rails, used	73	57
Railroad products	198 ^r	97
Wire rope	141	113
Wire-stranded products	329	158
Springs	310	214
Nails and staples	589	388
Fasteners	1,330	779
Chains and parts	150	98
Pipe and tube fittings	307	203
Other	366 ^r	456
Total	5,220 ^r	3,530
Grand total	34,200 ^r	18,200

See footnotes at end of table.

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

(Thousand metric tons)

	2008	2009
Cast iron and steel products:		
Cast steel pipe fittings	307	203
Cast iron pipe and fittings	71	35
Other products	399	226
Total	777	464

¹Revised.

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	2008	2009
Semifinished	124,000	70,200
Plate	84,800	46,800
Sheet and strip	72,100	36,000
Bars and shapes	116,000	69,900
Wire and wire rods	62,400	40,700
Pipe and tube	127,000	81,300
Total	586,000	345,000

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)

	2008	2009
Coal, consumption	20,000	13,900
Coke: ³		
Production	14,200	10,100
Exports	1,780	1,190
Imports	3,270	315
Consumption, apparent	15,400	9,360

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(2010/01Q).

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

(Thousand metric tons)

Country ⁵	2005	2006	2007	2008	2009
Algeria	952 ^e	1,093	1,193	690 ^e	458
Argentina:					
Pig iron	2,646	2,481	2,593	1,847 ^r	807
Direct-reduced iron	1,823	1,947	1,810	2,581 ^r	2,042
Australia	6,203	6,276	6,351	6,409 ^r	4,400 ^e
Austria	5,444	5,547	5,808	5,795 ^r	4,562 ^p
Belgium	7,254	7,516	6,576	7,125 ^r	3,087
Bosnia and Herzegovina ^e	60	60	60	243 ⁶	483 ⁶
Brazil:					
Pig iron	33,884	32,452	35,571	35,286 ^r	35,300 ^p
Direct-reduced iron ^e	411	376	362	302	305 ^p
Bulgaria	1,081	1,147	1,069	441	--
Burma: ^e					
Pig iron	2	2	2	2	2
Direct-reduced iron	40	40	40	40	40
Canada:					
Pig iron	8,274	8,305	8,577	9,000 ^e	5,000 ^e
Direct-reduced iron	591	446	910	690 ^e	300 ^e
Chile	1,074	1,115	1,147	1,109 ^r	920 ^e
China ⁷	343,750	412,450	476,520	470,670	543,750
Colombia	325	360 ^r	341 ^r	300 ^r	324
Czech Republic	4,627	5,191	5,289	4,737	3,483
Egypt:					
Pig iron	1,100	1,100	1,000	1,000	600
Direct-reduced iron ^e	2,900	3,100	2,786 ⁶	3,000	2,900
Finland	3,056	3,158	2,914	2,900 ^e	2,800
France	12,705	13,013	12,426	11,372 ^r	8,105
Germany:					
Pig iron	28,854	30,360	31,149	29,111	20,127 ^p
Direct-reduced iron ^e	440	580	590	520 ^r	380 ^p
Hungary	1,329	1,335	1,394	1,289	1,050
India:					
Pig iron	27,125	28,300	28,800	29,000 ^e	29,500
Direct-reduced iron	12,040	14,740	18,100	20,200 ^e	21,000
Indonesia, direct-reduced iron ^e	1,390	1,290 ⁶	1,420 ^r	1,290 ^r	1,300
Iran:					
Pig iron	2,300	2,041	2,118	2,200 ^e	2,500 ^e
Direct-reduced iron ^e	6,850	6,850	7,440	7,460	8,000
Italy	11,423	11,497 ^r	11,110 ^r	10,373 ^r	5,719
Japan	83,058	84,270	86,771	86,171	86,000 ^e
Kazakhstan	3,581	3,400	3,240	2,761	2,700 ^e
Korea, North ^e	900 ⁶	900	900	900	900
Korea, Republic of	27,309	27,559	29,437	31,043	30,000 ^e
Libya, direct-reduced iron	1,669	1,633	1,660	1,569	1,097
Malaysia, direct-reduced iron	1,349	1,277	1,840	1,957 ^r	2,000 ^e
Mexico:					
Pig iron	4,047	3,800	4,077	4,670 ^r	3,929
Direct-reduced iron	5,973	6,167	6,265	5,940 ^r	4,203
Morocco ^e	15	15	15	15	15
Netherlands ⁸	6,031	5,417	6,412 ^r	6,130 ^r	4,655
New Zealand ^e	652	664	679	622 ^r	608
Nigeria	--	150	200	--	-- ^e

