



2006 Minerals Yearbook

CEMENT

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Production of portland and masonry cement in the United States in 2006 was 98.2 million metric tons (Mt), second only to the record level in 2005. Cement sales totaled 127 Mt. Imports of cement reached a new record of 32.1 Mt. Cement prices increased significantly (tables 1, 11–12) in most districts and, as a result, the overall value of cement sales to domestic final customers increased to \$12.9 billion. Based on typical portland cement mixing ratios in concrete, the delivered value of concrete (excluding mortar) in the United States in 2006 was estimated to be at least \$54 billion.

Indications of percentage or other changes expressed in this report compare activity in 2006 with that of 2005 unless specified otherwise. Except where otherwise indicated, activity levels in this report exclude those in Puerto Rico. And except for some trade data, the cements covered in this report are limited to those hydraulic varieties broadly classified as portland and/or masonry cement; these are the binding agents in concrete and most mortars. Varieties included as portland cement are listed in table 15 and include blended cements¹. Masonry cements include true masonry cements, portland-lime cements, and plastic cements; currently, the category does not include natural cement for mortar, minor production of which resumed in 2004 after a hiatus of 34 years. Certain other hydraulic cements (notably aluminous cement) are included in the trade data in tables 16–18 and 21 (clinker) and within the world hydraulic cement production data in table 22. Excluded are pure (unblended) supplementary cementitious materials (SCM) such as fly ash, other pozzolans, and ground granulated blast furnace slag (GGBFS).

The bulk of this report is based on data compiled from U.S. Geological Survey (USGS) annual questionnaires sent to cement and clinker manufacturing plants and associated distribution facilities and import terminals, some of which are independent of U.S. cement manufacturers. For 2006, forms were received from 151 of 156 facilities canvassed, a response rate of 97%. The respondents included all but one of the production sites and accounted for about 99% of total cement sales. For 2005, forms were received from 146 of 150 facilities canvassed, a response rate of 97%. For both years, however, telephone inquiries to the nonrespondents obtained their cement and clinker production data, and thus the production data represent 100% response. The USGS canvass (and this report's tables) do not include the sales of several importers that have yet to participate in the surveys. To the degree that they are selling independently of the participating companies, the missing importers' sales volumes for 2005–06 are estimated to be perhaps as much as 1% of the total portland cement sales tonnages shown in this report.

¹Sales data for blended cements (also called composite cements) listed separately from portland cement are available within the monthly cement reports of the USGS Mineral Industry Surveys series, starting with January 1998.

Background information on cement and its manufacture, as well as on the USGS cement canvasses, is given in van Oss (2005).

Legislation and Government Programs

Since 1990, the dominant trade issue has been the existence of antidumping remedies against Japan and Mexico. These had been contested in international courts. On January 6, the U.S. International Trade Commission (ITC) announced that it would conduct a 5-year sunset review on the antidumping duties against Mexico and an expedited review of the duties against Japan (U.S. International Trade Commission, 2006). Then, on January 19, it was announced that an agreement had been reached with Mexico resolving the trade dispute (U.S. Department of Commerce, 2006). Under the new agreement, the substantial antidumping tariffs on imported gray portland cement from Mexico were to be reduced to \$3 per metric ton and import volumes would be limited to an annual quota of 3 Mt; an additional quota of 0.2 Mt would be allowed in the case of need resulting from a natural disaster. In addition, the Mexican companies affected would receive a return of duties paid that had been held in escrow; for example, CEMEX S.A. de C.V. (CEMEX) would receive about \$100 million (CEMEX S.A. de C.V., 2006b). The agreement, which went into effect on April 3, would be for 3 years, after which, providing that the quota had not been exceeded, the tariffs and import quota would be eliminated entirely.

Environmental Issues

Most emissions associated with the cement industry are those from the manufacture of the intermediate product called clinker. By far, the largest emissions are of carbon dioxide (CO₂) derived from the calcination of carbonate raw materials and the combustion of fuels, but the industry is also a significant source of emissions of nitrogen oxides (NO_x) and sulfur oxides (SO_x). Overall, generation of CO₂ by the U.S. cement industry in 2006 amounted to about 80 to 83 Mt, or about 0.90 to 0.94 metric ton (t) CO₂ per ton of clinker; the high end of the range reflects fuel combustion emissions derived using “standard” heat values for the fuels consumed (table 7) and the low end uses the heat values actually reported by the individual plants. The fuel combustion emissions exclude those associated with generation of the electricity purchased by the cement industry. Both ends of the range include a standard emissions from calcination of 0.51 ton CO₂ per ton of clinker as detailed in van Oss and Padovani (2003, p. 123–126) and by the Intergovernmental Panel on Climate Change (2006). This emissions factor for calcination assumes that all the calcium oxide (CaO) in the clinker is derived from a carbonate source. If reasonable assumptions are

made regarding the average CaO content of slags, ashes, and similar alternative raw materials burned in the kiln (table 6), the emissions factor for 2006 is reduced by about 2.5% to 0.50 ton CO₂ per ton of clinker, and the total emissions of CO₂ are thus reduced by about 1 Mt from the range noted above. The percentage savings can be significantly larger at the individual plants that actually burn these alternative raw materials. The fuel combustion component of emissions (0.39 to 0.43 t CO₂ per ton of clinker for the industry overall) represents a 9% to 10% unit reduction from the range in 2000 calculated by van Oss and Padovani (2003, p. 99); this reduction appears to reflect technological upgrades at various plants. Strategies to reduce unit (per ton of product) emissions include encouraging the use of SCM in finished cement (blended cements and cements classified on a performance basis rather than a compositional basis) and in concrete to reduce the clinker content of these products, and on allowing addition of “inert” fillers to boost cement output without simultaneously boosting clinker output. In regard to the latter, the ASTM International standard for portland cement (ASTM C-150-05) now allows for the addition of up to 5% ground limestone in the finish mill; widespread adoption of limestone addition was not expected unless the States’ departments of transportation incorporate the practice into the otherwise similar American Association of State Highway and Transportation Officials (AASHTO) standard M85. Strategies to reduce plant emissions mainly involve improving energy efficiencies, such as through plant upgrades, switching to lower carbon fuels, and incorporating alternative raw materials into the kiln feed that would reduce the need to burn so much limestone or other carbonate raw materials.

The cement industry is subject to scrutiny concerning storage of cement kiln dust (CKD) and emissions of hexavalent chromium, hydrocarbons, and mercury. On December 20, the U.S. Environmental Protection Agency (EPA) issued a final rule governing emissions limits for hydrocarbons and mercury by new cement kilns, and stipulated restrictions on the burning of fly ash from boilers equipped with mercury scrubbing systems (such as carbon injection) unless the cement plant could demonstrate no net mercury emissions increase from the use of the ash (U.S. Environmental Protection Agency, 2006).

Production

Portland cement production in 2006 was 92.8 Mt, down slightly from the 2005 record (table 3). Data were not collected on the production of individual varieties of portland cement, but the breakout would approximate the ratios evident in the breakout of portland cement sales, by type (table 15). Ideally, these ratios should be adjusted for cement imports, which are dominantly of Types I, II, and V. Yearend stockpiles increased significantly in most districts, but the data are not necessarily indicative of fluctuations during the year.

Ranking of companies is made difficult because of the existence of some common parent companies and joint ventures. With common parents combined under the larger subsidiary’s name and with joint ventures apportioned, the 10 leading companies at yearend 2006 were, in descending order of portland cement production, Holcim (US) Inc.; CEMEX,

Inc.; Lafarge North America, Inc.; Buzzi Unicem USA, Inc. (including Alamo Cement Co.); Lehigh Cement Co.; Ash Grove Cement Co.; Essroc Cement Corp.; Texas Industries Inc. (TXI); California Portland Cement Co.; and St. Marys Cement, Inc. The U.S. industry continued to be heavily consolidated: the leading 5 cement companies, combined, had about 56% of total U.S. portland cement production, and the leading 10 companies continued to account for about 80% of total production. Of these named companies, all except Ash Grove and TXI were foreign owned as of yearend.

Despite a significant downturn in residential construction during the year, masonry cement production fell only slightly to 5.4 Mt (table 4); yearend stocks of masonry cement rose by nearly 30%. As in past years, the reported production understates true output, primarily because a large, but unknown, tonnage of masonry cement (especially portland-lime cement) is made at job sites by combining purchased portland cement and lime.

Clinker production in 2006 reached a new record of 88.6 Mt (table 5), but was a combination of a very strong first 4 months and a mostly lackluster rest of the year. The early increases were in response to strong market conditions and the effects of new kilns and/or other plant upgrades that had been completed in 2005 and early 2006. In the second half of the year, clinker output exceeded the amount needed for cement production and, along with higher levels of clinker imports, yielded a large increase in yearend clinker stockpiles.²

Apparent annual clinker production capacity fell by about 1% overall to 101 Mt. Apparent annual capacity is calculated based on plant-reported daily capacities and a reported split-out of downtime between that for scheduled routine maintenance (used in the calculation) and all other downtime. These components are not always reported correctly. Most plants have total downtimes in excess of routine maintenance, thus an overall capacity utilization of 85% or higher is considered to indicate a plant (or district) operating more or less at full practicable capacity. Partial year operation of new or old kilns yields low capacity utilization ratios because, whereas the annual capacities for these kilns are fully counted, they will have relatively low comparative clinker outputs. A large capacity decline in 2006 in eastern Pennsylvania was because of the permanent closure of one plant’s kilns in 2005. A large capacity decline in South Carolina reflected the replacement in 2005 of wet kilns with a single dry kiln (both types’ capacities were counted in 2005). Clinker production in South Carolina rose significantly, however, owing to a full year’s operation on the new dry kiln. Large capacity increases in Alabama and Illinois reflected upgrades at several plants. Overall, the average annual clinker capacity in 2006 remained about 0.96 Mt per plant, but rose slightly to 0.58 Mt per kiln.

Nonfuel raw materials consumed to make clinker and cement are listed in table 6. The 2006 ratios among clinker raw materials (as contributors of major oxides) appear to be broadly

²Yearend stockpiles of clinker are an artifact of data collection convenience rather than a reflection of full-year market conditions or production capacity. Generally, if the clinker is not required for immediate cement production, a plant will try to build up its stocks of clinker prior to scheduled extended kiln shutdowns so as to provide continuity of clinker feed to the finish (cement) mill. These shutdowns can be at any time of the year.

similar to those in 2005. Direct comparison of ratios among raw materials should be done with caution; tonnage and tonnage ratio changes could reflect widespread raw material substitution, activities at just a few plants, or even errors in reporting. Thus, for example, the large increase noted for cement rock in 2006 may reflect erroneous differentiation between this material and limestone by some respondents. The increase in consumption of limestone for finished cement appears to be in excess of that needed for masonry cement and may thus reflect increased incorporation of a ground limestone addition (of up to 5%) to Type-I portland cement as allowed for in the 2005 revision of the ASTM C-150 portland cement standard. The decline in consumption of CKD is likely owing to incomplete reporting. The 15% decrease in consumption of fly ash for cement appears proportional to the decline in sales of blended cements incorporating fly ash (table 15). In contrast, the 30% increase in granulated slag consumption for cement is almost double the relative increase in sales of blended cements incorporating slag.

The tonnages of other blast furnace slag and steel slag consumed to make clinker are broadly similar to sales of slag to make clinker collected on the USGS canvass of ferrous slag processors (air-cooled blast furnace slag sales of 0.37 Mt in 2005 and 0.11 Mt in 2006; steel slag sales of 0.60 Mt in both years) (van Oss, 2007), at least if the two slag types are summed. The differences between the two canvasses may simply reflect a difference between purchases and consumption by the cement industry in a given year, but likely also reflect respondent errors in differentiating the two slag types on the cement canvass. A comparison cannot be made for granulated slag because most of the material sold by slag processors (for cementitious use) went directly to the concrete industry rather than to cement companies and so is invisible to the USGS canvasses of the cement industry.

For fly ash and bottom ash, comparison can be made between the data in table 6 and those published for sales (for cement or as raw feed for clinker) of coal combustion products published by the American Coal Ash Association (ACAA). For fly ash, table 6 shows consumption of 2.95 Mt of fly ash for clinker and 0.13 Mt for cement; the corresponding ACAA number is about 3.8 Mt (American Coal Ash Association, 2007). For bottom ash, consumption was about 1.2 Mt for clinker only (table 6), and the ACAA reported 0.84 Mt of bottom ash sales. The differences in the two data sets probably reflects a difference between consumption (table 6)—which is from a mix of ongoing purchases and drawdown of stockpiles—and sales (ACAA), and the fact that the ACAA data are extrapolated. The ACAA also reported minor sales (about 16,000 t) of boiler slag, but the host category in table 6 (“other slag”) contains a number of slag types (mostly from various smelters) and the identity of the slags is poorly constrained. Consumption of gypsum by the cement industry was 5.44 Mt in 2006 (table 6). Of this amount, at least 0.66 Mt was synthetic gypsum (the differentiation from natural gypsum is not required on the USGS canvass). This is much higher than the 0.24 Mt flue gas desulfurization (FGD) gypsum reported by the ACAA and reflects the fact that the USGS data are a combination of purchased FGD gypsum from the coal-fired powerplants (perhaps similar to the ACAA data) and gypsum recovered from the cement plant’s own SO_x scrubbers.

Fuels consumed by the cement industry are listed in table 7. As with the nonfuel raw materials, data shifts can reflect activities at just a few plants. In terms of overall mass of fuels (in total) and the ratios thereof to clinker production, changes in 2006 were insignificant, and most of the relative tonnage changes were minor. Although not listed in table 7, overall heat consumption in 2006 was about 4.5 billion joules (GJ)³ per metric ton of clinker, about 2% higher than in 2005. Wet plants in 2006 averaged about 6.5 GJ per ton of clinker, about 3% lower than the ratio in 2005, and dry kiln plants averaged about 4.1 GJ per ton of clinker, unchanged from the ratio in 2005. Combination plants (operating both wet and dry kilns) averaged 4.9 GJ per ton in 2006, also unchanged. Overall, 2006 continued a multiyear trend of generally decreasing unit heat or fuel consumption by the industry;⁴ this reflected a number of plant conversions from wet to dry technology and a variety of other energy-saving measures. As noted earlier, the fuel reductions have also led to a reduction in unit fuel combustion emissions of CO₂.

Unit electricity consumption increased for all plant types in 2006 (table 8) for reasons that could be related to maintenance issues or upgrades (total downtime, not just that for routine maintenance). Modern dry process plants have higher average electricity consumption per ton of cement product than wet process plants because of a complex array of blowers and fans associated with the modern kiln lines. For the same technology and overall plant capacity, a plant that operates multiple kilns will generally have higher unit electricity consumption than a plant operating a single kiln. The wet-dry difference in 2006 is exceptionally small, mostly reflecting an increase in the unit consumption by the remaining wet plants.

In February, Lafarge S.A. (France) announced an offer to purchase the 46.8% of the shares in Lafarge North America that it did not already own. After the initial offer was rejected, a higher price was offered and accepted; the purchase was completed in May (Cement Americas, 2006d; Lafarge North America, 2006). In another consolidation move, in October, CEMEX S.A. de C.V announced a bid to purchase the worldwide assets of the Australian company Rinker Group Ltd., including its U.S. subsidiary, Rinker Materials Corp. Although the offer was rejected as being too low, CEMEX increased the offer early in 2007 (Cement Americas, 2006a).

