

IRON AND STEEL

By Michael Fenton

Iron and steel are the basic metals of an industrial society and are vital to the United States for its national security and economic well-being. Although acceptable substitutes are available for many uses, they are not practical on a large scale at this time because of the cost and lack of availability of alternative materials.

Data regarding U.S. production of iron and steel and shipments of steel mill products were reported by the American Institute of Iron and Steel (AISI). 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 Institute of Iron and Steel (IISI) and by foreign government agencies. Consistent with international usage and Federal Government policy, the U.S. Geological Survey is reporting all data on iron and steel in metric units, unless otherwise noted.

Environment

The term “brownfield” generally applies to abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental pollution. Many brownfield sites are found throughout the United States; some are abandoned steel plants, which continue to deteriorate in urban centers. These industrial properties, sometimes thousands of acres in size, are not easily sold for redevelopment because of continuing seller liability after environmental cleanup. The steel industry continues to seek liability relief for sellers of brownfield sites. When a site is cleaned up, the owner or responsible party must obtain relief from all forms of environmental liability before the property can be sold for redevelopment. The U.S. Senate Steel Caucus addressed this issue, which was the subject of a number of bills introduced in the 104th Congress.

Production

Production of raw steel in the United States increased only slightly to 95.5 million metric tons from 95.2 million tons in 1995. AISI estimated raw steel production capability to be 105.3 million tons, up from 102 million tons in 1995. Production represented 90.7% of estimated capability, compared with 93.3% from that of 1995.

Integrated steel producers smelt iron ores to liquid iron in blast furnaces and use basic oxygen furnaces to refine this iron with some scrap to produce raw liquid steel. The basic oxygen process was used to make 54.8 million tons of steel. The use of this process declined somewhat from 59.6% of total steel

production in 1995 to 57.4%. The integrated steel industry in the United States consisted of 15 companies operating ironmaking and steelmaking facilities at 22 locations. Several of these companies also operated nonintegrated plants and/or other steelmaking facilities at the same locations.

Minimills and specialty mills are nonintegrated steel producers. Minimills use modern technology to produce a limited product line with maximum efficiency. These plants always incorporate electric arc furnaces (EAF) to melt low-cost raw materials (usually scrap), continuous casting machines, and a hot rolling mill that is often closely coupled to the casting operation. Specialty mills include producers of stainless, alloy-electrical, and tool steel; high-temperature alloys; forged ingots; and other low-volume steel products. The EAF steelmaking process was used to produce 40.7 million tons of steel, an increase of 6.0% over that of 1995, and accounted for 42.6% of total steelmaking. Overall, the nonintegrated sector of the industry consisted of more than 65 companies having more than 90 steelmaking plants.

Raw liquid steel is mostly cast into semifinished products in continuous casting machines. Only 6.7% of U.S. production was cast in ingot form and subsequently rolled into semifinished forms; this represents a decrease from 8.8% in 1995. Continuous casting production was 89.0 million tons, or 93.3% of total steel production, compared with 86.7 million tons and 91.1% in 1995.

Consumption

“Steel mill products” are produced at a steel mill, either by forging or rolling, in forms normally delivered for fabrication or use. Some companies purchase semifinished steel mill products from other steel companies and use them to produce steel mill products. To avoid double counting steel mill product shipments under these circumstances, steel mills identify any shipments of steel mill products to other companies that are reporters of steel mill product shipments. The accumulated shipments of all companies less the shipments to other reporting companies are identified as “net” shipments.

The 5-year trend of steadily increasing net shipments of steel products to satisfy domestic demand continued; in fact, the amount of products shipped was the highest in 22 years. Shipments of steel mill products by U.S. companies increased 3.5%, to 91.5 million tons. Export shipments by AISI reporting companies reversed an upward trend that had started the previous year by falling dramatically from 4.03 million tons (revised) in 1995 to 2.11 million tons. Shipments to domestic customers rose 6% during 1996. The oil and gas, mining,

quarrying, and lumbering industries and makers of construction products continued rising trends of 22% and 4%, respectively. Steel service centers and distributors and manufacturers of appliances and of industrial and agricultural machinery, equipment, and tools increased 14%, 8%, and 3%, respectively. Manufacturers of automobiles, the largest single end-use market, and of containers, packaging, and shipping materials remained essentially unchanged.

High demand for steel put a strain on production facilities and may have been responsible, in part, for blast furnace outages at several major integrated producers, including U.S. Steel Group, National Steel Corp., Weirton Steel Corp., and Rouge Steel Co. The repair costs, in addition to lower average selling prices, contributed to reduced operating income and per-ton operating profits. Operating income declined because steel prices were depressed by cheap imports. Nevertheless, the industry as a whole remained profitable but below 1995 levels.

Prices

The Bureau of Labor Statistics Producer Price Index for steel mill products was down by 3.7%, from 120.1 in 1995 to 115.7 (1982 base = 100). The index declined during the first quarter, rose during the second and third quarters to the January level, and remained essentially constant for the remainder of the year.

