CEMENT

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Hydraulic cements primarily are used as the binding agents in concrete and most mortars. The hydraulic cements covered in this report are mostly limited to those that can be loosely classified as portland cement and/or masonry cement. Varieties covered within portland cement are listed in table 16 and include blended cements.[1] Masonry cements include true masonry cements, portland-lime cements, and plastic cements. Certain other hydraulic cements, most notably aluminous cement, are included within the world hydraulic cement production data given in table 23 and the trade data in tables 17-19 and 22 (clinker). Excluded from the U.S. data, and to the degree possible from international data, are pure (unblended) pozzolans or supplementary cementitious materials (SCM), such as fly ash and ground granulated blast furnace slag (GGBFS); GGBFS is increasingly being referred to as slag cement. Although SCM are not finished cements in their own right, they play an important role as components of blended cements or as partial substitutes for portland cement in concrete. Indications of percentage or other changes expressed in this report compare activity in 2003 with that of 2002 unless specified otherwise. Except where otherwise indicated, activity levels in this report exclude those in Puerto Rico.

Production of portland and masonry cements in the United States in 2003 rose by about 3.5% to 92.8 million metric tons (Mt), a new record (table 1). Output of clinker—the intermediate product of cement manufacture—increased by about 0.5% to a new record of 81.9 Mt. The United States ranked third in the world in hydraulic cement production; world output in 2003 was nearly 2 billion metric tons (Gt).

The construction economy in the United States was fairly strong in 2003, especially that for housing. Although relatively severe weather hurt overall cement sales to final customers in January and February, all but two of the remaining months showed sales increases, and sales in July, September, October, and December were the highest on record. Apparent consumption of cement (a calculated statistic) for the year rose by 3.7% to about 114 Mt (table 1). Consumption measured by shipments (sales) to final domestic customers rose by 3.8% to about 112.4 Mt (table 9); this was second only to the record sales in 2001 of 112.7 Mt. The country continued to rely, albeit at lower levels, upon imports to offset the large shortfall in cement production relative to sales. In contrast to the higher sales tonnages, the unit prices (measured as mill net values) for portland cement declined slightly (table 1). Overall, the value of cement sales in 2003 was about $8.3 billion (tables 1, 12, 13) or $8.4 billion for the slightly higher monthly data-based tonnages (table 9). Based on typical portland cement mixing ratios in concrete, the delivered value of concrete (excluding mortar) in the United States in 2003 was estimated to be at least $41 billion.

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 2003, responses were received for 144 of 151 facilities canvassed; a response rate of 95%. Of the nonrespondents, only three were production sites, and one of these closed during the year. The responding facilities accounted for 99% of the U.S. cement production in 2003. For 2002, responses were received from 137 of 145 facilities canvassed, a response rate of 94%. The 2002 responding facilities included all but five production sites and accounted for about 97% of U.S. cement production in that year.

An attempt was made to obtain any missing information by telephone, resulting in cement and clinker production data being obtained for all facilities (that is, 100% reporting) for both 2002 and 2003. For cases where followup inquiries (for data other than production) were not successful and for which applicable data were not available from the monthly surveys, estimates were incorporated. A number of district and national totals have been rounded to reflect this incorporation of estimates.

State totals are shown individually where possible or combined within districts where necessary to protect proprietary data. In several tables, a few States are shown subdivided (and for consumption, two metropolitan areas are split out); the county basis for these divisions is given in table 2.

Legislation and Government Programs

Economic Issues.—Government economic policies and programs that affect the cement industry are those affecting cement trade, interest rates, and public sector construction spending. The major trade issue in 2003 continued to be that of antidumping tariffs against Japan and Mexico. On January 9, 2003, the U.S. Department of Commerce (DOC) released its final determination for the 11th review period (August 2000 to July 2001) for gray portland cement and clinker from Mexico; the dumping margin for the period was set at 73.74% (Southern Tier Cement Committee, 2003). Then, on September 30, the DOC released its findings for the 12th review period (August 2001 to July 2002) wherein the dumping margin was assessed to be 79.81%. Both assessments were expected to be appealed (Cement Americas, 2003b).

The major Government construction funding program in 2003 remained the Transportation Equity Act for the 21st

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

Century (TEA-21), which authorized $216.3 billion in funding for the 6-year period from 1998 to 2003 to upgrade the country's transportation infrastructure. The TEA-21 expired on September 30, but Congress authorized continuation of its funding at 2003 levels for a further 5 months pending reconciliation of conflicting proposals for its full-scale reauthorization; the House proposal was for $375 billion, the Senate proposal was at $311 billion, and the White House was at $247 billion (Cement Americas, 2004).

Environmental Issues. —The major environmental issues relating to cement stem from the production of clinker manufacturing (van Oss and Padovani, 2002, 2003). The most significant emissions from clinker manufacture are of carbon dioxide (CO_2), amounting to nearly 1 metric ton (t) of CO_2 per ton of clinker, about one-half of which is derived from the calcination of calcium carbonate raw materials, and the rest, from the combustion of fuels. Overall, generation of CO_2 by the U.S. cement industry in 2003 amounted to about 79 Mt; this excluded emissions, assigned to the utility companies, associated with generating the electricity used by the cement industry. The cement industry was working on ways to reduce the unit emissions of CO_2. One way to do this is to increase the use of blended cements; that is, incorporate SCM to reduce the clinker component of the finished cement. The Portland Cement Association has long proposed altering the ASTM International C-150 specification for portland cement to allow for the incorporation of up to 5% ground (but unburned) limestone into finished portland cement as a nondeleterious filler. In December, this proposal was passed by the ASTM review committee (Portland Cement Association, 2003).