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	2005	2006	2007	2008	2009
Norway ^e	100	100	100	100	100
Pakistan ^e	1,500	1,200	1,000	1,000	1,000
Paraguay	124	136	148 ^r	145 ^r	146 ^p
Peru: ^e					
Pig iron	263	306	351 ⁶	395 ⁶	400 ^p
Direct-reduced iron	78	84	90	72	75
Poland	4,477	5,333	5,804	4,934	3,015
Portugal ^e	100	100	100	100	100
Qatar, direct-reduced iron	820	880	1,200	1,700 ^e	2,100
Romania	4,098	3,946	3,923	2,945 ^r	1,611
Russia:					
Pig iron	49,175	51,683	51,523	48,300	43,930
Direct-reduced iron ^e	3,340	3,340	4,000	4,000	4,000
Saudi Arabia, direct-reduced iron	3,630 ^e	3,580	4,340	4,970	5,000 ^e
Serbia	1,115 ⁹	1,529	1,485	1,582	1,006
Slovakia	3,618	4,145	4,012	3,529	3,019
South Africa:					
Pig iron	6,130	6,159	5,358	5,350 ^r	4,376
Direct-reduced iron	1,781	1,754	1,736	1,190	1,386
Spain	4,160	3,432	3,974	3,995	3,995 ^e
Sweden	3,730	3,577	3,815	3,800 ^e	3,700
Taiwan	9,854	10,500	10,550	9,750 ^r	7,939
Trinidad and Tobago, direct-reduced iron	2,055	2,072 ^r	2,065 ^r	1,600 ^r	1,182
Turkey	5,970	5,952	6,234	6,600 ^e	7,000 ^e
Ukraine	30,747	32,926	35,647	30,982	25,676
United Kingdom	10,236	10,736	10,960	10,137 ^r	7,674
United States:					
Pig iron	37,200	37,900	36,300	33,700	19,000
Direct-reduced iron	220	240	250	260	--
Venezuela, direct-reduced iron	8,897	8,400	7,782	7,140	7,150 ^p
Zimbabwe ^e	129	38	--	--	--
Grand total	858,000	939,000	1,020,000	997,000 ^r	1,000,000
Of which:					
Pig iron ¹⁰	802,000	881,000	955,000 ^r	931,000 ^r	935,000
Direct-reduced iron ¹¹	56,300	58,800 ^r	64,700 ^r	66,500 ^r	64,500

^eEstimated. ^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.

⁴Table excludes ferroalloy production except where otherwise noted. Table includes data available through August 25, 2010.

⁵In addition to the countries listed, Vietnam has facilities to produce pig iron and may have produced limited quantities during 2005–09, 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 Government of China 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.

¹⁰Includes unspecified pig iron and direct-reduced iron.

¹¹Listed separately.

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

(Thousand metric tons)

Country ⁴	2005	2006	2007	2008	2009
Albania	180	206	263	380 ^r	440
Algeria	1,007	1,158	1,278	646	458
Argentina	5,386	5,533	5,387	5,441 ^r	4,014
Australia	7,788	7,937	8,047	7,724 ^r	6,135
Austria	7,031	7,129	7,578	7,594 ^r	5,662 ^p
Azerbaijan	286	54	273	300 ^e	200 ^e
Bangladesh ^{e,5}	20	10	-- ⁶	--	--
Belarus	2,076	2,100	2,214	2,660	2,330
Belgium	8,906	11,238	10,692	10,676 ^r	5,636
Bosnia and Herzegovina, ingot production	289 ^r	490 ^r	533 ^r	608 ^r	519
Brazil ⁷	31,631	30,901	33,782	33,716 ^r	33,750 ^p
Bulgaria	1,969	2,124	1,909	1,330	726
Burma ^e	25	25	25	25	25
Canada	15,327	15,493	15,569	15,100	9,000 ^e
Chile ⁷	1,537	1,627	1,679	1,523 ^r	1,302
China ⁸	353,240	419,150	489,290	500,490	567,840
Colombia	842 ^e	1,221	1,245 ^r	1,053 ^r	1,079
Croatia	74	81	76	115 ^{r,c}	52 ^e
Cuba	245	257	262	274	274 ^e
Czech Republic	6,189	6,862	7,059	6,387 ^r	4,594
Ecuador	84	85	87	85 ^e	85 ^e
Egypt	5,603	6,045	6,224	6,198	5,508
El Salvador	48	72	73	72 ^e	72 ^e
Ethiopia, all from scrap ^e	60	60	110	150	150
Finland	4,738	5,052	4,431	4,418 ^r	3,078
France	19,481	19,857	19,252	17,874	12,836
Germany	44,524	47,224	48,550	45,833	32,671 ^p
Ghana, all from scrap ^e	25	25	25	-- ^r	--
Greece	2,266	2,416	2,554	2,400 ^e	2,082
Guatemala	207	292	349	250 ^r	224
Hong Kong ^e	500	550	550	550	550
Hungary	2,005	2,144	2,317	2,160 ^r	1,401
India	45,800	49,500	53,100	55,200	56,600
Indonesia	3,675	3,759	4,160 ^r	3,915 ^r	3,500 ^e
Iran	9,405	9,789	10,051	9,960 ^e	10,000 ^e
Israel ^e	480	480	480	480	430
Italy	29,061	31,550	31,990	30,477	19,737
Japan	112,471	116,266	120,203	118,739	87,500
Jordan ^e	150	150	150	150	150
Kazakhstan	4,477	4,245	4,784	4,244 ^r	4,147
Korea, North ^e	1,070	1,180	1,230	1,279 ⁶	1,300
Korea, Republic of	47,820	48,455	51,517	53,322	53,300 ^e
Latvia ^e	550	550	550	550	550
Libya	1,255	1,151	1,151	1,137	914
Luxembourg	2,194	2,802	2,858 ^r	2,582 ^r	2,215
Macedonia	326	360	372	252 ^r	278 ^e
Malaysia	5,296	5,834	6,895	6,423 ^r	6,600 ^e
Mauritania	1	1	1	2	2 ^e
Mexico	16,202	16,313	17,573	17,209 ^r	14,172