Foreign Trade

Exports of steel mill products declined dramatically to 4.6 million tons from 6.4 million tons, the highest level since 1940, in 1995. Canada again received the largest amount of U.S. exported steel, 2.2 million tons, essentially the same as that of 1995. Mexico was again in second place, receiving an increase of over 0.2 million tons, to nearly 1.0 million tons.

Imports of steel mill products increased by 19% to 26.5 million tons from 22.1 million tons in 1995. Brazil, Canada, the European Union (EU), Japan, the Republic of Korea, Mexico, and Russia were major sources for steel mill product imports. After the dramatic increase in 1994 of imported steel mill products from Russia and Ukraine, when more than 2 million tons was imported, imports from these countries declined about 6% in 1995. In 1996, combined imports increased 7.5% above the record level of 1994.

The striking increase in imports of steel mill products over that of the previous year appeared to be influenced by domestic and foreign conditions. Foreign steel markets were not absorbing available steel. The U.S. market became more attractive to foreign producers as prices rose moderately, partly as a result of plant furnace shutdowns and resulting shortages of semifinished steel. Surging imports prompted complaints by some domestic steelmakers of unfair trade practices. During November, Geneva Steel Co. and Gulf States Steel Inc. filed antidumping petitions with the U.S. Department of Commerce and the International Trade Commission (ITC) against imports of cut-to-length carbon plate from China, Russia, Ukraine, and South Africa (Steel Industry Update, 1997). Geneva Steel also

filed a lawsuit against importers Thyssen Steel Group and Ranger Steel Supply Corp. for selling underpriced plate imports from these countries. Citing forced layoffs, declining orders, and the inability to raise capital, the two companies were supported by Bethlehem Steel Corp. and six steel service centers. Domestic producers had been complaining that prices of imported plate were as much as \$100 less than those of U.S. plate. Although these petitions were specifically concerned with carbon plate, 21 of the 36 product categories tracked by the AISI showed increases in imports. Stainless steel producers blamed imports for their pricing and profit problems and threatened trade law suits. Imports of stainless steel wire products were increasing at an alarming rate, and the U.S. Stainless Wire Action Committee was formed to study the problem. In December, the ITC ruled that plate imports had caused material injury to domestic producers (Sacco, 1997).

The rising trend of imported semifinished steel for rolling, believed to have been imported by U.S. steel companies to supplement steelmaking capacity, ended temporarily in 1995 after 3 years as imports of mostly ingots, blooms, billets, and slabs declined 34% from the 1994 high of about 7.2 million tons to 4.7 million tons. During 1996, imports resumed their upward trend, increasing to 6.8 million tons, 45% over that of 1995.

The increase in imports of semifinished steel by steel companies must be taken into consideration in evaluating total consumption of steel mill products in the United States and the share of the market represented by imported steel. To avoid counting the imported semifinished steel and the products produced from it, the amount of semifinished steel consumed by companies that also produce raw steel must be subtracted from domestic consumption. For 1996, this amount was estimated to have been 5 million tons. For 1993, 1994, and 1995, the amount of such imports was estimated to be 2.5 million, 5 million, and 2.5 million tons, respectively, and prior to 1993, the annual amount was less than 0.5 million tons. Taking the imported semifinished steel into consideration, the share of the U.S. steel market represented by imported steel was an estimated 24%, compared with 22% in 1994.

Regarding the reporting of imports and exports, "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 fabricated 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

World production of pig iron totaled about 528 million tons, slightly less than that of 1995. In Asia, China continued to be the leading producer of pig iron in the world, producing more than 105 million tons, essentially unchanged from the 1995 total. Japan and the United States followed with 75 million and 49 million tons, respectively. The Republic of Korea's production continued to increase by 3.0%. Russia and Ukraine

were the only major pig iron producers in the former Soviet Union (FSU). Production in Russia decreased to that of 1994 after an increase of 10%, to nearly 40 million tons, reversing a 3-year decline, in 1995. Production in Ukraine decreased by 9%, to 18 million tons, during that same period. In North America, the only major producer of pig iron was the United States, where production was about equal to that of 1995. In South America, the only major pig iron producer was Brazil, producing about 25 million tons per year from 1994 through 1996. Germany was the top producer in the EU with 30 million tons. Italy increased production by nearly 3%.

DRI production was almost 32 million tons, an increase of nearly 4% since 1995 and 55% since 1992. The leading technology was the Midrex process, followed by the HYL III and the HYL I processes. Demand for charge materials and the growth of thin slab casting caused increased interest in DRI by steel producers. Direct reduction of iron ore proved to be a cost-effective way for developing countries, especially those with an abundance of natural gas, to encourage economic growth. The leading producer continued to be Venezuela, followed by India, Mexico, and Iran. World capacity for DRI production was estimated to be nearly 38 million tons per year. Additional capacity of 13 million tons was under construction in Australia, China, Egypt, India, the Republic of Korea, Mexico, Peru, Russia, South Africa, Saudi Arabia, the United States, and Venezuela. After the addition of several DRI plants, India's capacity reached more than 5 million tons per year. Five plants remained under construction, having a combined capacity of more than 0.5 million tons per year.