As of September 30, U.S. cement plants that burned hazardous wastes either as fuels or as raw materials were required to be in compliance with the U.S. Environmental Protection Agency's National Emission Standards for Hazardous Air Pollutants (NESHAP) from Hazardous Waste Combustors (HW MACT). This followed the June 10, 2002, requirement for all portland cement plants to be in compliance with the NESHAP for Source Categories; Portland cement industry (PC MACT) (Ellis, 2003).

Production

Cement in 2003 was produced in 37 States and Puerto Rico (tables 3, 4). The 2003 data reflect the first year of operations for a new plant in Florida (Suwannee American) and the closure of one small plant in Nevada (Royal Cement).

The five leading cement-producing States in 2003, in descending order, were California, Texas, Pennsylvania, Michigan, and Missouri; the order was unchanged from that in 2002. Cement producers in the United States ranged widely in size and in the number of plants operated. Ranking companies in terms of output or capacity is made difficult by the existence of some common parent companies and joint ventures. If companies with common parents are combined under the larger subsidiary's name, with joint ventures apportioned, then the leading 10 companies at yearend 2003, in descending order of cement production, were Holcim (US) Inc.; CEMEX, Inc.; Lafarge North America, Inc.; RC Lonestar, Inc. (including Alamo Cement Co.); Lehigh Cement Co.; Ash Grove Cement Co.; Essroc Cement Corp.; Texas Industries Inc. (TXI); California Portland Cement Co.; and Centex Construction Products, Inc. The largest 5 of these had about 58% of total U.S. portland cement production, and the leading 10 together accounted for about 77% of total U.S. production. Of these companies, all except Ash Grove, Centex, and TXI were foreign-owned as of yearend.

Ownership consolidation in the U.S. cement industry continued in 2003. Early in the year, Hanson PLC sold its 50% share of the North Texas Cement Co., L.P. joint venture to its partner Ash Grove, giving Ash Grove 100% ownership of the company. The major assets of North Texas Cement were a 0.9-million-metric ton-per-year (Mt/yr) integrated plant at Midlothian, TX, and a large import terminal in Houston, TX. In July, Ash Grove changed the legal name of the former joint venture to Ash Grove Texas, L.P., but was conducting business under the general name Ash Grove Cement Co. In July, Lafarge sold its subsidiary Lafarge Florida, Inc. to Florida Rock Industries, Inc. The facilities transferred included two grinding plants and import terminals (Tampa and Port Manatee) on the Florida west coast as well as terminals on the Florida east coast. Not included in the sale was the large Jacksonville, FL, terminal that Lafarge had acquired in 2001 when it purchased Blue Circle Industries.

In late September, CEMEX purchased Dixon-Marquette Cement Co. from Prairie Material Sales, Inc. The main asset in the purchase was the 0.6-Mt/yr Dixon integrated plant at Dixon, IL. In October, the Brazilian company Votorantim Cimentos Ltda. purchased Badger Cement Products LLC, a grinding plant in Milwaukee, WI. The facility was to be operated by Votorantim's Canadian subsidiary St. Marys Cement, Inc., which also operated a grinding plant in Detroit, MI. The acquisition followed the yearend 2002 purchase by Votorantim of a 50% (and operational) stake in the (then) new Suwannee American Cement Co. plant at Branford, FL.

Following the 2002 takeover of Dyckerhoff AG of Germany by Buzzi Unicem S.p.A of Italy, most of the U.S. assets of the two companies (owned under Lone Star Industries, Inc. and RC Cement, respectively) were merged in October 2003 under the temporary name RC Lonestar, Inc., which then was changed in January 2004 to Buzzi Unicem USA, Inc. Not included in the merger was the Buzzi subsidiary Alamo Cement Co. of San Antonio, TX.

Owing to the May 2003 internal split of Australian companies Rinker Group Ltd. and CSR Ltd., Rinker became the sole owner of Rinker Materials Corp. (formerly CSR Rinker Materials), which operated two integrated cement plants in Florida.

The Suwannee American plant at Branford, FL, was commissioned in February; this was the only plant that opened during the year (the plant had first fired its kiln in late December 2002 but produced no cement until early 2003). The only plant closure during the year was that of Royal Cement Co., Inc.'s small integrated facility at Logandale, NV, in August. The plant had been in intermittent production for several years.