There were no plant openings during the year. Although not reported in the 2005 edition of this report, CEMEX restarted the grinding of clinker on a minor basis at its PCG plant in Houston, TX, in mid-2005, and operated it as a clinker grinding plant throughout 2006. The facility is the former Gulf Coast Portland Cement Co. plant that ceased grinding clinker in 1995, at which time it switched to the grinding of petroleum coke. In the only cement plant “closure” in 2006, St. Marys Cement’s Badger grinding plant in Milwaukee, WI, was switched over to the grinding of granulated blast furnace slag early in the year.

³The USGS canvass solicits information on heat consumption in terms of millions of British thermal units (MBtu), where 1 MBtu=1.055056 GJ, and data are based on high or gross heat values of fuels rather than low or net heats.

⁴For example, the overall unit heat consumption for 2006 was 10% lower than that in 2000 reported by van Oss and Padovani (2002; table 4).

In February, CEMEX announced that it would build a second kiln at its Balcones plant in New Braunfels, TX. The new line would essentially double the plant's existing capacity to about 2 million metric tons per year (Mt/yr) and was expected to be completed in 2008 (CEMEX S.A. de C.V., 2006a).

Near yearend, Illinois Cement Co. (a subsidiary of Eagle Materials, Inc.) completed the precalciner addition to the kiln at its LaSalle, IL, plant, thereby increasing its clinker capacity to about 0.9 Mt/yr. This was the first completed phase of a multiyear project to expand Eagle Materials' overall cement production capacity. In January, Eagle Materials also announced plans to double the capacity of its subsidiary Nevada Cement plant at Fernley, NV, to about 1 Mt/yr; the upgrade would replace the existing two long dry kilns with a single, preheater-precalciner dry kiln. The company also announced a similar upgrade (to about 1 Mt/yr) of its Mountain Cement Co. plant in Laramie, WY, also by replacing a pair of long dry kilns. Both of the upgrades were anticipated to be completed in late 2008 (Eagle Materials, Inc., 2006).

Two new plants were under construction in Florida. In February, an environmental permit was received by Sumter Cement Co., LLC for the construction of a 1.56 Mt/yr (clinker) plant at Center Hill. The project was originally announced as an expansion project of Suwannee American Cement LLC, which operates a plant at Branford, but was reorganized under Sumter Cement name. Sumter Cement, like Suwannee American, is a 50-50 joint venture between Brazilian company Votorantim Cimentos and Florida-based Anderson Columbia Co.; Votorantim will be the plant operator. The new plant was expected to become operational in 2009. Suwannee American had permission to add a second kiln line (1 Mt/yr) at its Branford plant (Bell, 2006; Florida Department of Environmental Protection, 2006b; Suwannee American Cement LLC, 2008). An environmental permit was also issued for a new 1.04 Mt/yr (clinker) cement plant at Sumterville, FL, organized under the name American Cement Co. (Florida Department of Environmental Protection, 2006a, p.1). American Cement was a joint-venture of Oldcastle Materials and New Jersey-based Trap Rock Industries, Inc.

Apart from Suwannee American, two existing plants in Florida received permission to expand capacity. In January 2006, Titan America announced that it had recently received environmental approval for a further expansion of clinker capacity of its Pennsuco plant at Medley, to about 2.2 Mt/yr (Titan America, 2006). The company had already replaced its old wet kilns with a new 1.6-Mt/yr dry kiln in 2004. Florida Rock Industries was given approval for a second kiln line at its Newberry, FL, cement plant. The new line was to have a capacity of about 1 Mt/yr of clinker (Bell, 2006).

National Cement Co. of Alabama added a third finish mill at its Ragland, AL, plant; the new 1.2-Mt/yr mill came online at yearend (International Cement Review, 2006a). Work was underway at GCC-Rio Grande, Inc.'s new 2.6-Mt/yr cement plant at Pueblo, CO; the plant was expected to become operational in late 2007 (Cement Americas, 2006b; International Cement Review, 2006a). Essroc Cement Corp. began construction of a new precalciner kiln line at its Martinsburg, WV, plant. The new 1.5-Mt/yr line was intended to replace the three existing wet kilns at Martinsburg, as well as, ultimately,

the two existing wet kilns at the nearby Frederick, MD, plant (Concrete Monthly, 2006). In January, Keystone Cement Co. announced a modernization program for its Bath, PA, plant in which the facility's capacity would be nearly doubled by replacing the two existing wet kilns with a single precalciner dry kiln of about 1 Mt/yr capacity. The new kiln line was expected to come online in 2009 (Keystone Cement Co., 2006).

In August, Lafarge North America announced plans to expand its Harleyville, SC, plant through the addition of a second 1.3-Mt/yr kiln line. The project was anticipated to be completed by yearend 2009 (Cement Americas, 2006c).

Consumption

The measure of consumption preferred by the cement industry for market analysis is the monthly sales tonnages (strictly, cement shipments to final domestic customers) by State, data for which are provided by the USGS monthly surveys and which have been summarized in table 9. Although the national totals in table 9 are close to those of tables 11, 12, and 14, the individual State totals in table 9 are very different. Table 9 reveals the sales destinations and so directly provides the location and amounts of consumption. In contrast, the regional totals in tables 11, 12, and 14 simply pertain to the locations of the reporting entities (chiefly the production sites), not the locations of consumption. It is very common for shipments to cross State lines.

Domestic portland cement consumption in 2006 was 122 Mt, only slightly lower than the 2005 record. This virtual tie with 2005 belied very different month-by-month consumption levels for the 2 years. In 2005, consumption was at record levels in nearly every month, supported by (then) record imports. This trend continued strongly through the first quarter of 2006; total portland cement sales for the quarter were up almost 15%, and imports were up 40%. Then, except for May (up slightly), sales began a steady monthly decline relative to the record 2005 levels; still, the year-to-date sales for 2006 were ahead of 2005 through November. Relative to 2005, imports in 2006 were higher in every month through July (year-to-date up 21%), and although they declined in every month thereafter, imports for the year overall were a new record. The reported import origins of monthly sales lagged actual cement imports in most months in 2006; for the year the lag appears to be about 1.3 Mt, which suggests a major import component to the buildup of cement stockpiles (tables 1, 9).

Although it is difficult to accurately estimate the overall volume of sales by importers not participating in the USGS canvasses, much less their sales into specific States, it is possible to do so for Texas because of the existence of a special tax on cement sales and associated public data on the sales tonnages (by company) through the Texas Comptroller of Public Accounts. On the assumption that certain importers identified on the Texas tax reports only sell to final customers, it may be estimated that the USGS sales data for Texas overall (table 9) understate the consumption in Texas by approximately 0.27 Mt in 2006. For markets serviced by the Philadelphia, PA, customs district, USGS data understate sales by about 0.46 Mt (table 18).

In recent years, it has been common for California, Florida, and Texas, as a group, to be general indicators of the trend of national consumption, but this was not the case in 2006 owing

to a 6.6% decline in consumption in California. Only 9 States (none among the leading 10) showed consumption increases of 10% or more for the year. The lackluster performance in many States appears to reflect a decline in housing construction, as discussed below. The strong increases seen in Louisiana and in Mississippi were largely owing to reconstruction work in the aftermath of Hurricane Katrina in 2005. Much of the strong increase in New England is merely an artifact of more complete reporting during the year (certain import sales data became available for 2006 but not for 2005).

As a key construction material, cement consumption levels within a given category of construction will broadly reflect levels of construction spending, although significant time lags may exist between the onset or cutoff of spending and changes in the consumption of cement. Construction spending data are available in current dollars from the U.S. Census Bureau, but the Portland Cement Association has converted the data to constant 2000 dollars to provide the basis for a more meaningful analysis of spending trends. In terms of constant dollars, overall construction spending in 2006 was stagnant at \$879 billion (Portland Cement Association, 2008), which is in accord with the nearly identical level of cement sales tonnages 2005–06 noted earlier. The residential construction sector continued to be dominant at \$467 billion, but unlike its 6.4% increase in 2005, the residential spending level in 2006 was a 4.0% decline. The residential decline in 2006 was led by a nearly 8% decline (to \$303 billion) in single-family housing construction; multifamily construction spending actually increased by nearly 8% to \$39 billion. The nonresidential construction sector was up by 7.7% overall to \$168 billion, and much of this increase could in part be credited to lag effects of the very strong housing sector in 2005 and early 2006. Public sector construction was up by 2.4% to about \$195 billion, led by a 4.7% increase (to \$54 billion) in spending for highways and streets. Construction for sewage treatment and waste disposal rose by about 9% to nearly \$18 billion; this also could be a lag effect of the construction boom in 2005 to early 2006.

Concrete competes with other construction materials. Overall, the effect of competing materials can be crudely evaluated through use of a calculated “penetration rate” or intensity factor for cement, here defined the tonnage of cement consumed per \$1 million in construction spending. Changes in penetration rates can reflect cost or performance advantages of concrete compared to competing construction materials, the specific sizes and types of construction projects, shifts in spending between new construction and repairs, lag times between construction spending and concrete consumption, and total cement consumption underreported because of partial substitution in concrete mixes of portland cement by other cementitious materials. Using the apparent consumption data in table 1, the overall construction spending data show a generally increasing trend in penetration rates for 2002–06; \$1 million in construction spending bought, in chronological order, about 135 t of cement in 2002; 138 t in 2003; 143 t in 2004; 146 t in 2005; and 145 t in 2006.

Sales to final customers of different types of portland cement are listed in table 15. As in past years, sales were dominated by Types I and II cements and sulfate-resistant varieties of cement

(Type V and Type II/V hybrids reported as Type V). Sales of oil-well cements rose by just 2.8% to about 1.5 Mt, well below the 2.1 Mt sales of cement to “oil well” drilling customers (up by 15.1%) in table 14. Although the respective increases are both in accord with higher levels of drilling activity in 2006, the relatively low sales of specialized oil-well cements indicate a high proportion of relatively shallow holes (these can make use of less specialized cements) being drilled, and this is in accord with the fact that most of the drilling activity in 2006 was for natural gas exploration.

Following on a nearly 70% increase in 2005, blended cement sales rose a further 7.6% in 2006 to about 3.4 Mt. Blends incorporating natural pozzolans were up fivefold, but this reporting category may include some mischaracterized material. Blends incorporating GGBFS were up by nearly 14%, which is in accord with slag sales data collected through the USGS ferrous slags canvass. Sales of blended cement incorporating fly ash fell by 16%, and could reflect issues of higher carbon content in some ashes as a result of more powerplants switching to low-NOx burners (high carbon ashes are not suitable for use in blended cements without prior carbon removal, which adds to their cost). However, the apparent decline could also reflect some ash-content blended cements being characterized as “other blended cement” as a result of their being part of three component mixes (for example, blends with both fly ash and CKD). In any case, the continued increase in sales of blended cements overall would support the notion that the large 2005 jump was not an aberration. If sustained, higher blended cement sales will indicate not only a greater degree of acceptance of the environmental and performance benefits of incorporating SCM in concrete, but an increasing willingness of concrete companies to incorporate the SCM by purchasing finished blended cements rather than doing the blending themselves from purchased components.

Masonry cement sales fell slightly to 5.4 Mt according to the monthly data (table 9) or to 5.3 Mt according to the annual canvass (table 12). In either case, the relative decline is small compared with the decline in new single-family housing construction (12.6% on the average monthly number of units), and this may reflect the increases in spending on multifamily housing and on repairs and improvements. The decline in masonry sales is not in accord with a 1.3% increase in reported sales (of portland cement) to brick manufacturers (table 14) and the 4.7% increase in the sales of block cements (table 15), but instead appears to be more reflective of a decline in clay brick sales.

Data on the mill net values for shipments to final customers by plants and import terminals (terminal nets) are listed in tables 11–13. The average mill net value of portland cement in 2006 was about \$99.50 per metric ton, up by about \$10.50 per ton. Further, it represents a nearly 28% unit value (“price”) increase in just 2 years. The increases were largely in response to rapidly escalating energy costs (major cost components of both of cement manufacture and transport), and should be viewed in the context of relatively stagnant cement prices in 2000–03 and, despite widespread cement shortages, a relatively small price increase in 2004. Masonry cement prices also rose in 2006, but more modestly; analysis of the increase is difficult because of

a high proportion of masonry cement sales being in bagged or packaged form.

Foreign Trade

Trade data from the U.S. Census Bureau are listed in tables 16–21. Exports of hydraulic cement and clinker fell by about 6% to about 0.7 Mt (table 16), after excluding from the 2006 official trade data an apparent excess (0.74 Mt) of aluminous cement exports to Mexico from Laredo, TX⁵. Exports overall continued to be very small compared with imports, and Canada continued to be the dominant recipient of the exports.

Overall, imports of cement and clinker in 2006 increased by 6.9% to a record 35.6 Mt (table 17). The cement component of the imports (table 1, and table 17 minus table 21) increased by 5.7% to a record 32.1 Mt. Even more persistent than cement consumption, imports were up strongly for about the first half of 2006, and recorded increases in almost all months through July (up by 21.4% year-to-date). Thereafter, monthly imports fell steadily, although not enough to erase the net gain for the year, but it was clear that the brunt of the cement sales declines was being accommodated by reduced imports. This, in turn, reflected the fact that since the early 1990s, the majority of cement imports have been controlled by domestic cement producers, and they import only as needed to make up for production shortfalls.

The apparent imports of clinker (table 21) increased by nearly 20% to 3.4 Mt. The data are incomplete, however, with regards to overland imports from Canada; the tonnages listed are insufficient to feed the grinding plants in Michigan, Washington, and Wisconsin (all of which source their clinker from Canada). The unreported Canadian clinker appears to be mostly coming in by truck, at a value of less than \$2,000 (customs value) per truckload; such shipments are classified as “informal entries” and data on them are not routinely transmitted by the U.S. Customs Service to the U.S. Census Bureau for recordation into the official trade data (reproduced in tables 17–21). This recordation problem presumably does not exist for imports by rail or by barge or ship because these shipments are larger. Clinker imports from Canada have been estimated to be higher than those reported in tables 1 and 21 by about 0.5 Mt in 2005 and 0.7 Mt in 2006.

The 10 busiest customs districts of entry in 2006 were, in descending order, New Orleans, LA; Tampa, FL; Los Angeles, CA; Houston-Galveston, TX; San Francisco, CA; Miami, FL; Seattle, WA; Detroit, MI; New York, NY; and Nogales, AZ; the ranking was identical for 2005 except for the 10th position, which was Charleston, SC (table 18). These customs districts together accounted for about 70% of total imports in both years.

The United States imported cement and (or) clinker from 37 countries in 2006, the leading 10 of which were, in descending order, China, Canada, Thailand, the Republic of Korea, Mexico,

⁵The total exports of cement and clinker to Mexico for 2006 in the official (U.S. Census Bureau) data are 0.779 Mt, but for the component aluminous cement exported from Laredo, TX, the data include several months of data in kilograms misreported as tons. These were converted to metric tons for the correction to table 16, resulting in a net reduction of 0.744 Mt for the Mexico destination and the U.S. total.