World production of crude steel was more than 758 million tons, only a small increase from the 754 million tons produced during 1995. As in previous years, production varied widely among major regions of the world. Asian countries produced 38% of the world's steel; the EU, 20%; and North America, 16%. During 1996, China became the world's leading steel producer, reaching 100 million tons, a gain of 4.8% over that of 1995. The leading producers behind China, in declining order, were Japan, the United States, Russia, and Germany. These five countries accounted for about one-half of world production. The combined steel production of the 10 steel-producing states in the FSU was less than 80 million tons; Russia and Ukraine remained the top producers. Production in Russia declined by 4% after reversing a declining 3-year trend with a 5% increase in 1995. Ukrainian production was stable at its 1995 level. In the former Soviet satellite states of Eastern Europe, steel production declined to nearly 31 million tons, a decrease of nearly 10%, compared to that with 1995.

Outlook

The global economy as a whole has been growing and is expected to continue to do so, attributed, in part, to reduced interest and inflation rates and the increasing sizes of the economies of developing countries. The steel sector will participate in world economic growth on the basis of new and replacement infrastructure needs; increasing usage of steel in the

automotive, construction, and beverage container industries; and increasing demand for durable goods. Growth of Asian steel demand and local steel industries to meet this demand, especially in China, will be greater than in the relatively mature industrial countries of North America and Europe. Growth of demand in North America may be modest at best, while demand in Europe should return to modest growth after a recent period of decline caused by public spending reductions and tax increases.

Factors providing the greatest impetus for growth in the world steel industry are industrial privatization, focus on free-market development, and the trend to EAF steelmaking. Privatization of the steel industries of Mexico, Brazil, and Italy are notable examples of changes in state control, but the most significant changes are underway in China, Eastern Europe, and the FSU. The demand for steel in China, which had been partially fueling the free-market economic boom during the early 1990's, is expected to continue at record growth rates, at least in the short term. Free trade and new investment will be encouraged, at least in North America, by such agreements as the General Agreement on Tariffs and Trade and the North American Free Trade Agreement. If global steel supply exceeds demand, then protectionist trade measures, especially in Europe, may be taken.

The deterioration of the U.S. highways and bridges was brought to the attention of the 104th Congress by AISI and the Steel Manufacturers Association. According to Federal Government statistics, 234,500 miles of U.S. road were listed as poor or mediocre, and one-third of all bridges were rated as being structurally deficient or functionally obsolete. Infrastructure rebuilding will require more than \$900 billion during the next 20 years. According to an American Automobile Association study (Christianson, 1996), \$72 billion is needed to improve the road system during the next 5 years, and \$53 billion is needed to maintain current conditions. In response, Congress allocated more than \$20 billion for construction of roads, bridges, and tunnels, a 1.6% increase over that of 1996.

As the prices of lumber continue to rise and the quality of the lumber falls, steel producers will be actively seeking a larger share in the residential construction market. Galvanized steel is more fireproof and impervious to pests, more durable, stronger, more precisely machined, and easier to assemble than wood. The goal of steel producers is to increase their share of the Nation's homes framed with steel from 1% to 25% by 2000.

The automobile industry will continue to be a significant user of steels and cast iron. Because the U.S. Government, among others, has recognized the need to decrease vehicle weight as a way of decreasing air pollution, manufacturers probably will be forced to replace iron and steel with lightweight materials, such as aluminum and plastic. During the past 6 years, however, the unit content of steel in domestically produced family vehicles has increased, and the demand for light trucks with a greater steel content has been increasing. To protect and increase its share in the automotive market, 32 steel companies from 15 countries are designing steel car bodies in the UltraLight Steel

Auto Body project. The steel industry also is working with vehicle manufacturers to find cost-effective ways to ensure maximum use of iron and steel.

U.S. minimills began as small, simple, inexpensive, lightly manned producers of carbon steel, mostly long products, that used local sources of scrap for feedstock for local distribution.

In contrast, integrated steel plants were large, complex, capital and labor intensive, multiproduct enterprises that used raw materials from diverse and distant sources to make a wide range of products for domestic and foreign markets. The distinction between these two types of steelmakers will become increasingly blurred as the integrated companies reduce costs of labor, capital, and operations and the minimills become more capital intensive; increase costs; invest in sources of iron units, such as DRI, as alternatives to scrap; and produce a wider range of high-quality flat and long products. U.S. steelmakers will continue to improve product quality, to reduce costs, and to focus on improving export performance, given an increase in domestic supply and declining domestic demand over the short term. Opportunities are abundant for those in the steel industry that are able to adapt to new world conditions.

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¹Prior to January 1996, published by the U.S. Bureau of Mines.