Major upgrades were announced for a number of U.S. cement plants during the year. In March, Dragon Products Co., Inc. began conversion of its Thomaston, ME, facility from

wet process to dry precalciner process. The conversion was designed to boost the plant's capacity by 40% to about 0.7 Mt/yr as well as improve its environmental performance. The kiln line upgrade was expected to be completed in mid-2004 (Cement Americas, 2003a). Work commenced at Giant Cement Co.'s Harleyville, SC, plant to replace its four wet kilns with a single dry precalciner kiln line, thereby increasing overall clinker capacity by about 25% to 1 Mt/yr. The new kiln was expected to come online around yearend 2004, at which time two of the wet kilns would be closed down, with the other two to follow at yearend 2005. Holcim completed construction of a 2.25-Mt/yr dry precalciner kiln line (plus new raw and finish mills) at its plant at Holly Hill, SC. The new facility replaced a pair of old wet kilns and associated mills. The wet plant was closed in May, and the new plant started up in June (International Cement Review, 2004). Holcim continued the permitting process for its proposed 4-Mt/yr Lee Island plant in Ste. Genevieve County, MO. When built, this facility will have one of the largest capacity kilns in the world.

Lafarge was planning to add a new finish mill at its Roberta plant in Calera, AL. The mill was expected to be completed by yearend 2004 and would complement the new 4,400-metric-ton-per-day (t/d) kiln that was brought online in 2002. In the interim, and possibly to continue on a long-term basis, the plant began supplying excess clinker to the company's Atlanta, GA, plant, allowing the Atlanta facility to significantly reduce operations on its own, less efficient kiln line (Seymour and Schureck, 2003).

Rockland Materials, Inc., a Phoenix, AZ, concrete company, was planning to build a very small (about 0.3 Mt/yr) cement plant near Drake, AZ, under the name Sterling Bridge Cement, Inc. However, in early 2003, Rockland filed for Chapter 11 protection and sold Sterling Bridge (including its permit applications and limestone reserves) to ARPL Tecnologia, S.A. (owner of the Peruvian cement producer Cementos Lima SA). Sterling Bridge was then reformed by ARPL into a new company called Drake Cement, LLC, and the projected size of the plant has been boosted to almost 0.6 Mt/yr. Construction work was planned to commence in early 2003, with a target completion date of early 2007 (Niemuth, 2003§[2]).

Portland Cement.—In 2003, portland cement was made in the United States at a total of 114 plants plus 2 in Puerto Rico. Of the U.S. plants, six were grinding facilities that relied entirely on clinker made elsewhere (primarily foreign). The distribution, by district, of portland cement plants, cement production, grinding capacities, and yearend cement stockpiles, is listed in table 3. Although the activity is not shown in the tables, a number of portland cement plants also grind GGBFS as a separate product.

In 2003, production of portland cement rose overall by 3.3% to about 88.1 Mt, a new record. Most districts showed production increases, many of which could be related to recent capacity upgrades at specific plants. The effect of an entirely new plant, as in Florida in 2003, will not necessarily be significant during the first year of operations, as the startup may have been late in the year, the plant will generally have an extended period of ramp-up operations, and the company will need to capture market share. The overall cement grinding capacity rose by about 5% to 113 Mt, but the capacity data for the year contain an unusually high component of estimates and are less reliable than the data for production. As listed in table 3, capacity utilization fell slightly to about 78%. The utilization percentages are relative to portland cement production, but if they are calculated on a total cement (including masonry) basis, then the utilization percentage in 2003 improves to about 82%, slightly lower than in 2002. Many cement plants have excess grinding capacity because it is relatively inexpensive to provide for such. Also, the capacities listed in table 3 for some districts include reported clinker grinding capacity that is currently utilized to grind granulated slag into GGBFS. This is especially true in Florida, which shows a relatively low capacity utilization level. Further, some low utilization rates reflect plant upgrades late in the year; the full new capacity is credited without commensurate full year production at the upgraded levels.

Data are not collected on the production of specific varieties of portland cement, but it may be assumed that production levels approximate the ratios among types of portland cement sold (table 16). On this basis, production of Types I and II (or hybrids thereof) accounted for about 83% of total portland cement output in 2003, down from about 86% in 2002. This relative decline appears to reflect the growing market for sulfate-resistant cements (Types II and V). Several companies market cements that meet both requirements (hence are rated Type II/V) but the USGS canvass form does not offer this "hybrid" as an entry choice. Accordingly, it appears that, increasingly, these cements are being reported as Type V; indeed, Type V sales showed a significant increase in 2003.

Based on the data in table 16, the overall production of blended cements appears to have increased modestly in 2003, but perhaps not for all blended cement varieties. In particular, the production of blends incorporating natural pozzolans (for example, volcanic ash) appears to have declined significantly. The shifts in apparent production of blends containing GGBFS, fly ash, and miscellaneous synthetic pozzolans at least roughly mirror the consumption of these SCM as raw materials (table 6; more information can be found in the "Raw Materials and Energy Consumed in Cement Manufacture" section).

Ideally, if sales data are to be used as a proxy for production ratios, then the sales ratios should be adjusted for the import component of sales. Imports are dominated by Types I and II portland cement but include significant volumes of Type V (mainly into southern California) and white cement. There is no tariff code distinction among gray portland cement types.

Yearend stockpiles declined by almost 14% to about 6.2 Mt. Because cement sales at any moment can represent a combination of current production and stockpiles (which can fluctuate), the apparent drawdown of yearend stocks is of qualitative interest only, but does suggest a shortfall in production relative to cement demand beyond what can be satisfied with imported material.

Masonry Cement.—Production of masonry cement rose by 6.5% in 2003 to about 4.7 Mt and reflected the continued strong housing construction sector of the economy (table 4).