Taiwan, Greece, Colombia, Venezuela, and Sweden. Together, these major sources accounted for about 90% of the total inflows. Imports from China were up by 123% to 10.5 Mt—the same percentage increase as that in 2005—and China easily displaced Canada from the first place position Canada had held in 2005 and in almost all recent past years. The tonnage from Canada fell by 6.4% to 5.1 Mt, not counting informal entries of clinker, as discussed earlier. Imports from Taiwan and Thailand showed large percentage increases in 2006, whereas large percentage declines were seen for Greece, Sweden, and, especially, Venezuela. Notwithstanding a drastic reduction in antidumping tariffs, imports from Mexico rose only modestly during the year and remained well below the agreed-upon quota of 3 Mt.

As in past years, gray portland cement was the dominant cement variety imported; in 2006, imports of this material totaled 30.7 Mt (table 19), or 86% of total cement and clinker imports. White cement imports were 1.3 Mt in 2006, down by 10.6% (table 20). As in past years, the 2006 data on white cement imports appears to include some material (for example, from the Dominican Republic and at least some of the material from Venezuela) that, based on low unit values, is likely either gray portland cement and/or gray clinker for which a white cement tariff code was recorded by the importers. Even excluding these questionable tonnages (relatively small in 2006), the imports of white cement appear to be enough in themselves to fully supply the sales of white portland cement (table 15). However, given that the three U.S. white cement plants all produced at more or less full capacity during the year and recorded no unduly large shifts in cement stockpiles, there would appear to be an overall excess of at least 0.2 Mt of white cement relative to the sales, even accounting for white cement exports (just 24,104 t in 2006) and white material incorporated within the overall sales of masonry cement (tables 9, 12, and 16). It also is possible that the white cement component of total cement sales is being underreported by some respondents to the USGS annual canvass.

Owing to fuel cost increases and some shortages of ships, there have been widespread, largely informal, reports in recent years of substantially higher fuel-related shipping costs for imports as well as some steep rises in the chartering rates for cement ships and other bulk carriers. The difference between the unit customs value and that on a cost, insurance, freight (c.i.f.) basis is a proxy for the shipping cost (tables 17–21). For imported gray portland cement (table 19), this difference was \$20.61 per metric ton, and becomes \$23.84 per ton if Canada and Mexico are removed (on the assumption that their data are anomalous because of a large majority percentage of overland imports); this is essentially unchanged from the difference in 2005 and only about 5% higher than that in 2004. If transportation costs have indeed gone up significantly, as would seem logical, then either a large majority of the imports are on a long-term contract basis (shielded from shipping rate fluctuations) or the unit cost difference is no longer a good proxy for the shipping cost component. A possible explanation for the latter would be if the customs value no longer represents the original free-on-board-ship value of the cargo; perhaps owing to middleman markups.

World Review

World hydraulic cement production data are listed in table 22. Although the data are supposed to include all forms of hydraulic cement, data for the United States are for portland plus masonry cement only, and data for some other countries also may be incomplete. For some countries, the production data may include their exports of clinker.

World cement output in 2006 was an estimated 2.6 billion metric tons (Gt), up by about 9%. Production was from more than 150 countries. China was again by far the world's leading producer; its output was up by nearly 13% to 1.2 Gt or 47% of the world total. China was also the world's leading cement exporter. The remaining top 15 producing countries were, in descending order, India, the United States, Japan, the Republic of Korea, Russia, Spain, Italy, Turkey, Mexico, Brazil, Thailand, Indonesia, Germany, and Iran. Cumulatively, the top 5 countries had about 62% of total world output; the top 10 countries, about 72%; and the top 15 countries, about 79%.

Regionally, Asia contributed about 66% of world production and included 7 of the 15 leading producing countries. Western Europe had about 9% of total output; North America, about 6%; the Middle East (including Turkey), about 6%; Central America and South America, about 4%; Africa, about 4%; the Commonwealth of Independent States, about 3%; and Eastern Europe, 2%.

Outlook

The severe decline in housing starts that characterized much of 2006 was expected to continue into 2007. The "lag effect" construction (such as schools, churches, and shopping malls) that had accompanied the housing boom appeared to have significantly tapered off by mid-2006, and this type of nonresidential construction was expected to play only a modest role in the 2007 market. Accordingly, other forms of private sector construction, as well as that in the public sector (especially for transportation infrastructure) were expected to become more dominant in 2007. Overall, cement sales were expected to decline somewhat in 2007, with a modest recovery expected by 2008 or 2009 and with long-term growth of several percent yearly in the medium to long term. In the near term, any reduction in sales was expected to be accommodated largely through further reduced imports and not reduced cement production. Capacity increases from new plants and/or expansions at existing plants were expected to significantly reduce the need for imports in the medium- to long-term, assuming no significant shutdown of domestic capacity because of environmental concerns (such as those about CO₂ emissions).

References Cited

- American Coal Ash Association, 2007, ACAA 2006 coal combustion product (CCP) production and use survey: Aurora, CO, American Coal Ash Association fact sheet, 2 p.
- Bell, Peter, 2006, Florida heats up: *International Cement Review*, April, p. 39-44.

- Cement Americas, 2006a, Cemex bid forces fast-track Rinker valuation: *Cement Americas*, November/December, p. 2.
- Cement Americas, 2006b, GCC-Rio Grande awards contracts for greenfield plant: *Cement Americas*, March/April. (Accessed July 8, 2008, via http://cementamericas.com/magarchive/issue_20060301/.)
- Cement Americas, 2006c, Lafarge planning nearly \$300 million S.C. upgrade: *Cement Americas*, September/October. (Accessed July 8, 2008, via http://cementamericas.com/magarchive/issue_20060901/.)
- Cement Americas, 2006d, Third Lafarge offer is the charm, deal completed: *Cement Americas*, May/June, p. 9.
- CEMEX S.A. de C.V., 2006a, CEMEX announces expansion of New Braunfels, Texas cement plant: Monterrey, Mexico, CEMEX S.A. de C.V. press release, February 16, 2 p.
- CEMEX S.A. de C.V., 2006b, United States and Mexico agree to resolve antidumping order on Mexican cement: Monterrey, Mexico, CEMEX S.A. de C.V. press release, January 19, 2 p.
- Concrete Monthly, 2006, Essroc Cement begins plant work: *Concrete Monthly*, v. 4, no. 9, September, p. 11.
- Eagle Materials, Inc., 2006, Eagle materials Inc. plans to increase its cement capacity by 50%; increases its annual dividend by 75% and issues initial FY 2007 earnings guidance 30% to 40% above FY 2006 guidance: Dallas, TX, Eagle Materials, Inc. press release, January 25, 3 p.
- Florida Department of Environmental Protection, 2006a, Final determination, Natural Resources of Florida dba, American Cement Company, Sumterville plant: Florida Department of Environmental Protection, DEP file no. 1190042-001-AC (PSD-FL-361), February 13, 10 p., and permit, 29 p.
- Florida Department of Environmental Protection, 2006b, Final determination, Sumter Cement Company, Center Hill plant: Florida Department of Environmental Protection, DEP file no. 1190041-001-AC (PSD-FL-358), February 6, 6 p., and permit, 32 p.
- Intergovernmental Panel on Climate Change, 2006, Mineral industry emissions: IPCC Guidelines for National Greenhouse Gas Inventories, v. 3, ch. 2. [CD ROM].
- International Cement Review*, 2006a, US project advances: *International Cement Review*, April 2006, p. 59-64.
- Keystone Cement Co., 2007, Keystone modernization: *International Cement Review*, April, p. 52-53.
- Lafarge North America, 2006, Lafarge North America confirms receipt of proposal from Lafarge S.A.: Herndon, VA, Lafarge North America press release, February 6, 2 p.
- Portland Cement Association, 2008, Construction put in place: *Monitor*, v. 18, no. 16, June, p. 10.
- Suwannee American Cement LLC, 2008, Branford, FL, About us: Suwannee American LLC. (Accessed July 31, 2008, via <http://www.suwanneecement.com/aboutus.html>.)
- Titan America, 2006, Florida's largest cement plant to increase production: Deerfield Beach, FL, Titan America press release, January 17, 1 p.
- U.S. Department of Commerce, 2006, U.S. and Mexico reach agreement in principal on cement trade: Washington DC, U.S. Department of Commerce, Commerce News (press release), January 19, 2 p.
- U.S. Environmental Protection Agency, 2006, 40 CFR Part 63 National emission standards for hazardous air pollutants from the portland cement manufacturing industry [EPA-HQ-OAR-2002-0051; FRL-8256-4]: *Federal Register*, v. 71, no. 244, December 20, p. 76519-76552.
- U.S. International Trade Commission, 2006, ITC will conduct a full "sunset" review concerning gray portland cement and cement clinker from Mexico and an expedited review concerning gray portland cement and cement clinker from Japan: Washington, DC, U.S. International Trade Commission, News release 06-002, January 6, 2 p.
- van Oss, H.G., 2005, Background facts and issues concerning cement and cement data, U.S. Geological Survey Open File 2005-1152, available via <http://minerals.usgs.gov/minerals/pubs/commodity/cement>.
- van Oss, H.G., 2007, Slag—Iron and steel, in *Metals and minerals*: U.S. Geological Survey, *Minerals Yearbook 2006*, v. I, p. 69.1-69.7.
- van Oss, H.G., and Padovani, A.C., 2002, Cement manufacture and the environment—Part I—Chemistry and technology: *Journal of Industrial Ecology*, v. 6, no. 1, p. 89-105.
- van Oss, H.G., and Padovani, A.C., 2003, Cement manufacture and the environment—Part II—Environmental challenges and opportunities: *Journal of Industrial Ecology*, v. 7, no. 1, p. 93-126.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Cement. Ch. in Mineral Commodity Summaries, annual.
Cement. Mineral Industry Surveys, monthly.

Other

American Coal Ash Association, annual survey.
Cement. Ch. in Mineral Facts and Problems, U.S. Bureau of
Mines Bulletin 675, 1985.
Cement Americas, bimonthly.

Cement Americas, North American Cement Directory. Intertec
Publishing, annual.
Concrete Products, monthly.
International Cement Review, monthly.
Portland Cement Association:
Monitor, The, monthly.
U.S. and Canadian Portland Cement Industry, Plant
Information Summary, annual.
Rock Products, monthly.
Slag Cement Association, annual survey.
The European Cement Association.
World Cement, monthly.

TABLE 1
SALIENT CEMENT STATISTICS¹

(Thousand metric tons and thousand dollars unless otherwise specified)

	2002	2003	2004	2005	2006
United States: ²					
Production:					
Cement ³	89,732	92,843	97,434	99,319	98,167
Clinker	81,517	81,882	86,658	87,405	88,555
Shipments from mills and terminals: ^{3, 4, 5}					
Quantity	108,500	111,000	120,000	128,000 ^r	127,000
Value ⁶	8,250,000	8,340,000	9,520,000	11,700,000 ^r	12,900,000
Average value ⁶ dollars per metric ton	76.00	75.00	79.50	91.00	101.50
Stocks at mills and terminals, yearend	7,680	6,610	6,740 ^r	7,450 ^r	9,380
Exports of cement and clinker	834	837	749	766	723 ⁷
Imports for consumption: ⁸					
Cement	22,198	21,015	25,396	30,403	32,141
Clinker	1,603	1,808	1,630	2,858	3,425
Total ⁹	23,801	22,823	27,026	33,261	35,566
Consumption, apparent ¹⁰	110,020	114,090	121,950 ^r	128,250 ^r	127,660
World, production ¹¹	1,850,000	2,030,000	2,190,000	2,350,000 ^r	2,560,000 ^e

^eEstimate. ^rRevised.

¹Unless otherwise indicated, data are for portland (including blended) and masonry cements only. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Excludes Puerto Rico.

³Includes cement produced from imported clinker.

⁴Includes imported cement.

⁵Shipments to final domestic customers. Data are from an annual survey of plants and terminals and may differ from the totals in table 9, which are based on consolidated monthly surveys from companies.

⁶Value at mill or independently reporting terminal of cement shipments to final domestic customers.

⁷Official export data have been corrected to remove an apparent excess 743,939 metric tons of aluminous cement from Laredo, TX, into Mexico.

⁸All forms of hydraulic cement or clinker, respectively.

⁹Data may not add to totals shown because of independent rounding.

¹⁰Production (including that from imported clinker) of portland and masonry cement plus imports of hydraulic cement minus exports of cement minus change in yearend cement stocks.

¹¹Total hydraulic cement. May include clinker exports for some countries.

TABLE 2
COUNTY BASIS OF SUBDIVISION OF STATES IN CEMENT TABLES

State subdivision	Defining counties
California, northern	Alpine, Fresno, Kings, Madera, Mariposa, Monterey, Tulare, Tuolumne, and all counties farther north.
California, southern	Inyo, Kern, Mono, San Luis Obispo, and all counties farther south.
Illinois, metropolitan Chicago	Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will Counties in Illinois.
Illinois, excluding Chicago	All counties other than those in metropolitan Chicago.
New York, eastern	Delaware, Franklin, Hamilton, Herkimer, Otsego, and all counties farther east and south, excepting those within Metropolitan New York.
New York, western	Broome, Chenango, Lewis, Madison, Oneida, St. Lawrence, and all counties farther west.
New York, metropolitan	New York City (Bronx, Kings, New York, Queens, and Richmond), Nassau, Rockland, Suffolk, and Westchester.
Pennsylvania, eastern	Adams, Cumberland, Juniata, Lycoming, Mifflin, Perry, Tioga, Union, and all counties farther east.
Pennsylvania, western	Centre, Clinton, Franklin, Huntingdon, Potter, and all counties farther west.
Texas, northern	Angelina, Bell, Concho, Crane, Culberson, El Paso, Falls, Houston, Hudspeth, Irion, Lampasas, Leon, Limestone, McCulloch, Reeves, Reagan, Sabine, San Augustine, San Saba, Tom Green, Trinity, Upton, Ward, and all counties farther north.
Texas, southern	Brazos, Burnet, Crockett, Jasper, Jeff Davis, Llano, Madison, Mason, Menard, Milam, Newton, Pecos, Polk, Robertson, San Jacinto, Schleicher, Tyler, Walker, Williamson, and all counties farther south.