TABLE 1
SALIENT IRON AND STEEL STATISTICS 1/

(Thousand metric tons)

	1992	1993	1994	1995	1996
United States:					
Pig iron:					
Production 2/	47,400	48,200	49,400	50,900	49,400
Exports 3/	33	27	56	56	60
Imports for consumption 3/	497	828	2,500	2,360	2,660
Direct-reduced iron:					
Production 4/	390	440	480	460	450
Exports 3/	9	17	18	5	3
Imports for consumption 3/	542	1,090	1,170	1,190	1,050
Raw steel production: 5/					
Carbon steel	74,800	78,800	81,200	84,000 r/	84,900
Stainless steel	1,810	1,770	1,840	2,050 r/	1,870
All other alloy steel	7,710	8,220	8,180	9,080	8,710
Total	84,300	88,800	91,200	95,200	95,500
Capability utilization, percent	82.2	89.1	93.0	93.3	90.7
Steel mill products:					
Net shipments 2/	74,600	80,800	86,300	88,400	91,500
Exports 5/	3,890	3,600	3,470	6,420	4,560
Imports 5/	15,500	17,700	27,300	22,100	26,500
Producer price index for steel mill products 6/ (1982=100.0)	106.4	108.2	113.4	120.1	115.7
World production: 7/					
Pig iron	503,000	507,000 r/	516,000 r/	533,000 r/	529,000 e/
Direct-reduced iron 4/	20,500	23,600	27,300 r/	30,800 r/	32,900 e/
Raw steel	724,000	730,000	730,000	755,000 r/	758,000 e/

e/ Estimated. r/ Revised.

1/ Data are rounded to three significant digits, except prices; may not add to totals shown.

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

3/ Data from Bureau of the Census.

4/ Data from Midrex Direct Reduction Corporation.

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

6/ Data from Bureau of Labor Statistics.

7/ Data from U.S. Geological Survey and International Iron and Steel Institute.

TABLE 2
MATERIALS CONSUMED IN BLAST FURNACES AND PIG IRON PRODUCED 1/

(Thousand metric tons)

Material	1995	1996
Iron oxides: 2/		
Ores	1,200	862
Pellets	67,600	64,900
Sinter 3/	12,400	11,600
Total	81,200	77,400
Scrap 4/	1,700	1,700
Coke 2/	22,300	20,700
Pig iron produced	50,900	51,200

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ American Iron and Steel Institute.

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

4/ Mainly 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 MARKET 1/

	Thousand metric tons		Percent	
	1995	1996	1995	1996
Shipments by steel type:				
Carbon steel	82,100	84,400	92.8	92.2
Alloy steel	4,640	5,400	5.3	5.9
Stainless steel	1,720	1,730	1.9	1.9
Total shipments by steel type	88,400	91,500	100.0	100.0
Steel mill products:				
Ingots, blooms, billets and slabs	2,380	2,310	2.69	2.29
Wire rods	4,450	4,620	5.03	5.05
Structural shapes-heavy	5,180	5,170	5.86	5.65
Steel piling	515	399	.58	.44
Plates-cut lengths	4,930	5,010	5.57	5.48
Plates-in coils	3,280	2,860	3.70	3.12
Rails	483	544	.55	.59
Railroad accessories	89	109	.10	.12
Bars-hot-rolled	6,260	6,350	7.08	6.94
Bars-light-shaped	2,120	2,110	2.39	2.30
Bars-reinforcing	4,580	5,230	5.18	5.71
Bars-cold finished	1,620	1,530	1.83	1.67
Tool steel	66	61	.07	.07
Pipe and tubing-standard pipe	1,270	1,400	1.44	1.53
Pipe and tubing-oil country goods	1,350	1,630	1.53	1.78
Pipe and tubing-line pipe	1,070	1,080	1.21	1.18
Pipe and tubing-mechanical tubing	964	954	1.09	1.04
Pipe and tubing-pressure tubing	37	35	.04	.04
Pipe and tubing-stainless	24	25	.03	.03
Pipe and tubing-structural	174	180	.20	.20
Pipe for piling	43	43	.05	.05
Wire	593	592	.67	.65
Tin mill products-blackplate	310	296	.35	.32
Tin mill products-tinplate	2,400	2,490	2.71	2.72
Tin mill products-tin-free steel	796	840	.90	.92
Tin mill products-tin coated sheets	75	97	.08	.11
Sheets-hot-rolled	15,400	15,800	17.40	17.31
Sheets-cold-rolled	11,200	12,800	12.70	13.97
Sheets and strip-hot dip galvanized	10,300	10,400	11.60	11.36
Sheets and strip-electrogalvanized	2,940	3,350	3.32	3.66
Sheets and strip-other metallic coated	1,570	1,600	1.78	1.75
Sheets and strip-electrical	386	417	.44	.46
Strip-hot rolled	734	520	.83	.57
Strip-cold rolled	897	871	1.01	.95
Total-steel mill products	88,400	91,500	100.00	100.00
Shipments by markets:				
Service centers and distributors	21,500	24,600	24.40	26.89
Construction	13,500	14,100	15.30	15.41
Automotive	13,300	13,300	15.00	14.54
Machinery	6,530	6,880	7.39	7.52
Containers	3,750	3,720	4.25	4.07
All others	29,800	28,900	33.70	31.59
Total shipments by market	88,400	91,500	100.00	100.00

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 4
U.S. IMPORTS AND EXPORTS OF STEEL MILL PRODUCTS, BY COUNTRY 1/

(Thousand metric tons)