[2]A reference that includes a section mark (§) is found in the Internet Reference Cited section.

Yearend stocks fell by 14% to about 0.4 Mt. Unlike portland cement, little if any masonry cement is imported, and thus masonry cement production is very close to consumption levels (as defined by shipments to final customers) listed in table 9. The data in both tables 4 and 9, however, underrepresent true production and consumption levels of masonry cement because it is common for masonry cement (particularly the portland-lime variety) to be made at the jobsite from purchased portland cement and lime. There are no data on this jobsite activity. As in recent years, about 95% of the (reported) masonry cement output continued to be reported as having been made directly from clinker rather than from finished portland cement.

Clinker.—District-level data pertaining to clinker are listed in table 5; the production data are all reported, but some of the other data in the table incorporate estimates. Production of clinker in 2003 increased only slightly to 81.9 Mt, but this was a new record. The leading five producing States continued to be, in descending order, California, Texas, Pennsylvania, Missouri, and Alabama. A slight majority of districts showed increases in clinker production in 2003. Most of the larger increases, as with portland cement production, could be attributed to recent capacity upgrades.

In 2003, clinker was made by a total of 110 integrated plants, including 2 in Puerto Rico. The kiln count dropped by 7 to 188, owing largely to the replacement of multiple wet kilns with single dry kilns. Of the total plants, 78 were exclusively dry process facilities (including 1 semidry facility in Indiana), 26 were exclusively wet process plants, and 4 operated both wet and dry kilns at least part year. The count reflects the addition of one dry plant in Florida, the subtraction of a dry plant in Colorado (closed in 2002), and the midyear conversion of a wet plant to dry technology in South Carolina (hence reported as combined technology for the year).

Annual clinker capacity and capacity utilization statistics are very sensitive to reported kiln shutdown periods, specifically those for routine maintenance. Because of ambiguities in the characterization of downtime, this downtime sensitivity means that changes of a few percentage points in regional annual clinker production capacity or capacity utilization rates have little statistical significance. Given that a plant generally has a total downtime in excess of routine maintenance requirements, a capacity utilization rate of 85% or higher indicates that the facility is probably running at or close to full practical capacity; this also applies to district-level utilization rates. A utilization rate below this could indicate the temporary idling of kilns or the permanent closure of old kilns following successful startup of new ones. As long as a kiln was active for 1 day or more during the year, its capacity will be included in the data in table 5. Apparent U.S. clinker capacity in 2003 increased by 1% to 100 Mt/yr, although many individual districts showed capacity decreases. Overall capacity utilization fell slightly (0.4%) to 81.9%, but a few districts (notably southern California, Florida, Missouri, and South Carolina) showed large utilization increases. Some of the utilization decreases were attributable to extended maintenance. The average number of days of downtime for routine maintenance increased by 1.2 days.

Based on the data in table 5, the average plant clinker capacity in 2003 rose by about 1% to 0.93 Mt/yr, and the average kiln capacity increased by about 5% to 0.54 Mt/yr. Plants operating only dry process kilns produced almost 78% of the total clinker in 2003, about the same as in the previous year (table 7). Wet kiln plants accounted for about 16%, down from about 18% in 2002. Combination plants accounted for 5.8% of the clinker, compared with 4.5% in 2002; the 2002 figure, however, included one facility listed as a wet plant in 2002. Significantly, yearend stockpiles[3] of clinker fell by 20% to 4.4 Mt, an apparent drawdown that, along with higher levels of clinker imports, reflected increased overall levels of cement consumption during the year and especially strong demand for cement towards yearend (tables 1, 5, 22).

Raw Materials and Energy Consumed in Cement Manufacture.—Nonfuel raw materials may be differentiated between those for the manufacture of clinker and those added subsequently in the finish mill to make cement (table 6). Materials used to make clinker are of environmental interest because they are burned in the kiln and are thus associated with various chemical changes and emissions. Materials added in the finish mill are just ground. Typically, about 1.7 t of nonfuel raw materials is needed to make 1 t of clinker, and about the same ratio holds through to the final (portland) cement product. Limestone or other calcareous materials account for about 85% or more of the total raw materials needed.

Overall, the major ratios among raw materials types did not change appreciably in 2003, and some specific changes seen may reflect improved reporting rather than a net change in true consumption. Also, some materials may be classified somewhat differently from year to year or among plants; for example, one plant's limestone might be another's marble. The chemical grouping of materials under terms like "calcareous" and "aluminous" is somewhat arbitrary because many of the raw materials supply more than one oxide. The cement kiln dust (CKD) data for 2002 and 2003 continue to be significantly underrepresented because few plants routinely measure consumption of this material. The apparent significant drop in CKD consumed for clinker in 2003 could thus reflect even less complete reporting. As in past years, the changes seen among slag varieties probably include a component of classification error by some plants.