See footnotes at end of table.

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

(Thousand metric tons)

Country ⁴	2005	2006	2007	2008	2009
Moldova	1,016	675	995	885	425
Montenegro	104 ⁹	163	174	202 ^r	50 ^e
Morocco	205	314	314	478 ^r	480
Netherlands	6,919	6,372	7,368 ^r	6,853 ^r	5,194
New Zealand	889	862	845	853	800 ^e
Norway ^e	701	679	680	590 ^r	591 ⁶
Pakistan	825	1,040	1,090	1,100	1,100 ^e
Paraguay	101	118 ^r	132 ^r	130 ^r	130 ^{p, e}
Peru	790	896	881	1,150 ^e	1,200 ^e
Philippines	470	558	718	711 ^r	700 ^e
Poland	8,336	9,992	10,621	9,727	7,208
Portugal	1,400 ⁶	1,400	1,400	1,400	1,400
Qatar	1,057	1,003	1,147	1,406	1,028
Romania	5,632	6,266	6,261	5,035	2,699
Russia	66,186	70,816	72,389	68,700	59,166
Saudi Arabia	4,185	3,974	4,644	4,670 ^e	4,700 ^e
Serbia	1,286 ⁹	1,837	1,478	1,662	1,097
Singapore ^e	572	607	620	600	620
Slovakia	4,547 ^r	5,094 ^r	5,100 ^r	4,489 ^r	3,747
Slovenia	583	627	638	642 ^r	436
South Africa	9,494	9,718	9,098	8,269 ^r	7,484
Spain	17,826	18,391	18,999	19,048	19,100 ^{p, e}
Sri Lanka ^e	30	30	30	30	30
Sweden	5,692	5,435	5,673	5,500 ^e	5,000 ^e
Switzerland	1,158	1,252	1,264	1,260	981
Syria ^e	70	70	70	70 ^{r, 6}	70
Taiwan	18,567	19,203	20,883	19,222	15,566
Thailand	5,161	5,210	5,470	5,470 ^e	5,470 ^e
Trinidad and Tobago	711	674	682	675 ^e	675 ^e
Tunisia	66	68	61	82 ^r	155
Turkey	20,960	23,308	25,750	26,400 ^e	25,000 ^e
Uganda	30	30	30	30	25
Ukraine	38,636	40,899	42,830	37,107	29,757
United Arab Emirates ^e	70	70	90	90	90
United Kingdom	13,210	13,931	14,300	13,538	10,080 ^p
United States	94,900	98,200	98,100	91,900	59,400
Uruguay	64	57	71	70 ^r	70 ^{p, e}
Uzbekistan ^e	607	730 ^e	740 ^e	686 ^r	716
Venezuela	4,907	4,864	5,005	4,240	5,000 ^{p, e}
Vietnam	890	1,869 ^r	2,024	2,250 ^r	2,250 ^e
Zimbabwe	107	24	23	10 ^e	10 ^e
Total	1,140,000	1,250,000	1,350,000	1,330,000	1,240,000

^eEstimated. ^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.

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

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 September 8, 2010.

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 the Government of China considers as official statistical data.

⁹Montenegro and Serbia formally declared independence from each other in June 2006 and dissolved their union. Production is reported individually now.