Country	1995		1996	
	Imports	Exports	Imports	Exports
Argentina	112	9	99	6
Australia	--	18	--	13
Brazil	1,930	19	2,560	18
Canada	4,140	2,230	4,450	2,170
China	369	215	434	39
European Union	5,400	828	7,990	320
Finland	94	1	196	1
Japan	2,240	247	1,820	63
Korea, Republic of	1,270	475	1,250	169
Mexico	2,060	738	2,640	958
Russia	1,360	--	1,510	--
South Africa	(2/)	--	(2/)	21
Sweden	188	2	263	3
Taiwan	118	431	88	133
Trinidad and Tobago	(2/)	--	(2/)	--
Turkey	425	--	289	--
Ukraine	585	--	729	--
Venezuela	--	61	--	59
Other	1,850	1,150	2,140	590
Total	22,100	6,420	26,500	4,560

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Unable to distinguish country breakdown. Included with "Other."

Source: American Iron and Steel Institute.

TABLE 5
U.S. EXPORTS OF IRON AND STEEL PRODUCTS 1/

(Thousand metric tons)

	1995	1996
Steel mill products:		
Ingots, blooms, billets, and slabs	418	282
Wire rods	63	95
Structural shapes-heavy	431	319
Steel piling	33	31
Plates-cut lengths	221	180
Plates-in coils	480	212
Rails-standard	7	37
Rails-other	7	11
Railroad accessories	15	19
Bars-hot-rolled	269	319
Bars-light-shaped	88	105
Bars-concrete reinforcing	114	97
Bars-cold-finished	83	86
Tool steel	6	8
Pipe and tubing-standard pipe	64	70
Pipe and tubing-oil country goods	249	273
Pipe and tubing-line pipe	244	203
Pipe and tubing-mechanical tubing	11	11
Pipe and tubing-stainless	21	21
Pipe and tubing-nonclassified	224	227
Pipe and tubing-structural	35	41
Pipe for piling	4	4
Wire	115	96
Tin mill products-blackplate	14	5
Tin mill products-tinplate	290	323
Tin mill products-tin-free steel	51	54
Sheets-hot-rolled	1,710	433
Sheets-cold-rolled	551	462
Sheets and strip-hot-dip galvanized	149	94
Sheets and strip-electrogalvanized	94	137
Sheets and strip-other metallic coated	104	98
Sheets and strip-electrical	34	36
Strip-hot-rolled	74	42
Strip-cold-rolled	149	137
Total steel mill products	6,420	4,560
Fabricated steel products:		
Structural shapes-fabricated	230	203
Rails-used	23	17
Railroad products	47	38
Wire rope	6	11
Wire-stranded products	28	21
Wire-other products	15	81
Springs	51	61
Nails and staples	20	23
Fasteners	376	447
Chains and parts	22	23
Grinding balls	32	31
Pipe and tube fittings	23	28
Other 2/	42	48
Total fabricated steel products	914	1,030
Total all steel products	7,340	5,600
Cast iron and steel products:		
Cast steel pipe fittings	120	107
Cast iron pipe and fittings	23	24
Cast steel rolls	16	15
Cast grinding balls	16	28
Granules-shot and grit	31	25
Other castings	44	41
Total cast iron and steel products	250	240

1/ Data are rounded to three significant digits; may not add to totals shown.

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

Source: American Iron and Steel Institute.

TABLE 6
U.S. IMPORTS OF MAJOR IRON AND STEEL PRODUCTS 1/

(Thousand metric tons)

	1995	1996
Steel mill products:		
Ingots, blooms, billets and slabs	4,720	6,830
Wire rods	1,690	1,770
Structural shapes-heavy	606	933
Steel piling	69	62
Plates-cut lengths	1,320	1,710
Plates-in coils	789	1,200
Rails and railroad accessories	192	183
Bars-hot-rolled	1,040	1,070
Bars-light-shaped	144	143
Bars-reinforcing	483	528
Bars-cold-finished	258	236
Tool steel	116	124
Pipe and tubing-standard pipe	685	686
Pipe and tubing-oil country goods	164	210
Pipe and tubing-line pipe	449	554
Pipe and tubing-mechanical tubing	277	298
Pipe and tubing-pressure tubing	40	44
Pipe and tubing-stainless	48	51
Pipe and tubing-nonclassified	11	12
Pipe and tubing-structural	401	349
Pipe for piling	10	7
Wire	550	507
Tin mill products-blackplate	130	120
Tin mill products-tinplate	272	250
Tin mill products-tin-free steel	152	154
Sheets-hot-rolled	2,910	3,760
Sheets-cold-rolled	2,820	2,680
Sheets and strip-hot-dip galvanized	1,140	1,420
Sheets and strip-electrogalvanized	193	144
Sheets and strip-other metallic coated	119	107
Sheets and strip-electrical	91	99
Strip-hot-rolled	66	55
Strip-cold-rolled	181	165
Total steel mill products	22,100	26,500
Fabricated steel products:		
Structural shapes-fabricated	189	234
Rails-used	186	248
Railroad products	97	53
Wire rope	92	82
Wire-stranded products	126	136
Springs	296	288
Nails and staples	328	367
Fasteners	890	837
Chains and parts	90	90
Pipe and tube fittings	81	106
Other	220	237
Total fabricated steel products	2,600	2,680
Total all steel products	24,700	29,100
Cast iron and steel products:		
Cast steel pipe fittings	36	36
Cast iron pipe and fittings	39	45
Other products	244	263
Total cast products	319	344