TABLE 3
PORTLAND CEMENT PRODUCTION, CAPACITY, AND STOCKS IN THE UNITED STATES, BY DISTRICT¹

District ⁵	2005						2006					
	Active plants	Production ³ (thousand metric tons)	Capacity ²		Stocks at yearend ⁴ (thousand metric tons)	Percentage utilized ⁶	Active plants	Production ³ (thousand metric tons)	Capacity ²		Stocks at yearend ⁴ (thousand metric tons)	Percentage utilized ⁶
			Finish grinding (thousand metric tons)	Finish grinding (thousand metric tons)					Finish grinding (thousand metric tons)	Finish grinding (thousand metric tons)		
Maine and New York	5	3,241	4,569	70.9	220	5	3,356	4,203	79.8	235	79.8	
Pennsylvania, eastern	7	4,715	5,410	87.2	270	7	4,411	4,530 ⁷	81.3	277 ⁷	81.3	
Pennsylvania, western	3	1,573	1,719	91.5	126 ⁷	3	1,605	1,770 ⁷	90.7	117	90.7	
Illinois	4	3,237	3,410 ⁷	95.0	199 ⁷	4	3,108	3,420 ⁷	91.0	171 ⁷	91.0	
Indiana	4	3,058	3,723	82.2	223	4	3,025	3,720 ⁷	81.3	234	81.3	
Michigan and Wisconsin	6	5,599	7,330 ⁷	76.4	323 ⁷	5	5,437	7,328	74.2	422 ⁷	74.2	
Ohio	2	986	1,333	74.0	57	2	966	1,304	74.1	60	74.1	
Iowa, Nebraska, South Dakota	5	4,502	6,062	74.3	392	5	4,558	6,048	75.4	516	75.4	
Kansas	4	2,887	3,110 ⁷	92.8	146	4	3,003	3,329	90.2	249	90.2	
Missouri	5	5,332	7,017	76.0	444	5	5,240	6,958	75.3	678	75.3	
Florida ⁸	7	5,726	7,301	78.4	537 ⁷	7	5,876	7,301	80.5	591 ⁷	80.5	
Georgia, Virginia, West Virginia	4	2,370	3,440 ⁷	68.9	268	4	2,446	3,440 ⁷	71.2	280	71.2	
Maryland	3	2,552	2,706	94.3	146	3	2,651	3,087	85.9	222 ⁷	85.9	
South Carolina	3	3,267	5,018	65.1	185	3	3,315	5,109	64.9	223	64.9	
Alabama	5	5,123	5,948	86.1	270	5	5,201	6,036	86.2	403	86.2	
Kentucky, Mississippi, Tennessee	4	3,311	3,679	90.0	304	4	3,492	3,700 ⁷	94.3	348	94.3	
Arkansas and Oklahoma	4	2,810	3,280 ⁷	85.6	128	4	2,703	3,260 ⁷	83.0	233	83.0	
Texas, northern	6	6,639	7,560 ⁷	87.8	803	6	6,467	7,594	85.2	903 ⁷	85.2	
Texas, southern	5	4,916	5,620 ⁷	87.5	211	6	4,882	5,850 ⁷	83.4	411	83.4	
Arizona and New Mexico	3	2,788	3,480 ⁷	80.2	106	3	2,549	3,310 ⁷	77.0	163	77.0	
Colorado and Wyoming	3	2,648	3,025	87.5	185	3	2,579	3,450 ⁷	72.8	238	72.8	
Idaho, Montana, Nevada, Utah	6	3,085	3,740 ⁷	82.6	203	6	3,043	3,750 ⁷	81.2	256	81.2	
Alaska and Hawaii	--	--	--	--	71	--	--	--	--	97	--	
California, northern	3	2,696	2,944	91.6	127 ⁷	3	2,454	2,853	86.0	318 ⁷	86.0	
California, southern	8	8,868	10,200 ⁷	86.6	217 ⁷	8	8,495	10,238	83.0	435 ⁷	83.0	
Oregon and Washington	4	1,974	2,448	80.6	163	4	1,906	2,540 ⁷	75.1	158 ⁷	75.1	
Importers ⁹	--	--	--	--	639 ^{r,7}	--	--	--	--	456 ⁷	--	
Total or average ¹⁰	113	93,904	114,000 ⁷	82.3	6,910 ^{r,7}	113	92,768	115,000 ⁷	80.6	8,700 ⁷	80.6	
Puerto Rico	2	1,584	2,462	64.3	45	2	1,546	2,462	62.8	26 ⁷	62.8	
Grand total or average ¹⁰	115	95,488	117,000 ⁷	81.9	6,960 ^{r,7}	115	94,313	118,000 ⁷	80.2	8,720 ⁷	80.2	

¹Revised. -- Zero.

²Even when presented unrounded, data are thought to be accurate to no more than three significant digits. Includes data for white cement.

³Reported grinding capacity is based on fineness needed to produce a plant's normal output mix, including masonry cement, and allowing for downtime for routine maintenance.

⁴Includes cement made from imported clinker.

⁵Includes imported cement. Includes stocks at mills and terminals and in transit.

⁶District assignment is the location of the reporting facilities, including terminals. Includes independent importers for which district assignments were possible.

⁷Calculated relative to portland cement output; utilization percentage would be higher if calculated to include masonry cement output.

⁸Data contains estimates for nonrespondent or incompletely reporting facilities.

⁹Production and grinding capacity data exclude a plant that produced only masonry cement.

¹⁰Data include only those importers or terminals for which district assignments were not possible.

¹¹Data may not add to totals shown because of independent rounding.

TABLE 4
MASONRY CEMENT PRODUCTION AND STOCKS IN THE UNITED STATES, BY DISTRICT¹

District ⁴	2005			2006		
	Active plants	Production ² (thousand metric tons)	Stocks at yearend ³ (thousand metric tons)	Active plants	Production ² (thousand metric tons)	Stocks at yearend ³ (thousand metric tons)
Maine and New York	4	119	18	4	119	20
Pennsylvania	6	399	60 ⁵	9	384	63 ⁵
Indiana and Ohio	4	555	72	6	529	75
Michigan	4	228	46 ⁵	4	176	38 ⁵
Iowa, Nebraska, South Dakota	2	W	W	2	W	W
Kansas	2	W	W	2	W	W
Missouri	2	W	W	2	W	W
Florida	5	902	35	5	900	45
Georgia, Maryland, Virginia, West Virginia	5	543	51	6	511	63
South Carolina	3	498	26	3	575	48
Alabama	4	475	77	4	526	67
Kentucky, Mississippi, Tennessee	3	W	W	3	W	W
Arkansas and Oklahoma	4	188	18	4	193	21
Texas, northern	5	213	21	4	184	112
Texas, southern	3	182	13	3	198	9
Arizona and New Mexico	3	W	W	3	W	W
Colorado and Wyoming	2	W	W	2	W	W
Idaho, Montana, Nevada, Utah	1	W	W	1	W	W
California, northern	3	67	11	3	92	12
California, southern	4	627	12	4	605	18
Importers ⁶	--	--	4 ⁵	--	--	3 ⁵
Total ⁷	76	5,415	532 ⁵	74	5,399	689 ⁵

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹Includes masonry, portland-lime, and plastic cements. Even where presented unrounded, data are thought to be accurate to no more than three significant figures.

²Includes cement produced from imported clinker.

³Includes imported cement.

⁴District assignment is the location of the reporting facilities, including importers for which regional assignments were possible.

⁵Data contains estimates for nonrespondents or incompletely reporting facilities.

⁶Data include only those importers or terminals for which district assignments were not possible.

⁷Data may not add to totals shown because of independent rounding.

TABLE 5
CLINKER CAPACITY AND PRODUCTION IN THE UNITED STATES IN 2006, BY DISTRICT¹

District	Active plants ²		Number of kilns ⁴	Daily capacity ^{3,4} (thousand metric tons)	Average days of routine maintenance ⁴	Apparent annual capacity ^{4,5} (thousand metric tons)	Production (thousand metric tons)	Percentage of capacity utilized	Yearend stocks ⁶ (thousand metric tons)
	Process used								
	Wet	Dry							
Maine and New York	2	2	4	10.9	31.7	3,650 ⁷	3,094	84.9 ⁷	98 ⁷
Pennsylvania, eastern	2	4	6	14.6	32.0 ⁷	4,760 ⁷	4,132	86.9 ⁷	186
Pennsylvania, western	2	1	3	5.2	20.1 ⁷	1,800 ⁷	1,584	88.1 ⁷	50
Illinois	--	4	4	10.0	11.3	3,484	2,575	73.9	82
Indiana	1	3 ⁸	4	10.3	21.5	3,507	3,101	88.4	131
Michigan	1	2	3	14.1	25.6	4,747	4,119	86.8	380
Ohio	1	1	2	3.4	20.2	1,159	1,049	90.5	93
Iowa, Nebraska, South Dakota	--	4	1	14.0	17.6	4,841	4,222	87.2	235
Kansas	1	3	4	9.8	17.0	3,388	2,951	87.1	153
Missouri	2	3	5	16.1	25.8	5,372	4,757	88.6	193
Florida	--	6	6	17.7	24.5	5,954	5,630	94.6	380
Georgia, Virginia, West Virginia	1	2	3	8.3	10.5	2,901	2,464	84.9	154
Maryland	1	2	3	8.1	20.0 ⁷	2,754	2,663	96.7 ⁷	130 ⁷
South Carolina	--	3	3	12.3	20.7	4,260	3,525	82.8	379
Alabama	--	5	5	17.0	22.4	5,833	5,186	88.9	219
Kentucky, Mississippi, Tennessee	1	3	4	10.5	17.4	3,669	3,280	89.4	168
Arkansas and Oklahoma	2	2	4	8.0	24.5 ⁷	2,730 ⁷	2,575	94.4 ⁷	137
Texas, northern	2	3	1	22.4	15.0	7,753	6,389	82.4	442
Texas, southern	--	4	1	13.8	15.3 ⁷	4,810 ⁷	4,411	91.7 ⁷	332
Arizona and New Mexico	--	3	3	8.6	11.6	3,014	2,627	87.2	310
Colorado and Wyoming	--	3	3	8.9	22.1	2,974	2,493	83.9	253
Idaho, Montana, Nevada, Utah	3	3	6	8.5	18.8	2,918	2,800	96.0	81
California, northern	--	3	3	8.8	39.6	2,781	2,341	84.2	98
California, southern	--	8	8	29.6	21.3	10,143	8,829	87.0	655
Oregon and Washington	1	2	3	6.2	30.9	2,055	1,758	85.5	34
Total or average ⁹	23	79	105	296.9	20.6 ⁷	101,000 ⁷	88,555	87.5 ⁷	5,370 ⁷
Puerto Rico	--	2	2	5.9	28.3	1,979	1,490	75.3	71
Grand total or average ⁹	23	81	107	302.8	20.7 ⁷	103,000 ⁷	90,045	87.2 ⁷	5,440 ⁷

-- Zero.

¹Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Includes white cement plants. Includes all plants active for at least one day during the year.

³Sum of reported daily kiln capacities for each plant in district.

⁴Kilns active at least one day during the year. Excludes idle kilns (full year) that cannot be restarted, fully permitted, in less than 6 months.

⁵Sum of apparent annual kiln capacities: for each kiln, calculated as 365 days minus days reported as shut down for routine maintenance and then multiplied by the reported (unrounded) daily capacity.

⁶Includes imported clinker and clinker stockpiles at grinding plants.

⁷Data contain estimates for nonrespondent or incompletely reporting facilities and have been rounded to no more than three significant digits.

⁸Includes one semidry kiln.

⁹Data may not add to totals shown because of independent rounding.

TABLE 6
RAW MATERIALS USED IN PRODUCING CLINKER AND CEMENT IN THE UNITED STATES^{1,2}

(Thousand metric tons)

Raw materials	2005		2006	
	Clinker	Cement ³	Clinker	Cement ³
Calcareous:				
Limestone (includes aragonite, marble, chalk, coral)	114,000	2,230	114,000	2,380
Cement rock (includes marl)	11,300	2	13,300	52
Cement kiln dust (CKD) ⁴	334	414	178	364
Lime ⁵	9	30	121	21
Other	26	21	22	19
Aluminous:				
Clay	4,790	--	4,770	--
Shale	3,780	30	3,010	37
Other ⁶	721	--	637	--
Ferrous:				
Iron ore	813	--	752	--
Mill scale	656	--	754	--
Other ⁷	84	--	55	--
Siliceous:				
Sand and calcium silicate	3,010	--	3,620	--
Sandstone, quartzite, soils, other	950	--	1,030	--
Fly ash	2,950	153	2,950	130
Other ash, including bottom ash	1,210	--	1,190	--
Granulated blast furnace slag ⁸	144	521	207	678
Other blast furnace slag	255	--	324	--
Steel slag	525	--	490	--
Other slags	58	2	145	2
Natural rock pozzolans ⁹	--	8	--	15
Other pozzolans ¹⁰	222	62	139	14
Other:				
Gypsum and anhydrite	--	5,370	--	5,440
Other, n.e.c. ¹¹	84	108	66	92
Total ¹²	146,000	8,940	148,000	9,240
Clinker, imported, raw materials equivalent ¹³	--	4,750	--	4,210
Grand total ¹²	146,000	13,700	148,000	13,500

-- Zero.

¹Excludes Puerto Rico.

²Data have been rounded to three significant digits to reflect inherent reporting accuracy and the incorporation of estimates for some facilities.

³Includes portland, blended, and masonry cements.

⁴Data are underreported.

⁵Data are probably underreported, especially regarding incorporation within masonry cements.

⁶Includes alumina, aluminum dross, bauxite, catalysts, staurolite, and other materials.

⁷Includes iron sludges, pyrite, and other materials.

⁸Includes both ground (GGBFS) and unground material.

⁹Includes pozzolana and burned clays and shales except where reported directly as clay or shale.

¹⁰Includes diatomite, silica fume, other microcrystalline silica, and other pozzolans, even if not used as such.

¹¹Not elsewhere classified. Includes fluorspar.

¹²Data may not add to totals shown because of independent rounding.

¹³Converted as the weight of foreign clinker consumed times 1.7.

TABLE 7
CLINKER PRODUCED AND FUEL CONSUMED BY THE CEMENT INDUSTRY IN THE UNITED STATES, BY PROCESS¹

Kiln process	Clinker produced ³			Fuel consumed ²				Waste fuel		
	Active plants	Quantity (thousand metric tons)	Percentage of total	Coal ⁴ (thousand metric tons)	Petroleum coke (thousand metric tons)	Oil ⁵ (thousand liters)	Natural gas (thousand cubic meters)	Tires (thousand metric tons)	Solid (thousand metric tons)	Liquid (thousand liters)
2005:										
Wet	23	11,807	13.5	1,480	586	29,300	22,800	85	9	479,000
Dry	79	70,809	81.0	7,340	1,740	58,000	310,000	315	110	894,000
Both ⁶	4	4,790	5.5	679	21	--	62,000	5	10	93,300
Total ⁷	106	87,405	100.0	9,490	2,350	87,300	395,000	405	130	1,470,000
2006:										
Wet	23	11,659	13.2	1,530	518	33,700	18,000	90	19	585,000
Dry	79	72,742	82.1	7,340	1,860	46,700	306,000	323	283	360,000
Both	3	4,154	4.7	661	13	--	44,800	5	--	42,600
Total ⁷	105	88,555	100.0	9,540	2,390	80,400	369,000	418	302	988,000

-- Zero.

¹Data exclude Puerto Rico.

²All fuel data have been rounded to three significant digits.

³Clinker data were all reported; although unrounded, data are thought to be accurate to no more than three significant digits.

⁴Essentially all reported to be bituminous.

⁵Distillate and residual fuel oil. Excludes used oils that were reported under liquid wastes.

⁶Fuel quantities may not represent normal operating conditions owing to the inclusion of a plant that underwent conversion from wet to dry technology the year.

⁷Data may not add to totals shown because of independent rounding.