Among the siliceous raw materials, the ratio between the consumption (to make cement) of certain pozzolans or SCM and the corresponding sales (as a proxy for production) of blended cements (listed in table 16), is within the range of typical mixing proportions for the respective blended cements. Year-to-year variations in these ratios are difficult to interpret owing to wide variations in the SCM contents of various blended cements. For example, the decline in the apparent proportion of granulated slag (mostly GGBFS) within blended cement (45% in 2003 compared with 49% in 2002) could represent lower sales volumes of the more slag-rich blends, or it could represent

[3]Yearend stockpiles of clinker are an artifact of data collection convenience rather than reflecting full-year market conditions or production capacity. Generally, if the clinker is not required for immediate cement market needs, 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 year.

a decrease in the use of slag as a grinding aid to make Type I portland cement. It is important to note that by far the largest customer for SCM is the concrete industry directly, which prefers to directly blend these materials within concrete mixes (in effect making a blended cement) rather than purchasing finished blended cements from the cement industry. Thus the 0.33 Mt of granulated slag listed as consumed in 2003 in table 6 is only about 10% of the 3.4 Mt of granulated slag sold by slag processors as a cementitious additive during the year (per data collected in the USGS "Iron & Steel Slag" canvass for 2003); the excess is material sold to the concrete industry. Similarly, the 2.3 Mt of fly ash and 1.1 Mt of "other ash, including bottom ash" consumed by the cement industry in 2003 (table 6) may be compared with data published by the American Coal Ash Association (2004) that differentiate sales to the cement industry from those to the concrete industry. Sales to the cement industry in 2003 amounted to about 2.7 Mt of fly ash and 0.45 Mt of bottom ash, and sales to the concrete industry were about 11.1 Mt of fly ash and 0.3 Mt of bottom ash. Bottom ash sold to the concrete industry, however, was likely being used as an aggregate rather than as an SCM.

Cement plants commonly can switch among a variety of primary fuel types, and many routinely burn a mix of fuels. Fuels consumed by the cement industry are listed in table 7. The quantity ratios among fuels in 2003 appear to be broadly similar to those in 2002 save for a large, possibly cost-related decrease in the amount of natural gas consumed, particularly by dry process plants. Natural gas, for the most part, is used to warm up a kiln after an extended kiln shutdown, and for this task, fuel oil and sometimes liquid waste fuels may be substituted. The evidence of somewhat more extensive downtimes for routine maintenance and for longer unscheduled outages (lower capacity utilization percentages) in table 5 might support the lower natural gas consumption in 2003 if it is assumed that the periods of downtime were fewer but longer (that is, fewer restarts). However, natural gas reporting is subject to larger reporting errors than most other fuels because of the cumbersome reporting units used, and it may be that the 2003 consumption of natural gas is underreported. Continuing a trend, the use of used tires as fuel was up significantly during the year. Apart from overall fuel cost savings (companies are actually paid to burn tires) compared with the use of coal or petroleum coke, using tires can help reduce emissions of nitrogen oxides.

Although not listed in table 7, overall heat consumption in 2003 averaged about 4.4 million British thermal units (MBtu) per metric ton of clinker, about the same as in 2002. Wet plants in 2003 averaged 6.6 MBtu per ton of clinker compared with about 6.2 MBtu per ton in 2002; the increase may reflect operational inefficiencies experienced during the shutdown of some wet kilns in 2003. Dry plants in 2003 averaged 3.8 MBtu per ton compared with 3.9 MBtu per ton in 2002; the decline was owing to the increase in the number of more efficient, modern precalciner dry kilns.

As in past years, dry process plants had a higher average electricity consumption per ton of cement product than wet process plants (table 8). This reflects the complex array of fans and blowers associated with modern dry kilns and clinker coolers. But the difference between wet and dry plants in 2003 was very much smaller than in past years, evidently owing to the continuing decline in the number of wet kilns and the increase in the number of more efficient dry process plants, including more efficient finish mills. In 2003, the average unit power consumption for wet plants increased significantly, and that for dry plants decreased. Further, as plants have been upgraded, there has been a general decline in the number of kilns in operation. For the same general technology, plants operating multiple kilns almost invariably have higher electrical power (and general energy) requirements per ton of overall output capacity than do plants with the same overall capacity but which operate a single kiln.

Consumption

Apparent consumption of portland and masonry cement increased by 3.7% to about 114 Mt in 2003 (table 1). The measure of consumption preferred by the cement industry for its market analyses, however, is that of cement shipments to final customers (that is, sales). The definition of "final customer" is left to the reporting cement producer but is generally understood to include concrete manufacturers, building supply dealers, construction contractors, and others (for example, the categories listed in table 15). The data for shipments are published monthly by the USGS and are summed in this annual report in tables 9-10.

Significant tonnage differences (up to several million tons) existed in some past years between the U.S. portland cement sales totals derived from annual canvasses (tables 1, 11-12, 15-16) and the monthly survey-based totals (tables 9, 10). The differences likely pertained to shipments (mainly of imported cement) by terminals that were missed by the annual survey but which were captured on the monthly surveys; the monthly data are more complete because they contain a lot of data submitted on a company-total rather than site-total basis. When missing terminals were identified, they were added to the canvass, with the result that the tonnage discrepancy declined and became insignificant for the period 2001-02. However, a significant discrepancy (1.7 Mt) reappeared for 2003. It is unclear if this discrepancy is related to missed terminals or whether it represents erroneous reporting on the monthly surveys (such as double-counting by companies of cement sold to or swapped with other cement companies).

In contrast to portland cement, data for masonry cement have tended to not show significant discrepancies between the monthly and annual reporting because little of this material is imported.