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 7
U.S. IMPORTS OF STAINLESS STEEL 1/

(Metric tons)

Product	1995	1996
Semifinished	122,000	102,000
Plate	107,000	127,000
Sheet and strip	306,000	344,000
Bars and shapes	85,400	91,000
Wire and wire rods	72,000	75,300
Pipe and tube	48,000	51,300
Total	741,000	791,000

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 8
U.S. SHIPMENTS OF IRON AND STEEL CASTINGS 1/

(Thousand metric tons)

	1995	1996
Ductile iron castings	3,900 r/	3,830
Gray iron castings	5,680 r/	5,610
Malleable iron castings	266	238
Steel castings	1,050 r/	1,110
Steel investment castings	84 r/	81
Total	11,000 r/	10,900

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

TABLE 9
COAL AND COKE AT COKE PLANTS 1/ 2/

(Thousand metric tons)

	1995	1996
Coal: Consumption	30,000	28,800
Coke: 3/		
Production	21,500	20,900
Exports	680	1,020
Imports	1,650	1,010
Consumption, apparent	22,200	20,900

1/ Data are rounded to three significant digits.

2/ Includes furnace and merchant coke plants.

3/ Coke production and consumption do not include breeze.

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

TABLE 10
 PIG IRON 1/ AND DIRECT-REDUCED IRON: 2/ WORLD PRODUCTION, BY COUNTRY 3/ 4/

(Thousand metric tons)

Country 5/	1992	1993	1994	1995	1996 e/
Albania e/	10	10	10	10	10
Algeria	1,100	925	919	940 r/	850
Argentina:					
Pig iron	966	984	998	1,050 e/	1,000
Direct-reduced iron	1,027 r/	1,156	1,266	1,360 r/	1,420 6/
Australia	6,384	6,714	7,466	7,476 r/	7,381 6/
Austria	3,074	3,390	3,362	3,838 r/	3,800
Belgium	8,533	8,178	8,974 r/	9,199 r/	9,000
Bosnia and Herzegovina e/	150 6/	100	100	100	100
Brazil:					
Pig iron	23,152	23,982	25,177	25,090	25,100
Direct-reduced iron	290 r/	250	220	300	340 6/
Bulgaria	837	998	1,442	1,607 r/	1,513 6/
Burma:					
Pig iron	1	2	1	2 e/	2
Direct-reduced iron	10	20	10	20	20
Canada:					
Pig iron	8,621	8,633	8,150	8,464	8,500
Direct-reduced iron	639	740	770	1,010	1,417 6/
Chile	873	917	883	850	850
China	75,890	87,390	97,409	105,300 r/	105,300
Colombia	308	238	245 r/	282 r/	288 6/
Croatia e/	40	40	--	--	--
Czech Republic 7/	XX	4,668	5,287	5,289	5,200
Czechoslovakia 8/	8,039	XX	XX	XX	XX
Egypt:					
Pig iron	1,062	1,326	1,148	1,062 r/	1,050
Direct-reduced iron	826 r/	837 r/	774 r/	860	830 6/
Finland	2,452	2,535	2,597	2,242 r/	2,400
France	13,051 r/	12,679 r/	13,293	13,154 r/	13,000
Georgia	274	88	--	-- e/	--
Germany:					
Pig iron	27,399 r/	26,970	29,923	29,828 r/	30,000
Direct-reduced iron	170	180	280	410	370 6/
Hungary	1,176	1,407	1,590	1,600 e/	1,500
India:					
Pig iron	15,126	15,674	17,808	18,626	20,000
Direct-reduced iron	1,437	2,208	3,122	4,280	4,830 6/
Indonesia: Direct-reduced iron	1,370	1,500	1,620	1,860	1,800 6/
Iran:					
Pig iron	2,053	1,961	1,883	1,532	1,867 6/
Direct-reduced iron	830	1,650	2,630	3,301 r/	3,778 6/
Italy	10,462	11,066	11,157	11,684	12,000
Japan	73,144	73,738	73,776	74,905 r/	74,597 6/
Kazakstan	4,659	3,544	2,432	2,528 r/	2,536 6/
Korea, North e/	6,600	6,600	6,600	6,600	6,600
Korea, Republic of	19,323	22,000 e/	21,169 r/	22,344 r/	23,010
Libya: Direct-reduced iron	846	944	852	970	862 6/
Luxembourg 9/	2,256	2,411	1,927	1,028 r/	1,200
Macedonia e/	20	20	20	20	20
Malaysia: Direct-reduced iron	550	710	990	1,090	1,048 6/
Mexico:					
Pig iron	3,404	3,423	3,500	4,142 r/	4,200
Direct-reduced iron	2,440	2,730	3,240	3,691 r/	3,900 6/
Morocco e/	15	15	15	15	15
Netherlands 9/	4,847 r/	5,404 r/	5,443 r/	5,647 r/	5,600
New Zealand	625	653	563	631	650
Nigeria: Direct-reduced iron	53	39	40	36 r/	20
Norway	70	73	70 e/	70 e/	70
Pakistan e/	1,100	1,200	1,045 r/ 6/	1,100 r/	1,500
Paraguay	92	81	90 r/	103 r/	100

See footnotes at end of table.