TABLE 8
ELECTRIC ENERGY USED AT CEMENT PLANTS IN THE UNITED STATES, BY PROCESS¹

Plant process	Electric energy used ²						Finished cement produced ⁴ (thousand metric tons)	Average consumption (kilowatthours per metric ton of cement produced)
	Generated at plant		Purchased		Total ³			
	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Quantity ² (million kilowatthours)	Percentage		
2005								
Integrated plants:								
Wet	--	--	23	1,770	1,770	13.2 ^r	13,075	135
Dry	5	486	79	10,400	10,900	81.3 ^r	78,423	139
Both ⁵	--	--	4	770	770	5.7	5,029	153
Total or average ³	5	486	106	12,900 ^r	13,400 ^r	100.0	96,527	139
Grinding plants ⁶	--	--	7	214	214	--	2,562	84
Exclusions ⁷	--	--	2	XX	XX	--	229	XX
2006								
Integrated plants:								
Wet	1	(⁸)	23	1,770	1,770	13.1	12,741	139
Dry	5	476	79	10,600	11,100	82.3	79,014	141
Both	--	--	3	622	622	4.6	4,098	152
Total or average ³	6	476	105	13,000	13,500	100.0	95,854	141
Grinding plants ⁶	--	--	6	160	160	--	1,962	81
Exclusions ⁷	--	--	2	XX	XX	--	351	XX

^rRevised. XX Not applicable. -- Zero.

¹Data exclude Puerto Rico.

²Electricity data are rounded to no more than three significant digits because they contain estimates.

³Data may not add to totals shown because of independent rounding.

⁴Include portland and masonry cements. Data are all reported and have not been rounded.

⁵Electricity consumption may not represent normal operating conditions owing to the inclusion of one plant that underwent conversion from wet to dry kiln technology during the year.

⁶Excludes plants that reported production of only masonry cement.

⁷Plants that reported production only of masonry cement.

⁸Less than 1/2 unit.

TABLE 9
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN^{1,2}

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2005	2006	2005	2006
Destination:				
Alabama	1,738	1,798	183	196
Alaska ³	173	176	--	--
Arizona	4,671	4,611	102	103
Arkansas	1,205	1,187	97	87
California, northern	5,377	4,761	148	130
California, southern	9,945	9,549	540	530
Colorado	2,521	2,641	33	31
Connecticut ³	799	814	19	18
Delaware ³	208	247	13	12
District of Columbia ³	205	210	(4)	(4)
Florida	11,233	11,180	1,052	1,015
Georgia	4,395	4,484	357	394
Hawaii ³	431	462	7	6
Idaho	704	724	1	1
Illinois, excluding Chicago	2,437	1,921	28	27
Illinois, metropolitan Chicago ³	2,101 ^f	2,634	70	71
Indiana	2,182	2,173	92	84
Iowa	1,933	1,920	6	3
Kansas	1,537	1,546	11	11
Kentucky	1,486	1,330	117	104
Louisiana ³	2,167 ^f	2,546	65	72
Maine	234	334	5	5
Maryland	1,568	1,614	92	95
Massachusetts ³	1,242	1,196	22	21
Michigan	2,924	2,505	135	101
Minnesota ³	2,016	1,902	39	15
Mississippi	1,067	1,176	69	80
Missouri	2,816	2,626	52	44
Montana	380	396	1	1
Nebraska	1,362 ^f	1,306	6	5
Nevada	2,602	2,626	27	29
New Hampshire ³	229	336	5	7
New Jersey ³	1,964	1,923	94	96
New Mexico	901	900	8	8
New York, eastern	653	662	19	18
New York, western ³	817	798	27	25
New York, metropolitan ³	1,681	1,893	92	104
North Carolina ³	2,900	3,109	352	357
North Dakota ³	359	368	2	2
Ohio	3,893	3,727	171	154
Oklahoma	1,603	1,543	71	69
Oregon	1,237	1,318	1	1
Pennsylvania, eastern	2,214	2,172	71	67
Pennsylvania, western	1,096	1,107	56	54
Rhode Island ³	188	212	3	3
South Carolina	1,778	1,851	166	177
South Dakota	483	588	2	2
Tennessee	2,242 ^f	2,259	278	284
Texas, northern	6,793	6,499	164	170
Texas, southern	7,876 ^f	8,122	257	268
Utah	1,526	1,697	(4)	(4)

See footnotes at end of table.

TABLE 9—Continued
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN^{1,2}

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2005	2006	2005	2006
Destination—Continued:				
Vermont ³	129	158	3	3
Virginia	2,666	2,639	203	188
Washington	2,238	2,351	2	2
West Virginia	512	562	27	26
Wisconsin	2,348	2,171	25	22
Wyoming	466	466	1	--
Total ⁵	122,445 ^r	122,026	5,489	5,401
Foreign countries ⁶	1,857 ^r	1,813	(4)	(4)
Puerto Rico	424 ^r	473	--	--
Grand total ⁵	124,726 ^r	124,312	5,489	5,401
Origin:				
United States	94,004	91,933	5,429	5,354
Puerto Rico	1,584	1,558	--	--
Foreign countries ⁷	29,139 ^r	30,821	60	47
Total shipments ⁵	124,726 ^r	124,312	5,489	5,401

^rRevised. -- Zero.

¹Includes cement produced from imported clinker and imported cement shipped by domestic producers and importers.

²Data are developed from consolidated monthly surveys of shipments by companies and may differ from data in tables 1, 10-12, and 14-15, which are from annual surveys of individual plants and importers. Includes any revisions to monthly data available through April 30, 2008. Although presented unrounded, data are thought to be accurate to no more than three significant digits.

³Has no cement plants.

⁴Less than ½ unit.

⁵Data may not add to totals shown because of independent rounding.

⁶Includes shipments to U.S. possessions and territories.

⁷Imported cement sold to final customers in the United States as reported by domestic producers and other importers. Data do not match the imports in tables 17 and 21.

TABLE 10
SHIPMENTS OF PORTLAND CEMENT FROM MILLS IN THE UNITED STATES,
IN BULK AND IN CONTAINERS, BY TYPE OF CARRIER^{1,2}

(Thousand metric tons)

	Shipments from plant to terminal		Shipments to final domestic consumer				Total shipments to consumer ⁴
	In bulk	In containers ³	In bulk	In containers ³	In bulk	In containers ³	
2005:							
Railroad	12,000	13	1,570	18	488	--	2,080
Truck	3,920	200	62,700	1,940	55,100 ^r	727 ^r	121,000 ^r
Barge and boat	8,970	--	80	--	559 ^r	--	639 ^r
Total ⁴	24,900	214	64,400	1,960	56,200 ^r	727 ^r	123,000 ^{r,5}
2006:							
Railroad	11,600	12	1,740	16	804	1	2,560
Truck	4,700	285	63,500	1,760	52,700	736	119,000
Barge and boat	7,870	--	67	--	558	--	625
Total ⁴	24,100	297	65,300	1,780	54,000	737	122,000 ⁵

^rRevised. -- Zero.

¹Includes imported cement and cement made from imported clinker. Data exclude Puerto Rico.

²Data are rounded to no more than three significant digits because they include estimates.

³Includes packages, bags, jumbo bags, and supersacks.

⁴Data may not add to totals shown because of independent rounding.

⁵Shipments based on an annual survey of plants and importers; may differ from totals in table 9, which are based on consolidated monthly data.

TABLE 11
PORTLAND CEMENT SHIPPED BY PRODUCERS AND IMPORTERS IN THE UNITED STATES, BY DISTRICT¹

District ^{3,4}	2005			2006		
	Quantity (thousand metric tons)	Value ²		Quantity (thousand metric tons)	Value ²	
		Total (thousands)	Average (dollars per metric ton)		Total (thousands)	Average (dollars per metric ton)
Maine and New York	3,434	\$305,647	89.00	4,420 ⁵	\$451,000 ⁵	102.00 ⁵
Pennsylvania, eastern	4,686	411,000 ⁵	87.50 ⁵	4,629	463,000 ⁵	100.00 ⁵
Pennsylvania, western	1,563	139,204	89.06	1,520 ⁵	147,000 ⁵	97.00 ⁵
Illinois	3,670 ^{r,5}	325,000 ^{r,5}	88.50 ⁵	3,616	358,000 ⁵	99.00 ⁵
Indiana	3,141	249,419	79.40	3,075	271,264	88.23
Michigan and Wisconsin	6,170 ⁵	574,000 ⁵	93.00 ⁵	6,050 ⁵	596,000 ⁵	99.00 ⁵
Ohio	984	89,069	90.48	949	94,360	99.47
Iowa, Nebraska, South Dakota	5,151	474,693	92.16	5,208	518,164	99.49
Kansas	2,376	200,526	84.41	2,526	240,854	95.35
Missouri	6,281	546,361	86.99	5,896	562,930	95.47
Florida	10,841	982,819	90.65	10,591	1,084,593	102.41
Georgia, Virginia, West Virginia	3,001	256,000	85.50 ⁵	3,259	324,928	99.69
Maryland	2,842	234,277	82.41	2,960 ⁵	264,000 ⁵	89.50 ⁵
South Carolina	3,827	289,278	75.59	3,723	330,187	88.69
Alabama	5,459	448,929	82.24	5,718	515,186	90.10
Kentucky, Mississippi, Tennessee	3,281	284,667	86.77	3,305	327,267	99.02
Arkansas and Oklahoma	2,998	250,345	83.51	2,830	262,542	92.77
Texas, northern	8,096	681,000 ⁵	84.00 ⁵	7,877	746,000 ⁵	94.50 ⁵
Texas, southern	6,674	534,932	80.15	6,543	607,741	92.89
Arizona and New Mexico	4,600 ⁵	465,000 ⁵	101.00 ⁵	4,610	524,592	113.79
Colorado and Wyoming	2,704	237,000	87.50	2,842	281,020	98.87
Idaho, Montana, Nevada, Utah	3,473	323,457	93.13	3,420	361,630	105.74
Alaska and Hawaii	560	78,247	139.72	591	82,662	139.81
California, northern	4,518	443,260	98.11	4,063	434,390	106.91
California, southern	11,575	1,125,323	97.22	10,964	1,197,612	109.23
Oregon and Washington	3,040 ⁵	268,000 ⁵	88.00 ⁵	2,690 ⁵	252,000 ⁵	93.50 ⁵
Importers ⁶	8,300 ^{r,5}	788,000 ^{r,5}	95.00 ^{r,5}	7,950 ⁵	848,000 ⁷	106.50 ⁵
Total or average ⁷	123,000 ^{r,5,8}	11,000,000 ^{r,5}	89.00 ⁵	122,000 ^{5,8}	12,100,000 ⁷	99.50 ⁵
Puerto Rico	1,867	W	W	1,820	W	W
Grand total ⁷	125,000 ^{r,5,8}	W	W	124,000 ^{5,8}	W ⁷	W

¹Revised. W Withheld to avoid disclosing company proprietary data.

²Includes portland cement (gray and white) and cement produced from imported clinker. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

³Values represent mill net or ex-plant (free on board plant) valuations of total sales to final customers, including sales from plant distribution terminals. The data are ex-terminal for independent terminals. All varieties of portland cement, and both bag and bulk shipments, are included. Unless otherwise specified, data are presented unrounded but may include cases where value data (only) were missing from survey forms and so were estimated. Accordingly, unrounded value data should be viewed as cement value indicators, good to no better than the nearest \$0.50 or even \$1.00 per metric ton.

⁴District is the location of the reporting entity, not necessarily the location of sales (see table 9 for sales data, by State).

⁵Includes shipments by independent importers where regional assignments were possible.

⁶Data are rounded (unit values to the nearest \$0.50) because they include estimated data.

⁷Importers for which district assignments were not possible.

⁸Data may not add to totals shown because of independent rounding.

⁹Shipments calculated on the basis of an annual survey of plants and importers; may differ from data in table 9, which are based on consolidated company monthly data.

TABLE 12
MASONRY CEMENT SHIPPED BY PRODUCERS AND IMPORTERS IN THE UNITED STATES, BY DISTRICT^{1,2}

District ⁴	2005			2006		
	Quantity (thousand metric tons)	Value ³		Quantity (thousand metric tons)	Value ³	
		Total (thousands)	Average (dollars per metric ton)		Total (thousands)	Average (dollars per metric ton)
Maine and New York	118	\$12,751	108.06	128 ⁵	\$15,200 ⁵	118.50 ⁵
Pennsylvania	342 ⁵	42,600 ⁵	124.50 ⁵	347	47,300 ⁵	136.00 ⁵
Illinois, Indiana, Ohio	536	68,340	127.50	520	70,762	136.14
Michigan	232 ⁵	28,000 ⁵	120.50 ⁵	200 ⁵	25,800 ⁵	129.00 ⁵
Iowa, Nebraska, South Dakota	40	3,728	93.20	17	2,055	120.85
Kansas and Missouri	169	21,279	125.91	149	20,257	135.73
Florida	945	134,930	142.78	913	148,507	162.69
Georgia, Maryland, Virginia, West Virginia	476	75,800 ⁵	159.50 ⁵	427	69,549	162.70
South Carolina	473	51,539	108.96	484	57,986	119.86
Alabama	500	57,727	115.45	538	68,100 ⁵	126.50 ⁵
Kentucky, Mississippi, Tennessee	127	16,364	128.85	137	18,802	137.04
Arkansas and Oklahoma	190	20,508	107.94	179	20,800	116.30
Texas, northern	188	26,200 ⁵	139.00 ⁵	202	31,600 ⁵	156.50 ⁵
Texas, southern	186	19,814	106.53	204	24,391	119.78
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	156	18,706	119.91	147	18,820	127.62
Alaska and Hawaii	5	1,234	246.80	4	1,135	264.55
California, northern; Oregon; Washington	71	9,060 ⁵	127.50 ⁵	93	11,421	123.44
California, southern	628	72,178	114.93	604	77,900 ⁵	129.00 ⁵
Importers ⁶	24 ⁵	3,480 ⁵	145.00 ⁵	17 ⁵	2,730 ⁵	169.50 ⁵
Total or average ⁷	5,410 ^{5,8}	684,000 ⁵	126.50 ⁵	5,310 ^{5,8}	733,000 ⁵	138.00 ⁵

¹Shipments are to final customers and include imported cement and cement made from imported clinker. Data exclude Puerto Rico, which did not record any masonry cement sales. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Includes gray, white, and colored varieties of masonry, portland-lime, and plastic cements.

³Values represent ex-plant (free on board) valuations of total sales to final customers, including sales from distribution terminals. Even where presented unrounded, data should be viewed as cement value indicators, good to no better than the nearest \$0.50 or even \$1.00 per metric ton.

⁴District is the location of the reporting entity, not necessarily the location of sales (see table 9 for sales data, by State).

⁵Data are rounded (unit values to the nearest \$0.50) because they include estimated data.

⁶Importers for which district assignments were not possible.

⁷Data may not add to totals shown because of independent rounding.

⁸Tonnages based on an annual survey of plants and terminals and may differ from the totals in table 9, which represent consolidated monthly surveys of companies.

TABLE 13
AVERAGE MILL NET VALUE OF CEMENT IN THE UNITED STATES^{1,2}

(Dollars per metric ton)

Year	Gray portland cement	White portland cement ³	All portland cement	Prepared masonry cement	All classes of cement
2005	88.50	176.00	89.00	126.50	91.00
2006	99.00	191.00	99.50	138.00	101.50

¹Excludes Puerto Rico. Values are the average of sales to final customers, free on board plant or import terminal, less all discounts, allowances, and onward delivery charges to customers or distribution terminals, but inclusive of bagging charges.

²Data are rounded to the nearest \$0.50 because they include estimates.

³The unit values for white cement include a component of resales showing significant price markups.