Superficial similarities between table 9 and tables 12-13 belie key differences in their component data. The most important difference is that table 9 reveals the shipment destinations and so directly provides the location and amounts of consumption. In contrast, the regional data in tables 12, 13, and 15 pertain to the location of the reporting entity (chiefly the production sites), not the location of consumption. It is very common for shipments to cross State lines; where a State shows a higher tonnage in table 9 than in table 12 or 13, the State is a net importer of cement. Where the higher tonnage is in table 12 or 13, the State is a net exporter of cement.

Based on table 9, domestic portland cement consumption (sales or shipments to final customers) increased by 3.7% in 2003 to just under 108 Mt, the second highest year on record (consumption was slightly more than 108 Mt in 2001). The import component of these sales fell by about 1.5% to about 19.0 Mt, reflecting higher domestic cement production and drawdown of cement and clinker stocks, as noted earlier. The leading 10 consuming States were, in descending order, California, Texas, Florida, Illinois, Ohio, Arizona, Georgia, New York, Pennsylvania, and Michigan. The leading 5 States accounted for about 40% of total U.S. consumption, and the leading 10 States accounted for about 55% of the total.

Cement is a key construction material and it may be expected that cement consumption levels will broadly reflect levels of construction spending, although there can be significant time lags between the onset or cutoff of spending corresponding changes in the consumption of cement or concrete. Lag times are particularly noticeable in sectors involving individual projects requiring high tonnages of concrete (for example, large office buildings or major public sector projects).

According to U.S. Census Bureau data quoted by the Portland Cement Association (2004), overall construction spending levels in 2003 were essentially unchanged (relative to revised 2002 data) at about $700 billion (constant 1996 dollars). Residential construction overall was up by 7.6% to about $364 billion largely owing to an 11.3% increase (to about $238 billion) in construction of new single-family houses; this activity reflected continued very low mortgage and general interest rates. Multifamily residential construction was up by a more modest 2.3% to $27 billion. Virtually all other construction categories showed spending declines in 2003. Nonresidential private construction (for example, office buildings and factories) declined by 8.4% to about $123 billion. Public sector construction spending fell by 2% to about $174 billion, led by a 0.9% fall in public building construction to about $79 billion and a 2.4% decline in the highways and street construction to about $48 billion.

Because nonresidential private and public construction projects tend to be more concrete-intensive than single-family housing construction, it is difficult to reconcile these general spending declines with the higher cement consumption levels noted earlier unless they are related to lag times or to significantly higher use of concrete relative to competing construction materials. The latter can be crudely evaluated through use of a calculated statistic called the "penetration rate" for cement. This can be defined as the tonnage of cement consumed per $1 million in spending. Many variables affect this type of analysis, especially the distribution of spending among different types of construction. Changes in penetration rates can reflect cost or performance advantages of concrete over competing construction materials, promotional efforts by the concrete industry, shifts in spending between new construction and repairs to existing infrastructure, lag times between construction spending and concrete consumption, and underreported cement consumption 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 1999 to 2002; $1 million in construction spending bought, in chronological order, about 157 t in 1999; 155 t in 2000; 160 t in 2001; 159 t in 2002; and 163 t in 2003.

Cement Customer Types.—Data on portland cement usage are collected on the basis of the types of customers to whom the cement is sold rather than the direct application itself (table 15). The distinction is that a customer, although classified in one category, may in fact use cement in more than one way. This data set includes a high proportion of estimates, many by the companies themselves, and likely understates consumption in the smaller use(r) categories. As in past years, the dominant customers for cement are the ready-mixed concrete producers, concrete products manufacturers, and road paving contractors.

Types of Portland Cement Consumed.—Sales to final customers of different types of portland cement are listed in table 16. Traditionally, sales of Types I and II, have overwhelmingly been the major cement types sold. In 2003, these two types accounted for about 83% of total portland cement sales, somewhat lower than the 86% in 2002 and lower still than in 2001. The reason for the relative decline is that the market for sulfate-resistant cements (Types II, V, and II/V hybrids) has increased owing largely to the long-lasting construction boom in the Southwestern States. In recent years, some Type II cements sold also have met the specifications of Type V cement or have been labeled as Type II/V hybrids, and these Type II or II/V cements have increasingly been recorded as sales of Type V portland cement on the USGS annual canvass. Sales of Types I, II, and V combined accounted for 92.7% of total sales in 2003, essentially unchanged from 2002. Sales of Type III (high early strength) cements declined somewhat in 2003; owing to the popularity of this type of cement for concrete tilt-up construction, the decline may reflect lower spending levels for multifamily residential and private nonresidential buildings as noted earlier. Sales of some types of blended cements decreased somewhat, but the significance of this is unclear given the preference of the concrete industry to buy SCM directly as additives to their concrete mixes. Blended cements in concrete offer improved performance, especially regarding decreased porosity, improved resistance to chemical attack, and reduced heat of hydration. The latter property, particularly through the use of fly ash as an SCM, has virtually eliminated sales of Type IV (low heat) portland cements.