TABLE 10--Continued
 PIG IRON 1/ AND DIRECT-REDUCED IRON: 2/ WORLD PRODUCTION, BY COUNTRY 3/ 4/

(Thousand metric tons)

Country 5/	1992	1993	1994	1995	1996 e/
Peru:					
Pig iron	147	147	150	150 e/	150
Direct-reduced iron	30	--	20	3	20 6/
Poland	6,498	6,298	7,082	7,373 r/	7,400
Portugal	402	398	415 e/	416 r/	400
Qatar: Direct-reduced iron	617 r/	573 r/	600	630	635
Romania	3,111	3,189	3,496	4,203	4,200
Russia:					
Pig iron	45,824	40,871	36,116	39,762	36,061 6/
Direct-reduced iron	1,580	1,540	1,710	1,680	1,500 6/
Saudi Arabia: Direct-reduced iron	1,610	2,015	2,111	2,129	2,296 6/
Serbia and Montenegro	512	62	17	120 e/	150
Slovakia 7/	XX	3,210 r/	3,330 r/	3,300 r/	3,300
South Africa:					
Pig iron	7,352 r/	6,940 r/	6,982 r/	7,137 r/	6,876 6/
Direct-reduced iron	910	870	935 r/	913 r/	960 6/
Spain	5,076	5,394	5,447	5,128 r/	5,200
Sweden	2,735	2,845	3,037	3,020 r/	3,000
Switzerland	110	110	110 e/	100 e/	100
Taiwan	5,292	6,116	5,941	6,056 e/	6,050
Trinidad and Tobago: Direct-reduced iron	680	730	940	1,050	1,070 6/
Tunisia	158	165	154	162	145 6/
Turkey	4,508	4,353	4,604	4,600 e/	5,000
Ukraine	34,663	26,999	21,200 r/	20,000 r/	18,143 6/
United Kingdom	11,542	11,534	11,943	12,238	12,225
United States:					
Pig iron	47,400	48,200	49,400	50,900	49,400 6/
Direct-reduced iron	390	440	480	460	450 6/
Venezuela: Direct-reduced iron	4,230	4,510	4,710	4,720	5,340 6/
Zimbabwe	507	211	100 e/	209 r/	210
Grand total	524,000 r/	531,000 r/	543,000 r/	564,000 r/	562,000
Of which:					
Pig iron	503,000 r/	507,000 r/	516,000 r/	533,000 r/	529,000
Direct-reduced iron	20,500	23,600	27,300 r/	30,800 r/	32,900

e/ Estimated. r/ Revised. XX Not applicable.

1/ Production is pig iron unless otherwise specified.

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

3/ Table excludes ferroalloy production except where otherwise noted. Table includes data available through June 4, 1997.

4/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

5/ In addition to the countries listed, Vietnam has facilities to produce pig iron and may have produced limited quantities during 1992-96, but output is not reported and available information is inadequate to make reliable estimates of output levels.

6/ Reported figure.

7/ Formerly part of Czechoslovakia; data were not reported separately until 1993.

8/ Dissolved Dec. 31, 1992.

9/ Includes blast furnace ferroalloys.

TABLE 11
RAW STEEL: 1/ WORLD PRODUCTION, BY COUNTRY 2/ 3/

(Thousand metric tons)