TABLE 14
PORTLAND CEMENT SHIPMENTS IN 2006, BY DISTRICT AND TYPE OF CUSTOMER ¹

(Thousand metric tons)

District ^{2,3}	Ready-mixed concrete	Concrete product manufacturers	Contractors	Building material dealers	Oil well, mining, waste	Government and miscellaneous ⁴	Total ^{5,6}
Maine and New York	3,530	409	99	349	--	28	4,420
Pennsylvania, eastern	2,920	1,150	140	298	--	119	4,629
Pennsylvania, western	1,070	263	124	18	22	21	1,520
Illinois	2,690	315	137	63	259	153	3,616
Indiana	2,350	462	171	64	10	17	3,075
Michigan and Wisconsin	4,850	562	307	112	57	159	6,050
Ohio	724	158	24	32	1	9	949
Iowa, Nebraska, South Dakota	3,970	607	378	50	67	135	5,208
Kansas	1,950	192	200	72	87	23	2,526
Missouri	4,730	434	576	56	5	100	5,896
Florida	7,630	2,140	237	562	--	20	10,591
Georgia, Virginia, West Virginia	2,200	758	167	96	9	27	3,259
Maryland	2,360	301	167	70	4	58	2,960
South Carolina	2,550	689	193	64	3	223	3,723
Alabama	4,330	668	224	134	23	337	5,718
Kentucky, Mississippi, Tennessee	2,560	444	123	78	22	78	3,305
Arkansas and Oklahoma	2,040	140	319	106	68	153	2,830
Texas, northern	5,080	496	1,030	70	676	528	7,877
Texas, southern	4,390	757	754	187	445	15	6,543
Arizona and New Mexico	3,370	665	259	152	158	8	4,610
Colorado and Wyoming	1,970	269	220	11	219	151	2,842
Idaho, Montana, Nevada, Utah	2,690	234	77	56	210	151	3,420
Alaska and Hawaii	538	48	--	--	--	5	591
California, northern	3,330	405	132	181	--	12	4,063
California, southern	7,820	2,350	237	459	96	--	10,964
Oregon and Washington	1,870	539	71	148	63	4	2,690
Importers ⁷	6,020	827	527	370	93	120	7,950
Total ⁶	89,500	16,275	6,890	3,859	2,597	2,652	122,000
Puerto Rico	820	386	82	504	--	25	1,820
Grand total ⁶	90,400	16,662 ⁸	6,972 ⁹	4,363	2,597 ¹⁰	2,677	124,000

-- Zero.

¹Includes imported cement and cement ground from imported clinker. Except for district totals, data have been rounded to three significant digits but are likely to be accurate to only two significant digits. District totals are accurate to no more than three significant digits.

²District is the location of the reporting entity, not necessarily the location of sales (see table 9 for sales data, by State).

³Includes shipments by independent importers for which district assignments were possible.

⁴Includes shipments for which customer types were not specified.

⁵District totals are unrounded except in accord with table 11.

⁶Data may not add to totals shown because of independent rounding.

⁷Shipments by importers for which district assignments were not possible.

⁸Grand total shipments to concrete product manufacturers include brick and block—6,400; precast and prestressed—3,770; pipe—1,960; and other or unspecified—4,530.

⁹Grand total shipments to contractors include airport—147; road paving—4,010; soil cement—1,340; and other or unspecified—6,970.

¹⁰Grand total shipments include oil well drilling—2,130; mining—239; and waste stabilization—230.

TABLE 15
 PORTLAND CEMENT SHIPPED FROM PLANTS IN THE UNITED STATES TO
 DOMESTIC CUSTOMERS, BY TYPE^{1,2}

(Thousand metric tons)

Type	2005	2006
General use and moderate heat (Types I and II) (gray) ³	94,800 ^r	93,500
High early strength (Type III)	3,960	3,810
Sulfate resisting (Type V) ³	18,100	17,700
Block	555	581
Oil well	1,440	1,480
White ⁴	1,190	1,180
Blended:		
Portland, natural pozzolans	40	216
Portland, granulated blast furnace slag	1,880	2,140
Portland, fly ash	362	304
Other blended cement ⁵	883	718
Total ⁶	3,160	3,400
Expansive and regulated fast setting	62 ^r	42
Miscellaneous ⁷	2	59 ⁸
Grand total ^{6,9}	123,000 ^r	122,000

^rRevised.

¹Sales to domestic final customers only. Includes sales of imported cement. Excludes Puerto Rico.

²Data are rounded to no more than three significant digits.

³Cements classified as Type II/V hybrids are included with Type V.

⁴Mostly Types I and II but may include Types III-V and block cements.

⁵Includes blends with other pozzolans (cement kiln dust, silica fume, other).

⁶Data may not add to totals shown because of independent rounding.

⁷Includes low heat (Type IV), waterproof, and other portland-type cements.

⁸Includes some ASTM C-1157 cements possibly included with other cement types in former years.

⁹Data are based on an annual survey of plants and importers; totals may differ from those in table 9, which are based on consolidated monthly data from companies.

TABLE 16
U.S. EXPORTS OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

	2005		2006	
	Quantity	Value ²	Quantity	Value ²
United States:				
Argentina	1	123	(3)	185
Australia	3	288	4	248
Azerbaijan	3	160	--	--
Bahamas	31	3,733	22	2,615
Brazil	1	124	2	112
British Virgin Islands	(3)	39	1	132
Canada	650	52,313	601	52,845
Cayman Islands	1	162	1	118
China	4	461	3	403
Colombia	(3)	63	1	216
Cyprus	(3)	46	1	106
Dominican Republic	4	216	1	180
Ecuador	(3)	47	1	36
El Salvador	--	--	1	88
France	1	102	--	--
Greece	2	202	2	162
Guatemala	1	164	1	113
Hong Kong	3	185	3	183
Indonesia	1	33	--	--
Ireland	(3)	90	1	119
Israel	1	35	1	53
Jamaica	(3)	48	2	117
Japan	1	66	1	45
Korea, Republic of	2	140	3	164
Mexico	28	4,787	35 ⁴	5,126 ⁴
Netherlands	1	30	(3)	10
Netherlands Antilles	1	127	1	175
Panama	1	129	2	370
Peru	3	189	3	198
Saudi Arabia	9	907	(3)	21
Singapore	(3)	15	1	258
Spain	1	26	1	59
Sweden	1	60	1	52
Taiwan	4	179	6	427
Thailand	(3)	58	1	61
Tokelau Islands	--	--	1	47
Trinidad and Tobago	1	129	1	89
Turks and Caicos Islands	(3)	33	3	189
United Arab Emirates	1	211	4	350
United Kingdom	1	32	(3)	21
Venezuela	1	127	4	241
Other	3 ^r	910 ^r	4	1,914
Total ⁵	766	66,789	723 ⁴	67,914 ⁴

See footnotes at end of table.

TABLE 16—Continued
 U.S. EXPORTS OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

	2005		2006	
	Quantity	Value ²	Quantity	Value ²
Puerto Rico:				
Antigua and Barbuda	--	--	1	137
Aruba	--	--	5	326
Bahamas, The	1	60	--	--
Barbados	--	--	7	257
British Virgin Islands	(3)	3	4	568
Dominica	--	--	1	124
Dominican Republic	35	1,415	(3)	10
Guadaloupe	--	--	14	618
Haiti	--	--	3	231
Jamaica	--	--	15	738
Martinique	--	--	7	2,594
Netherlands Antilles	--	--	18	805
St. Vincent and the Grenadines	--	--	1	627
Trinidad and Tobago	--	--	1	461
Turks and Caicos Islands	1	32	9	506
Other	(3)	3 ^r	(3)	24
Total ⁵	37	1,513	86	8,025
Grand total ⁵	803	68,302	809 ⁴	75,877 ⁴

^rRevised. -- Zero.

¹Includes portland and masonry cements.

²Free alongside ship value. The value of exports at the U.S. seaport or border point of export is based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. The value excludes the cost of loading.

³Less than ½ unit.

⁴Official export data have been corrected to remove an apparent excess (743,939 metric tons and \$38.253 million) of aluminous exports from Laredo, TX.

⁵Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 17
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER,
BY COUNTRY¹

(Thousand metric tons and thousand dollars)

	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States:						
Brazil	467	25,153	29,837	454	23,133	30,388
British Virgin Islands ⁴	--	--	--	16	1,993	2,559
Bulgaria	303	16,921	20,325	295	16,297	19,634
Canada	5,404	319,259	338,523	5,059	325,217	345,126
China	4,726	202,089	319,988	10,542	469,112	734,103
Colombia ⁴	1,844	94,981	123,758	1,862	110,909	139,797
Croatia	34	6,659	8,103	29	5,817	6,986
Denmark	227	16,316	24,978	270	20,369	31,185
Dominican Republic	77	4,406	6,188	24	1,295	1,788
Egypt	569	33,419	48,355	275	16,902	24,485
France	74	16,509	19,508	97	22,805	25,380
Greece	2,786	104,910	172,406	1,950	91,745	135,493
Indonesia	865	29,481	58,713	130	5,045	8,620
Japan	4	1,155	1,832	3	1,097	2,403
Korea, Republic of	2,526	87,370	144,854	2,544	106,553	157,391
Mexico	2,173	110,281	138,030	2,264	142,081	171,928
Norway	522	25,299	32,574	233	9,849	15,077
Peru	1,047	35,546	60,527	822	40,108	54,371
Philippines	312	9,728	18,220	--	--	--
Romania	--	--	--	212	9,444	13,523
Spain	236	16,497	22,895	69	7,362	10,043
Sweden	1,050	35,421	59,660	889	37,760	57,483
Taiwan	1,759	71,448	124,679	2,180	93,516	148,997
Thailand	2,893	117,719	193,668	3,798	180,136	268,166
Turkey	675	28,873	50,665	591	30,801	46,815
United Arab Emirates	5	468	698	2	198	329
United Kingdom	14	4,907	5,211	7	2,943	3,037
Venezuela	2,484	119,203	170,362	943	48,907	66,850
Other	187	13,178	15,918	6	4,131	4,904
Total ⁵	33,261	1,547,198	2,210,475	35,566	1,825,530	2,526,864
Puerto Rico:						
China	--	--	--	78	2,891	4,686
Colombia	5	589	806	12	1,427	1,882
Denmark	212	8,054	13,499	27	1,508	2,337
Korea, Republic of	146	5,130	9,410	201	9,649	15,716
Mexico	12	1,189	1,733	12	1,281	1,816
Other	15	628	695	(6)	29	30
Total ⁵	391	15,590	26,142	330	16,785	26,467
Grand total ⁵	33,652	1,562,788	2,236,617	35,896	1,842,315	2,553,331

-- Zero.

¹Includes portland, masonry, and other hydraulic cements.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry.

⁴Material from British Virgin Islands is thought to be from Colombia.

⁵Data may not add to totals shown because of independent rounding.

⁶Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 18
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
 AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States:						
Anchorage, AK:						
Canada	8	449	898	11	526	1,557
France	--	--	--	(4)	2	5
Korea, Republic of	134	4,643	8,859	120	4,624	8,430
Total ⁵	143	5,092	9,757	131	5,152	9,992
Baltimore, MD:						
Canada	--	--	--	76	4,206	5,527
China	12	1,225	2,606	--	--	--
Germany	(4)	9	9	--	--	--
Netherlands	(4)	36	39	(4)	20	24
Norway	89	3,458	3,458	--	--	--
Romania	--	--	--	132	6,058	8,893
Sweden	--	--	--	(4)	176	212
Taiwan	25	822	1,758	35	1,225	1,225
United Kingdom	--	--	--	(4)	82	96
Venezuela	7	294	484	18	639	639
Total ⁵	134	5,844	8,354	262	12,404	16,617
Boston, MA:						
Canada	--	--	--	29	1,654	2,328
China	--	--	--	4	132	267
Netherlands	(4)	48	51	(4)	22	24
Venezuela	132	5,292	8,246	42	1,922	2,929
Total ⁵	132	5,339	8,298	74	3,730	5,547
Buffalo, NY:						
Canada	817	48,849	52,421	828	55,681	59,501
Croatia	(4)	76	112	--	--	--
United Kingdom	6	1,398	1,447	4	1,159	1,196
Total ⁵	823	50,323	53,980	832	56,841	60,697
Charleston, SC:						
Brazil	37	2,126	2,151	--	--	--
China	--	--	--	9	327	696
Colombia	299	16,435	20,142	245	16,851	20,447
Greece	686	25,491	45,975	745	33,868	51,026
Italy	(4)	362	1,146	--	--	--
Japan	--	--	--	(4)	269	1,033
Netherlands	(4)	48	54	(4)	33	37
Spain	23	1,428	1,450	--	--	--
Sweden	(4)	13	16	--	--	--
Switzerland	(4)	12	15	--	--	--
United Kingdom	2	883	967	1	234	238
Venezuela	55	3,023	3,993	--	--	--
Total ⁵	1,102	49,820	75,909	998	51,582	73,477
Chicago, IL:						
France	--	--	--	(4)	53	56
Japan	(4)	74	85	(4)	151	181
Netherlands	1	729	866	1	826	993
Poland	--	--	--	(4)	20	21
Spain	(4)	2	3	--	--	--
United Kingdom	(4)	3	3	(4)	3	5
Total ⁵	1	809	958	2	1,053	1,255

See footnotes at end of table.