Prices

Data are collected by the USGS on the mill net values for shipments to final customers by plants and import terminals (terminal nets); the data are listed in tables 12-14. The values are not specific as to type of cement (for ecample, Type I versus Type V portland); the values thus cannot be equated to prices, although they are broadly similar and are casually referred to as prices. Separate valuations are provided by each respondent for gray portland cement (all varieties combined), white portland cement, and masonry cement. In order to protect proprietary data, the values for white portland cement are revealed only for the national totals in table 14 and for imports (table 21); elsewhere they are combined with gray portland cement (table 12). The value data make no distinction between bulk and container (bag or package) shipments; however, container shipments would be expected to have higher unit values.

Relative to most of the other data in this report, mill net value data contain a high percentage of estimates. For gray portland cement, value estimates for 2003 were made for 8% of the facilities canvassed and the estimated fraction in 2002 was 11% of facilities. Values for districts that contain a significant component of estimated values have been rounded; unit values have been rounded to the nearest $0.50. Many of the reported value data appear to be company estimates, and it is evident that some variation exists in how companies calculate their mill net values. Within many companies, increasing centralization of marketing functions has led to respondent personnel at production sites being increasingly divorced from sales data. Accordingly, even where they appear to be unrounded, all value data in this report should be taken as being estimated to some degree, and the values are better viewed as price indices for cement, suitable for crude comparisons among regions and over time. Unit value shifts of less than $0.50 per metric ton ($0.50 per ton) are probably of no statistical significance. Value shifts can reflect changes in actual unit prices within a region, changes in supply sources (for example, imports), changes in the types of cement sold, and changes in the mix of bulk and container sales.

With the above caveats, the average mill net value of portland cement in 2003 was about $73.50 per ton, down by about $1 per ton; this decline partly offset the higher sales tonnages (table 12). Total portland cement shipments were worth about $7.8 billion (table 12). Unit value declines were reported in all but a few districts; some of the larger declines, however, may represent a degree on inconsistent reporting.

The average unit values for gray portland and white portland cements are listed in table 14. The value data for white cement should be viewed with caution because the data incorporate a significant fraction of resales by gray cement companies; such resales are invariably at much higher prices than the values reported by the few producers and importers of white cement. Additionally, white cement includes a larger component of relatively costly package shipments and estimated values. Thus, the modest increase in the white cement unit value in 2003, if real, may not be statistically significant. A discussion of prices for imported white cement is given in the "Foreign Trade" section of this report.

The average mill net value in 2003 for masonry cement was $109 per ton, up by about $1 per ton (table 13). Given the fact that value estimates had to be made for 16% of the respondents reporting masonry cement sales, this apparent increase is probably not statistically significant. Also, some of the reported values for masonry cement suggest the omission of bagging charges, which are supposed to be included. Accordingly, although the market for masonry cement was very strong during the year, some of the unit value changes in table 13 appear to be excessive. The overall increase in the total value of sales, however, is consistent with the significantly higher sales tonnages reported in 2003.

The unit values in tables 12 and 13 are free on board (f.o.b.) the plant. A crude estimate of delivery costs to the customer can be made by comparison to the U.S. 20-city average delivered cement prices (for Type 1 portland and masonry cements) reported monthly by the journal Engineering News-Record. For 2003, the monthly U.S. average Type-1 delivered price for the year was calculated (after conversion to metric units) to be $91.30 per ton; a comparison of this with the average gray portland mill net value of $72.50 per ton in table 14 suggests an average delivery cost of almost $19 per ton. This was considerably higher than the $16 per ton estimate for 2002 and continued a trend (for example, about $12 per ton in 2000 and $14.50 per ton in 2001) that most likely reflects higher fuel costs. Fuel-related higher delivery charges appear to be the main factor responsible for the 3% average price increase for concrete to about $83 per cubic yard (for 4,000 pounds per square inch strength—the middle of the strength range reported). For masonry cement, the Engineering News-Record average price for 2003 was up slightly to about $172 per ton (converted from prices per 70-pound bag). The large difference between this and the average mill net value for masonry appears to incorporate a variety of handling charges for this mainly bagged commodity.

Foreign Trade

Trade data from the U.S. Census Bureau are listed in tables 17-22. Exports of hydraulic cement and clinker increased slightly in 2003 but, except for sales to Canada, remained insignificant (tables 1, 17). Almost all of the exported material was cement.

Overall imports (including into Puerto Rico) of hydraulic cement and clinker in 2003 appear to have decreased by 3.8% to 23.2 Mt (tables 18, 19). The cement component of these imports (table 18 data minus data in table 23) declined by an apparent 5.2% to 21.4 Mt, and the apparent clinker component increased by 14.7% to 1.8 Mt (table 22). The use of the "apparent" qualifier is deliberate because the trade data for 2003 and for an unknown number of recent previous years are incomplete with regards to overland imports from Canada, as discussed below. The clinker data for 2002-03 have been manually corrected to remove "clinker" coming into the Honolulu, HI, district; the material was actually gray portland cement incorrectly registered with the tariff code for clinker. The Honolulu data have been transferred to table 20 (gray portland cement).

The problem with the import data for Canada was first evident for clinker, but is thought to apply to cement imports as well, although the discrepancy with cement is much harder to quantify. The official trade data show insufficient clinker from Canada coming into the Detroit, MI; Milwaukee, WI; and Seattle, WA, customs districts to feed the grinding plants that are located in Michigan, Wisconsin, and Washington, respectively. These plants are essentially reliant on Canadian clinker and do not purchase significant quantities of domestic clinker. The unreported Canadian clinker appears to be that material coming in overland by truck, including material that may be transshipped after truck entry into the United States. Because the individual truckloads are worth less than $2,000 (customs value), the 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 18-22). This recordation problem 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 by about 0.7 Mt for 2002 and about 0.4 Mt for 2003 (tables 1, 22).