Country 4/	1992	1993	1994	1995	1996 e/
Albania e/	20 r/	19 r/	19 r/	22 r/	20
Algeria	842	865 e/	808	827	675
Angola e/	10	9	9	9	9
Argentina	2,700	2,886	3,289	3,617	3,650
Australia	6,803	7,853	8,424	8,447 r/	8,295 5/
Austria	3,953	4,149	4,405 r/	4,537 r/	4,500
Azerbaijan	385	228	36 r/	12 r/	80
Bangladesh 6/	36	32	34 e/	36 e/	37
Belarus	1,105	946	880	744	886
Belgium	10,377	10,173	11,319	11,606	11,600
Benin e/	8	2	--	--	--
Bosnia and Herzegovina e/	135	115	100	115	115
Brazil 7/	23,934 r/	25,207 r/	25,747	25,076	25,700
Bulgaria	1,551	1,941	2,491	2,724 r/	2,483 5/
Burma	10 r/	11 r/	17 r/	24 r/	25
Canada	13,924	14,300	13,897	14,415	14,500
Chile 7/	1,013	1,063	1,030 r/	1,013	1,010
China e/	80,940	89,560	92,610	95,360 r/	100,000
Colombia	657	687	693 r/	714 r/	677 p/
Croatia	102	74	63 r/	45 r/	50
Cuba e/	134	90	131	207 5/	231 p/
Czech Republic 8/	XX	6,744 r/	7,093 r/	7,189 r/	7,000
Czechoslovakia 9/	10,520	XX	XX	XX	XX
Denmark	591	603	723	654 e/	650
Dominican Republic	33	--	--	--	37 p/
Ecuador	20	27	22 r/	22 r/	22
Egypt	2,524	2,772	2,622	2,642	2,620
El Salvador e/	28	37	40	10 5/	10
Finland	3,076	3,256	3,420	3,180 e/	3,200
France	17,961	17,179	18,028	18,096	18,000
Georgia	529	215	141	84 e/	80
Germany	39,711	37,625	40,847	42,100 e/	42,000
Greece	923	980	848	939	950
Guatemala	25	18	18 e/	18 e/	19
Hong Kong e/	350	350	350	350	350
Hungary	1,541 r/	1,752	1,937 r/	1,865 r/	1,800
India	18,117	18,155	19,285	20,291	20,000
Indonesia	3,171	1,948	3,220	3,500 e/	3,400
Iran	2,940	3,672	4,498	4,696	5,420
Iraq e/	100	300	300	300	300
Ireland	257	326	316 r/	310 e/	300
Israel	109	120	180 r/	200 r/	200
Italy	24,904	25,701	26,114	27,766	28,000
Jamaica e/	25 r/ 5/	25	25	25 r/	25
Japan	98,132	99,623	98,295	101,640	98,801 5/
Jordan	30	30	30 e/	30 e/	30
Kazakstan	5,675	4,279	2,969	2,963 r/	3,140
Kenya e/	20	20	20	20	20
Korea, North e/	8,100	8,100	8,100	8,100	8,100
Korea, Republic of	28,054	33,000	33,745	36,772	38,900
Latvia	246	300	332	350 e/	350
Libya	789	920	874	909 r/	863
Luxembourg	3,068	3,293	3,092	3,079 r/	2,501 5/
Macedonia	171 r/	137	67 r/	32 r/	30
Malaysia	1,559	1,808	2,046	2,450 r/	2,600
Mauritania	7	7	7 e/	5 e/	5
Mexico	8,460	9,189	10,260	12,128	12,500
Moldova	619	604	453	299	643
Morocco e/	7	7	7	7	5
Netherlands	5,438	6,001	6,174	6,409	6,330
New Zealand	759	853	766	842	900
Nigeria e/	200	150	58	36	20
Norway	446	505	456	470 e/	450

See footnotes at end of table.

TABLE 11--Continued
RAW STEEL: 1/ WORLD PRODUCTION, BY COUNTRY 2/ 3/

(Thousand metric tons)

Country 4/	1992	1993	1994	1995	1996 e/
Pakistan	1,000 e/	1,100 e/	344	409	500
Paraguay	86	86	85 r/	96 r/	95
Peru	343	417	506	515 e/	510
Philippines	497	623	473	500 e/	500
Poland	9,867	9,937	11,113	11,890	11,500
Portugal	769	775	749	817 r/	800
Qatar	588	620	572	606	616 5/
Romania	5,376	5,446	5,800	6,555	6,500
Russia	67,029	58,346	48,812	51,300	49,200
Saudi Arabia	1,825	2,318	2,411	2,451	2,683 5/
Serbia and Montenegro	665	183	137	180 r/ e/	200
Singapore e/	500	500	500	500	500
Slovakia 8/	XX	3,768	3,948	3,255 r/	3,200
Slovenia	401 r/	355 r/	424 r/	407 r/	400
South Africa	8,970 r/	8,655 r/	8,236 r/	8,953 r/	7,909 5/
Spain	12,295	12,646	13,574	13,937 r/	14,000
Sri Lanka e/	30	30	30	30	30
Sweden	4,356	4,591	4,952	4,926 r/	5,000
Switzerland	1,208	1,260	800 e/	1,000 e/	1,000
Syria e/	70	70	70	70	70
Taiwan	10,705	12,038	11,590	11,605	12,000
Thailand	779	954	1,460	1,500 e/	1,500
Trinidad and Tobago	553	519	631	735 r/	695 p/
Tunisia	181	183	184	201	187 5/
Turkey	10,343	11,519	12,074	12,745	13,400
Uganda e/	30	30	30	35	55
Ukraine	41,759	32,357	23,798 r/	22,309	22,300
United Kingdom	16,212	16,625	17,286	17,604 r/	18,220 5/
United States	84,300	88,800	91,200	95,200	94,700 5/
Uruguay	55	36	36	40	40
Uzbekistan	630	573	364	352 e/	451
Venezuela	3,489	3,392	3,524	3,568 r/	3,730
Vietnam	219	270	300 e/	320 e/	310
Zimbabwe	547	221	187	210 e/	212
Total	724,000	730,000	730,000	755,000 r/	758,000

e/ Estimated. p/ Preliminary. r/ Revised. XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Steel 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.

3/ Table includes data available through July 9, 1997.

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

5/ Reported figure.

6/ Data for year ending June 30 of that stated.

7/ Excludes castings.

8/ Formerly part of Czechoslovakia; data were not reported separately until 1993.

9/ Dissolved Dec. 31, 1992.