TABLE 18—Continued
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States—Continued:						
Cleveland, OH:						
Canada	791	42,374	44,236	931	48,944	51,003
China	--	--	--	1	19	22
Netherlands	(4)	360	411	(4)	348	405
Total ⁵	792	42,734	44,647	932	49,311	51,430
Columbia-Snake, OR:						
Canada	111	5,277	5,787	18	870	915
China	672	23,704	39,359	1,011	42,203	61,500
Korea, Republic of	84	2,853	4,399	--	--	--
Thailand	--	--	--	3	129	208
Total ⁵	867	31,834	49,545	1,032	43,202	62,623
Dallas, Fort Worth, TX: China	--	--	--	(4)	6	8
Detroit, MI:						
Brazil	53	2,298	2,318	--	--	--
Canada	1,263	79,344	81,192	1,213	87,486	89,240
Germany	(4)	20	21	--	--	--
Japan	--	--	--	(4)	2	2
Netherlands	(4)	82	95	(4)	358	409
South Africa	(4)	8	9	(4)	27	28
United Kingdom	1	339	339	(4)	159	159
Total ⁵	1,317	82,092	83,974	1,214	88,032	89,837
Duluth, MN, Canada	158	7,121	7,951	--	--	--
El Paso, TX, Mexico	724	30,161	37,437	709	37,617	44,531
Great Falls, MT, Canada	62	3,078	3,282	25	1,425	1,495
Honolulu, HI:						
China	39	1,221	2,362	298	10,566	19,071
Philippines	312	9,728	18,220	--	--	--
Taiwan	77	2,541	4,524	196	7,104	11,797
Total ⁵	428	13,490	25,106	495	17,671	30,868
Houston-Galveston, TX:						
British Virgin Islands ⁶	--	--	--	(4)	67	78
China	243	9,063	17,052	1,718	75,458	127,082
Colombia ⁶	116	8,371	9,462	209	15,550	16,800
Croatia	--	--	--	(4)	6	8
Egypt	263	13,428	21,985	49	4,549	6,323
France	(4)	18	20	(4)	72	83
Germany	(4)	113	136	(4)	84	110
Greece	292	11,042	16,723	81	3,591	5,751
Korea, Republic of	1,259	45,315	70,928	1,009	41,838	68,752
Netherlands	--	--	--	(4)	42	47
Peru	47	1,013	1,603	--	--	--
Sweden	--	--	--	(4)	42	47
Taiwan	--	--	--	43	1,591	3,096
Thailand	309	15,682	27,591	259	10,001	18,590
Turkey	44	2,024	3,265	--	--	--
United Arab Emirates	1	106	170	--	--	--
United Kingdom	1	249	249	1	563	563
Venezuela	44	2,462	3,552	--	--	--
Total ⁵	2,619	108,886	172,737	3,371	153,455	247,330

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
 AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States—Continued:						
Laredo, TX:						
Canada	--	--	--	(4)	2	2
Mexico	142	16,531	17,386	222	23,833	25,147
Total ⁵	142	16,531	17,386	222	23,835	25,149
Los Angeles, CA:						
China	1,874	80,939	128,099	2,015	92,601	140,948
Colombia	1	165	290	(4)	39	54
Egypt	(4)	37	73	--	--	--
Germany	--	--	--	(4)	31	47
India	--	--	--	1	113	132
Indonesia	211	7,385	13,630	72	2,772	5,067
Japan	2	647	1,079	2	511	926
Korea, Republic of	--	--	--	(4)	5	5
Malaysia	(4)	4	4	--	--	--
Netherlands	(4)	17	22	--	--	--
Peru	2	196	294	--	--	--
Taiwan	214	9,694	14,053	41	2,190	3,020
Thailand	745	34,031	55,466	1,289	64,689	97,756
Turkey	--	--	--	(4)	8	9
United Arab Emirates	3	308	437	2	153	261
United Kingdom	(4)	189	189	(4)	77	78
Total ⁵	3,053	133,613	213,635	3,422	163,188	248,302
Miami, FL:						
Belgium	1	132	140	--	--	--
Brazil	--	--	--	12	503	737
British Virgin Islands ⁶	--	--	--	16	1,910	2,459
China	85	3,231	6,250	461	16,996	35,216
Colombia ⁶	16	1,782	2,472	24	1,581	2,192
Denmark	51	3,647	5,536	42	3,061	4,960
Egypt	33	1,225	2,149	48	2,833	4,222
Germany	(4)	120	132	--	--	--
Greece	439	16,157	26,207	219	10,186	14,469
India	--	--	--	(4)	6	11
Italy	(4)	14	17	--	--	--
Mexico	86	8,564	10,781	85	8,972	11,268
Portugal	--	--	--	(4)	2	3
Spain	96	7,743	12,769	69	7,362	10,043
Sweden	1,006	32,229	55,452	882	35,729	54,958
Taiwan	13	941	1,448	66	2,392	4,726
Thailand	80	2,996	5,959	40	1,482	2,867
Turkey	238	9,189	15,442	186	8,440	12,075
United Kingdom	(4)	74	74	(4)	8	9
Venezuela	120	6,783	9,389	36	2,356	3,203
Total ⁵	2,265	94,826	154,218	2,186	103,822	163,421
Milwaukee, WI, Canada	198	8,836	8,936	--	--	--
Minneapolis, MN, Canada	38	2,086	2,302	179	11,129	12,067
Mobile, AL:						
China	15	653	1,077	162	5,878	13,678
Colombia	137	5,977	8,988	--	--	--

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
 AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States—Continued:						
Mobile, AL—Continued:						
Egypt	16	769	1,295	--	--	--
Greece	14	689	1,152	162	7,230	11,488
Korea, Republic of	15	631	1,017	--	--	--
Taiwan	8	352	612	--	--	--
Thailand	61	2,711	4,786	168	7,878	13,072
Venezuela	248	12,760	16,706	29	1,900	2,160
Total ⁵	514	24,542	35,632	521	22,885	40,398
New Orleans, LA:						
China	552	29,337	38,095	1,327	72,471	94,281
Colombia	180	6,937	9,141	321	14,871	18,299
Croatia	33	6,230	7,544	29	5,662	6,806
Egypt	153	13,371	14,892	--	--	--
Greece	245	9,553	17,018	--	--	--
Korea, Republic of	897	29,316	52,462	1,024	42,114	57,984
Peru	998	34,336	58,631	822	40,108	54,371
Spain	78	5,652	6,533	--	--	--
Taiwan	528	16,179	40,089	464	18,048	33,155
Thailand	238	7,511	15,827	522	34,059	39,512
Turkey	102	6,647	11,095	119	9,814	13,915
United Kingdom	(4)	177	177	--	--	--
Venezuela	90	5,658	7,162	--	--	--
Total ⁵	4,095	170,906	278,666	4,629	237,149	318,323
New York, NY:						
China	8	281	611	143	5,490	9,040
Colombia	1	125	176	2	561	617
Croatia	--	--	--	(4)	142	162
Denmark	--	--	--	40	3,600	3,988
France	(4)	5	5	(4)	3	4
Germany	--	--	--	(4)	34	39
Greece	403	14,728	25,929	448	23,791	32,936
Netherlands	26	2,194	2,443	(4)	264	291
Norway	432	21,841	29,116	233	9,849	15,077
Poland	(4)	59	62	(4)	52	56
Sweden	7	1,812	2,164	2	1,612	1,945
Taiwan	37	1,194	2,490	86	3,099	5,247
Thailand	--	--	--	42	1,773	3,807
Turkey	159	6,023	11,573	122	5,644	9,384
United Kingdom	1	719	723	(4)	52	52
Venezuela	190	10,891	14,172	89	6,012	6,964
Total ⁵	1,265	59,872	89,464	1,207	61,978	89,609
Nogales, AZ, Mexico	1,068	46,007	63,252	1,080	59,042	76,311
Norfolk, VA:						
Bulgaria	303	16,921	20,325	295	16,297	19,634
Canada	--	--	--	13	963	963
China	36	1,306	2,753	242	9,468	16,644
Colombia	156	7,509	10,618	--	--	--

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
 AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States—Continued:						
Norfolk, VA—Continued:						
France	74	16,486	19,483	97	22,675	25,232
Germany	(4)	91	101	--	--	--
Greece	33	1,205	2,263	--	--	--
Netherlands	(4)	170	205	(4)	124	145
Romania	--	--	--	80	3,384	4,627
Sweden	11	511	578	(4)	31	34
United Kingdom	1	346	421	(4)	191	225
Venezuela	84	3,447	6,277	7	244	478
Total ⁵	697	47,992	63,025	734	53,378	67,982
Ogdensburg, NY:						
Canada	336	24,042	24,402	418	33,199	33,502
Germany	(4)	5	5	(4)	3	3
Total ⁵	336	24,047	24,407	418	33,202	33,505
Pembina, ND, Canada	178	8,686	9,081	122	5,934	6,205
Philadelphia, PA:						
Belgium	(4)	18	21	(4)	29	31
Germany	2	401	1,270	(4)	15	23
Korea, Republic of	--	--	--	143	8,559	8,589
Netherlands	2	993	1,257	2	1,287	1,572
Switzerland	74	4,598	4,618	--	--	--
Thailand	417	11,535	13,941	460	13,695	16,028
United Kingdom	--	--	--	(4)	120	123
Total ⁵	494	17,545	21,106	605	23,704	26,364
Portland, ME, Canada	156	18,254	19,168	84	10,307	11,042
Providence, RI:						
Canada	--	--	--	32	2,119	2,854
China	103	3,787	6,536	55	2,104	4,385
Turkey	82	3,120	5,908	164	6,895	11,431
Venezuela	555	22,125	34,829	400	18,577	26,573
Total ⁵	740	29,031	47,274	652	29,695	45,243
San Diego, CA:						
Mexico	153	9,019	9,175	76	5,250	5,315
Taiwan	549	27,211	38,988	604	31,805	44,028
Thailand	15	1,468	1,999	40	2,221	3,215
Total ⁵	717	37,698	50,162	720	39,277	52,559
San Francisco, CA:						
China	671	31,530	47,192	1,611	75,588	111,273
Indonesia	654	22,096	45,082	39	1,572	2,595
Israel	(4)	8	8	--	--	--
Japan	(4)	3	3	(4)	33	48
Taiwan	200	8,128	13,149	399	17,351	25,230
Thailand	837	33,716	53,981	750	33,936	55,304
United Arab Emirates	1	55	91	1	45	68
United Kingdom	(4)	87	87	1	266	266
Total ⁵	2,363	95,623	159,593	2,800	128,793	194,784

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
 AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States—Continued:						
Savannah, GA:						
China	--	--	--	1	85	175
Colombia	79	4,309	5,420	185	12,556	16,238
Finland	--	--	--	(4)	14	16
Netherlands	(4)	25	26	(4)	84	94
Romania	--	--	--	(4)	2	3
United Kingdom	1	392	460	(4)	29	29
Total ⁵	81	4,726	5,907	186	12,771	16,555
Seattle, WA:						
Canada	1,153	56,704	63,696	952	46,055	50,848
China	119	4,626	7,069	419	18,251	26,620
Germany	(4)	167	242	--	--	--
Japan	1	431	665	(4)	129	213
Korea, Republic of	136	4,612	7,189	248	9,413	13,631
Netherlands	(4)	14	17	(4)	78	92
Taiwan	51	2,097	3,236	--	--	--
Thailand	28	808	1,386	--	--	--
Total ⁵	1,489	69,459	83,502	1,619	73,925	91,404
St. Albans, VT, Canada	134	14,160	15,172	128	14,718	16,076
St. Louis, MO:						
China	(4)	9	17	--	--	--
Croatia	1	353	447	(4)	7	9
Netherlands	(4)	318	379	(4)	216	253
Total ⁵	1	681	842	(4)	224	262
Tampa, FL:						
Australia	(4)	37	37	--	--	--
Brazil	377	20,729	25,368	442	22,630	29,651
British Virgin Islands ⁶	--	--	--	(4)	17	22
China	297	11,178	20,911	1,053	40,990	72,176
Colombia ⁶	586	29,828	39,721	551	29,248	40,165
Denmark	177	12,669	19,442	187	13,709	22,237
Egypt	103	4,589	7,961	179	9,521	13,939
Greece	675	26,044	37,140	295	13,080	19,823
Hong Kong	77	1,858	1,911	--	--	--
Mexico	--	--	--	51	4,440	5,383
Spain	39	1,672	2,139	--	--	--
Sweden	25	856	1,451	5	171	287
Taiwan	57	2,288	4,332	244	8,711	17,472
Thailand	163	7,260	12,732	226	10,273	17,807
Turkey	50	1,869	3,382	--	--	--
United Kingdom	(4)	49	73	--	--	--
Venezuela	852	41,566	58,773	265	14,173	19,954
Total ⁵	3,478	162,493	235,374	3,499	166,961	258,917
U.S. Virgin Islands:						
Barbados	2	111	147	--	--	--
Venezuela	63	2,684	3,721	56	3,083	3,951
Total ⁵	65	2,795	3,868	56	3,083	3,951
Wilmington, NC:						
China	--	--	--	13	479	1,021
Colombia	270	13,543	17,328	324	19,650	24,985
Dominican Republic	77	4,406	6,188	24	1,295	1,788

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT
 AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States—Continued:						
Wilmington, NC—Continued:						
Indonesia	--	--	--	18	700	958
Mexico	--	--	--	42	2,927	3,973
Venezuela	42	2,217	3,057	--	--	--
Total ⁵	390	20,166	26,573	421	25,051	32,726
U.S. total ⁵	33,261	1,547,198	2,210,475	35,566	1,825,530	2,526,864
Puerto Rico (San Juan):						
Argentina	(4)	4	4	--	--	--
Belgium	1	39	95	--	--	--
Canada	--	--	--	(4)	21	22
China	--	--	--	78	2,891	4,686
Colombia	5	589	806	12	1,427	1,882
Costa Rica	(4)	3	4	--	--	--
Denmark	212	8,054	13,499	27	1,508	2,337
France	--	--	--	(4)	4	4
Honduras	15	578	588	--	--	--
Korea, Republic of	146	5,130	9,410	201	9,649	15,716
Mexico	12	1,189	1,733	12	1,281	1,816
Spain	(4)	4	4	(4)	4	4
Total ⁵	391	15,590	26,142	330	16,785	26,467
Grand total ⁵	33,652	1,562,788	2,236,617	35,896	1,842,315	2,553,331

¹Revised. -- Zero.

²Includes all varieties of hydraulic cement and clinker.

³Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

⁴Cost, insurance, and freight. The import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry.

⁵Less than ½ unit.

⁶Data may not add to totals shown because of independent rounding.

⁷Material from British Virgin Islands is thought to be from Colombia.

Source: U.S. Census Bureau.

TABLE 19
U.S. IMPORTS FOR CONSUMPTION OF GRAY PORTLAND CEMENT, BY COUNTRY

(Thousand metric tons and thousand dollars)

Country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ¹	C.i.f. ²		Customs ¹	C.i.f. ²
United States:						
Brazil	377	20,729	25,368	454	23,133	30,388
Bulgaria	303	16,921	20,325	295	16,297	19,634
Canada	4,301	242,961	260,188	4,089	243,292	261,558
China	4,149	169,832	277,318	9,260	397,302	641,665
Colombia	1,599	78,333	103,969	1,598	90,910	116,940
Egypt	350	15,843	27,309	215	11,010	16,540
Greece	2,755	103,952	171,448	1,950	91,745	135,493
Indonesia	865	29,481	58,713	130	5,045	8,620
Korea, Republic of	2,443	84,944	141,159	2,307	92,336	143,143
Mexico	1,856	75,290	99,365	1,875	97,221	122,203
Norway	504	23,645	30,562	233	9,849	15,077
Peru	671	25,497	42,607	431	17,791	28,132
Philippines	312	9,728	18,220	--	--	--
Romania	--	--	--	212	9,442	13,520
Spain	52	1,882	3,033	--	--	--
Sweden	1,031	33,085	56,902	886	35,900	55,245
Taiwan	1,759	71,448	124,679	2,180	93,516	148,997
Thailand	2,864	113,556	188,138	3,255	142,552	223,448
Turkey	581	22,759	40,446	487	22,015	34,587
Venezuela	1,682	76,026	113,914	795	39,210	55,213
Other	98	3,532	3,664	5	567	587
Total ³	28,551	1,219,444	1,807,328	30,655	1,439,133	2,070,990
Puerto Rico:						
China	--	--	--	78	2,891	4,686
Denmark	202	7,192	11,822	18	661	911
Korea, Republic of	78	3,240	5,824	201	9,649	15,716
Other	(4)	11 ^r	12 ^r	2	4	4
Total ³	280	10,442	17,658	299	13,205	21,317
Grand total ³	28,832	1,229,886	1,824,986	30,952	1,452,338	2,092,307

^rRevised. -- Zero.

¹The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

²Cost, insurance, and freight. The import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry.

³Data may not add to totals shown because of independent rounding.

⁴Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 20
U.S. IMPORTS FOR CONSUMPTION OF WHITE CEMENT, BY COUNTRY

(Thousand metric tons and thousand dollars)

Country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ¹	C.i.f. ^{2,3}		Customs ¹	C.i.f. ^{2,3}
United States:						
Belgium	1	132	140	--	--	--
Brazil	37	2,126	2,151	--	--	--
British Virgin Islands ⁵	--	--	--	16	1,993	2,559
Canada	329	39,057	40,454	347	42,832	43,938
China	17	1,672	3,408	38	3,577	5,752
Colombia ⁵	42	4,112	5,507	25	3,638	4,461
Denmark	227	16,316	24,978	265	19,916	30,732
Dominican Republic	77	4,406	6,188	24	1,295	1,788
Egypt	24	2,200	2,780	60	5,893	7,945
Germany	(4)	34	36	(4)	20	29
Greece	31	958	958	--	--	--
India	--	--	--	1	119	143
Mexico	251	29,302	32,353	305	36,126	40,150
Netherlands	7	592	815	--	--	--
Norway	17	1,653	2,012	--	--	--
Peru	2	196	294	--	--	--
Spain	73	6,903	11,231	69	7,362	10,043
Switzerland	74	4,598	4,618	--	--	--
Thailand	29	4,163	5,530	41	4,896	7,441
Turkey	94	6,114	10,219	104	8,779	12,220
United Arab Emirates	5	468	698	2	198	329
Venezuela	121	7,007	9,628	4	379	395
Other	(4)	59	59	24	5	6
Total ⁶	1,457	132,067	164,055	1,302	137,027	167,929
Puerto Rico:						
Belgium	1	39	95	--	--	--
Colombia	5	589	806	12	1,427	1,882
Denmark	10	862	1,677	8	847	1,426
Mexico	12	1,189	1,733	12	1,281	1,816
Total ⁶	28	2,680	4,311	33	3,555	5,124
Grand total ⁶	1,485	134,747	168,366	1,335	140,582	173,053

-- Zero.

¹Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

²Cost, insurance, and freight. The import value represents the customs value plus insurance, freight and other delivery charges to the first port of entry.

³Values of less than \$90.00 (c.i.f.) per metric ton likely indicate the mistaken total or partial inclusion of data for gray portland or similar cement or clinker. This error happens when the importer records the wrong tariff number with the U.S. Customs Service. Values that exceed \$200 per ton likely indicate misidentified specialty cement, not white cement.

⁴Less than ½ unit.

⁵Material from British Virgin Islands is thought to be from Colombia.

⁶Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 21
U.S. IMPORTS FOR CONSUMPTION OF CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2005			2006		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
United States:						
Brazil	53	2,298	2,318	--	--	--
Canada	740	33,792	34,176	608	36,110	36,471
China	557	29,966	38,458	1,240	67,499	85,729
Colombia	203	12,536	14,282	239	16,361	18,396
Croatia	(4)	64	94	(4)	36	48
Egypt	184	12,379	14,627	--	--	--
France	72	15,250	18,106	96	21,697	24,138
Korea, Republic of	83	2,427	3,695	237	14,213	14,243
Peru	374	9,853	17,626	391	22,317	26,239
Spain	33	2,061	2,098	--	--	--
Sweden	15	542	599	--	--	--
Thailand	--	--	--	502	32,688	37,278
Venezuela	543	27,360	36,078	111	5,899	7,824
Total ⁵	2,858	148,528	182,158	3,425	216,821	250,366
Puerto Rico:						
Honduras	15	578	588	--	--	--
Korea, Republic of	69	1,891	3,586	--	--	--
Total ⁵	83	2,469	4,174	--	--	--
Grand total ⁵	2,941	150,996	186,332	3,425	216,821	250,366

-- Zero.

¹For all types of hydraulic cement.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry.

⁴Less than ½ unit.

⁵Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 22
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2002	2003	2004	2005	2006 ^c
Afghanistan ^c	60	70	70	60	50
Albania	--	578	573	575	600
Algeria ^c	9,000	9,000	11,000 ^r	11,296 ^{r,3}	15,000
Angola	597	700	754	1,315 ^r	1,373 ³
Argentina	3,911	5,217	6,254	7,595	8,929 ³
Armenia	355	384	501	605	610
Australia ^c	7,550	8,000	8,000	9,000	9,000
Austria	3,918	3,886	3,976	4,736	4,700
Azerbaijan	848	1,013	1,428	1,538	1,605 ³
Bahrain	67	129	153	191	190
Bangladesh ^c	5,000	5,000	5,000	5,100	5,100
Barbados	298	325	322	320 ^c	320
Belarus	2,171	2,472	2,731	3,131	3,495 ³
Belgium	6,980	6,550	6,715	7,594 ^r	8,192 ³
Benin ^c	250	250	250	250	250
Bhutan ^c	160	160	170	170	180
Bolivia	1,010	1,138	1,276	1,440	1,636 ³
Bosnia and Herzegovina	913	891	1,045	1,026 ^r	1,226 ³
Brazil	38,027	34,010	34,413	36,673	39,540 ^p
Brunei	241	236	242	266 ^r	270
Bulgaria ^c	2,137 ³	2,100	2,100	2,100	2,000
Burkina Faso ^c	30	30	30	30	30
Burma ⁴	471	572	519	543	570 ³
Cameroon	937	949	1,032	1,000 ^c	1,000
Canada	13,079	13,416	13,863	14,179	14,355 ³
Chile	3,462	3,622	3,798	3,999	4,112 ³
China	725,000	862,080	970,000	1,068,850 ^r	1,204,110 ^{p,3}
Colombia	6,604 ⁵	7,337	7,822	9,959	10,038 ^{3,5}
Congo (Brazzaville)	--	--	--	100	100
Congo (Kinshasa)	265	331	403	511 ^r	530 ³
Costa Rica ^c	1,200	1,600	1,900	2,000	2,000
Côte d'Ivoire ^c	650	650	650	650	650
Croatia	3,378	3,654	3,811	3,481 ^r	3,633 ³
Cuba	1,327	1,346	1,401 ^r	1,567 ^r	1,705 ³
Cyprus	1,438	1,637	1,689	1,805	1,786 ³
Czech Republic	3,217	3,465	3,829	3,978	4,222 ³
Denmark	2,028	1,953	2,150	2,120 ^r	2,115 ³
Dominican Republic	3,050	2,907 ^r	2,654 ^r	2,779 ^r	2,800
Ecuador ^c	3,000	3,100	3,000 ^r	3,000 ^r	3,000
Egypt	28,155	26,639	28,763	29,000 ^c	29,000
El Salvador	1,323 ^r	1,391 ^r	1,265 ^r	1,131 ^r	1,311 ³
Eritrea ^c	45	45	45	45	45
Estonia	466	506	615	650	700
Ethiopia ⁶	900	1,130	1,316	1,568	1,700
Fiji ^c	111 ^{r,3}	120 ^r	120 ^r	143 ^{r,3}	150
Finland	1,198	1,493	1,295 ^r	1,357 ^r	1,685 ³
France	19,437	19,655	20,962	21,277	22,270 ³
French Guiana ^c	62 ³	60	60	60	60
Gabon ^c	257 ³	260	260	260	260
Georgia	347	345	425	450 ^c	450
Germany	31,009	32,749	31,854	30,629	33,516 ³
Ghana ^c	1,900	1,900	1,900	1,900	1,900
Greece	14,282	14,638	15,039	15,166 ^r	15,674 ³
Guadeloupe	230	230	230	230 ^c	230
Guatemala ^c	2,000 ^r	2,000 ^r	2,200 ^r	2,400 ^r	2,500
Guinea ^c	360	360	360	360	360
Haiti ^c	290 ³	290 ^{r,3}	300	300	300
Honduras	1,224 ^r	1,268 ^r	1,392 ^r	1,384 ^r	1,400
Hong Kong	1,206	1,189	1,039	1,005	1,010
Hungary	3,510	3,573	3,349	3,371 ^r	3,724 ³

See footnotes at end of table.

TABLE 22—Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2002	2003	2004	2005	2006 ^c
Iceland	83	90	90 ^e	95 ^e	95
India ^c	115,000	123,000 ³	130,000	145,000	160,000
Indonesia	34,640	35,500	33,230 ^r	33,917 ^r	35,000
Iran	28,600	30,460	32,198	32,650	33,000
Iraq ^c	6,834 ³	1,901 ³	2,500	3,000	3,500
Ireland	3,320	3,830	5,000 ^{r,e}	5,083 ^r	4,981 ³
Israel	4,584	4,632	4,494	5,093 ^r	5,089 ³
Italy	41,722 ^r	43,580 ^r	45,343 ^r	40,284 ^r	47,814 ³
Jamaica	614	608	808	845	761 ³
Japan	71,828	68,766	67,376	69,629	69,942 ³
Jordan	3,558	3,515	3,908	4,046	3,967 ³
Kazakhstan	2,129	2,570	3,662	3,975	4,200
Kenya	1,463	1,658	1,789	2,123	2,200
Korea, North ^c	5,320	5,540	5,630	5,700	5,700
Korea, Republic of	55,514	59,194	54,330	51,391	54,971 ³
Kuwait	1,584	1,863	2,635	2,145 ^r	2,200
Kyrgyzstan	533	757	870 ^r	900 ^e	1,211 ³
Laos ^c	240	250	250	250 ^r	250
Latvia	260	295	284	280 ^e	280
Lebanon	2,852	3,500 ^r	4,500 ^r	4,500 ^r	5,000
Liberia	54	25 ^e	121 ^r	144 ^r	155 ³
Libya ^c	3,300	3,500 ³	3,600	3,621 ^{r,3}	3,600
Lithuania	606	597	753	832	850
Luxembourg	728	714	797	760 ^r	800
Macedonia	600 ^e	768	820	800	800
Madagascar ^c	30 ^r	200 ^r	170 ^r	150 ^r	150
Malawi	109 ^r	161 ^r	120	160 ^{r,e}	200
Malaysia	14,336	17,243	15,690	17,860	18,000
Martinique ^c	221 ³	220	220	220	220
Mauritania ^c	200	200	300 ³	300	374 ³
Mexico	33,372	33,593	34,992	37,452 ^r	40,616 ³
Moldova	300	255	440	641 ^r	837 ³
Mongolia	148	162	62	112	141 ³
Morocco ^c	10,200	10,400	11,000	11,000	11,000
Mozambique	490 ^r	600 ^r	570 ^r	560 ^r	720 ³
Nepal ^c	290	295	285	290	295
Netherlands	3,085	2,450	2,380	2,496 ^r	2,790
New Caledonia	100	100	115 ^r	119 ^r	125
New Zealand ^c	1,000 ^r	1,080 ^r	1,110 ³	1,100	1,100
Nicaragua	549	890 ^r	521 ^r	530 ^r	530
Niger ^c	54	54 ^r	54 ^r	54 ^r	54
Nigeria ^c	2,100	2,300	2,300	2,400	3,000
Norway	1,631	1,650	1,420	1,613 ^r	1,695 ³
Oman ^c	1,700	2,100	2,500	2,621 ^{r,3}	2,600
Pakistan ^c	11,000	13,000	15,000 ^r	17,000 ^r	20,000
Panama	748 ^r	889 ^r	1,042 ^r	1,050 ^r	1,050
Paraguay ^c	450 ^r	520 ^r	470 ^r	550 ^r	600
Peru	3,980	4,000	4,590	4,600 ^e	5,000
Philippines	13,400 ^r	13,060	13,346 ^r	15,494 ^r	12,033 ³
Poland	10,948	11,653	12,566	12,646	14,688 ³
Portugal	9,759	8,567	8,843	8,438 ^r	8,340 ³
Qatar ^c	1,340	1,400	1,400	1,500 ^{r,3}	1,500
Réunion ^c	380	380	380	380	400
Romania	5,680	5,992	6,239	7,032	7,000
Russia	37,700	41,000	45,700	48,500 ^r	54,700 ³
Rwanda	101	110 ^r	104	101 ^r	100
Saudi Arabia	23,287 ^r	24,147 ^r	25,380 ^r	26,064	27,053 ³
Senegal	1,653	1,694	2,391 ^r	2,623 ^r	2,884 ³
Serbia and Montenegro ⁷	2,396	2,075	2,240	2,276 ^r	2,565 ³
Sierra Leone	144	169	180	172 ^r	234 ³

See footnotes at end of table.

TABLE 22—Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2002	2003	2004	2005	2006 ^e
Singapore ^e	200	150 ³	--	--	--
Slovakia	3,141	3,147	3,158	3,499	3,593 ³
Slovenia	1,178	1,370	1,186	1,114 ^r	1,269 ³
South Africa, sales ⁸	8,525	8,883	12,348	13,000 ^e	13,000
Spain, including Canary Islands	42,417	44,747	46,593	50,347	54,033 ³
Sri Lanka	1,018	1,164	1,400 ^r	1,500 ^r	1,600
Sudan	205	272	307	331 ^r	202 ³
Suriname ^e	65	65	65	65	65
Sweden	2,642	2,476	2,588	2,709 ^r	2,952 ³
Switzerland	3,771	3,613	3,851	4,022	4,040 ³
Syria	4,679	4,824	4,757	4,700 ^{r,e}	4,700
Taiwan	19,363	18,474	19,050	19,891	19,294 ³
Tajikistan	100	166	194	253	282 ³
Tanzania	1,026	1,186	1,281	1,366 ^r	1,422 ^p
Thailand	31,679	32,530	35,626	37,872	39,408 ³
Togo ^e	800	800	800	800	800
Trinidad and Tobago	744	766	768	686 ^r	883 ³
Tunisia	6,022	6,038	6,662 ^r	6,691 ^r	6,932 ³
Turkey	32,577	35,077	38,796	42,787	47,499 ³
Turkmenistan ^e	450	450	550 ^r	650 ^r	800
Uganda	506	507	559	630 ^{r,e}	630
Ukraine	7,142	8,900	10,600 ^e	12,183	13,732 ³
United Arab Emirates ^e	7,000	8,000	9,000 ^r	9,800 ^{r,3}	9,800
United Kingdom	11,089 ^r	11,215 ^r	11,405 ^r	11,216 ^r	12,119 ³
United States, including Puerto Rico ⁹	91,266	94,329	99,015	100,903	99,712 ³
Uruguay ^e	1,000	1,050	1,050	1,050	1,050
Uzbekistan ^e	4,000	4,000	4,800	5,068 ³	5,000
Venezuela ^e	7,000	7,700	9,000	10,000	11,000
Vietnam	21,121	24,127	26,153 ^r	30,808 ^r	32,690 ³
Yemen	1,561	1,541	1,546	1,573 ^r	1,600
Zambia ^e	230 ³	350	480	435	450
Zimbabwe ^e	600	400	500 ^r	600 ^r	700
Total	1,850,000	2,030,000	2,190,000	2,350,000 ^r	2,560,000

^eEstimated. ^pPreliminary. ^rRevised. -- Zero.

¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown. Even where presented unrounded, reported data are thought to be accurate to no more than three significant digits. Data are from a variety of sources, including the European Cement Association.

²Table includes data available through February 27, 2008. Data may include clinker exports for some countries.

³Reported figure.

⁴Data are for fiscal year ending March 31 of the following year.

⁵Data for 2002 and 2006 are for gray cement only; white cement output was likely to have been an additional 50,000 to 100,000 metric tons per year.

⁶Year ending July 7 of that stated.

⁷Serbia and Montenegro dissolved June 2006. Data are for Serbia only, as Montenegro has no cement plants.

⁸Data have been adjusted to remove sales of cementitious materials other than finished cement. Material sales removed (mostly fly ash and ground granulated blast furnace slag) amounted, in metric tons, to: 2002—1,099,044; 2003—1,190,000; 2004—1,436,000; 2005—1,440,000 (estimated); and 2006—1,440,000.

⁹Portland and masonry cements only.