Likewise, certain U.S. cement companies with plants in Canada near the U.S. border may allow some of their U.S. final

customers to pick up cement at the Canadian plants. Although these sales are being recorded correctly in the companies' monthly reporting to the USGS (table 9), an informal entry data recordation problem could exist for individual truckloads worth less than $2,000. Given the large volumes of Canadian cement that do get recorded by the U.S. Census Bureau and the fact that the USGS monthly canvass form cannot distinguish the mode of entry of imported cement, the magnitude of the underreporting of cement imports from Canada is difficult to estimate.

With the above caveats in mind, the busiest customs district of entry in 2003 was Tampa, FL; this was followed closely by Miami, FL; Houston-Galveston, TX; and Los Angeles, CA (table 19). The leading country suppliers of cement and clinker in 2003 were, in descending order, Canada, Thailand, China, Colombia, the Republic of Korea, Venezuela, Greece, Turkey, Sweden, and Mexico.

White cement imports are listed in table 21. Although no attempt has been made to correct the data, it is evident that a few of the country entries, notably the 2003 entries for the United Arab Emirates and for Venezuela, have unit values that are too low to be white cement. It is likely that this relatively inexpensive material is actually gray portland cement or even gray clinker for which a white cement tariff code was recorded by the importer. Some other entries have values that seem slightly too low and these may contain a component of gray portland cement.

Owing to fuel cost increases during the year, there were widespread informal reports of substantially higher shipping costs for imports as well as steep rises in the chartering rates for cement ships and other bulk carriers owing to a shortage of such vessels. An examination of the unit price data for imports, however, does not appear to bear out these informal reports to a significant degree for 2003. For example, if the data for Canada and Mexico are deducted (to remove the likely overland imports) from the gray portland cement imports in table 20, the average unit value of imports was $30.54 per ton in 2002 and $31.61 per ton in 2003 on a customs value basis and $42.58 per ton and $44.30 per ton, respectively, on a cost, insurance, and freight (c.i.f.) basis. The difference in the two value types (c.i.f. minus customs value) approximates the shipping costs. At $12.04 per ton in 2002 and $12.69 per ton in 2003, the approximate shipping costs rose by only 5.4%. Likewise, the value of oceanic clinker imports (that is, deducting for material from Canada and aluminous cement clinker from France) yields an average shipping rate of $10.53 per ton in 2002 and $12.03 per ton in 2003, a rise of 14.3%. Thus it would appear that, at least for cement, most of the imports did not experience large shipping cost increases in 2003, possibly owing to the existence of long-term import contracts.

World Review

The world hydraulic cement production data listed in table 23 were derived from data collected by USGS country specialists from a variety of sources. The data for some countries may include their exports of clinker. Although the data are supposed to include all forms of hydraulic cement, the data for the United States are for portland plus masonry cement only, and the data for some other countries also may not be all inclusive. World cement production increased by about 6% in 2003 to an estimated 1.95 Gt.

More than 150 countries had cement production during the year, although production was very unevenly distributed among them. In terms of country rankings in 2003, China remained by far the leading cement producer with a provisional production of about 813 Mt, or about 42% of the world total. The remaining top 15 countries were, in descending order, India, the United States, Japan, the Republic of Korea, Spain, Russia, Brazil and Italy (tied), Indonesia, Turkey, Thailand, Mexico, and Germany and Iran (tied). Cumulatively, the top 5 countries had about 59% of total world output; the top 10 countries, almost 69%; and the top 15 countries, about 77%.

Regionally, Asia contributed almost 63% of world production and included 6 of the leading 15 producing countries. Western Europe had about 10% of total output; North America, about 7%; 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

Continued low interest rates and very high levels of cement consumption late in 2003 allowed for predictions of about 5% growth in cement consumption in 2004. Indeed, yearend 2003 sales were so strong that many cement plants were finding it difficult to amass clinker stockpiles in advance of their expected early 2004 kiln shutdowns for maintenance. Without the clinker stockpiles, it would be difficult to continue making and supplying cement during the shutdown periods.

Rising fuel costs were of concern because they were increasing the costs of cement production and delivery; general cement price hikes of several dollars per ton were expected in 2004. Renewal of import contracts was expected to be possible only at significantly higher shipping and ship-chartering rates, and with the slow but steady recovery in the economies of several Southeast Asian countries, the availability of hitherto inexpensive cement from these countries was expected to become constrained. The TEA-21 bill was expected to be reauthorized in 2004 but perhaps at lower funding levels than had been proposed. States were anticipated to face continued difficulty in cofunding their share of public sector highway projects. Interest rates were expected to be raised modestly in 2004, and it was likely that continued higher rates would eventually slow the growth in cement consumption during the medium term (2005-10) to a modest 1% to 3% per year. The degree to which suppliers of fly ash, GGBFS, and other cementitious products can displace portland cement in concrete mixes will also affect mid- and long-term growth in cement consumption.

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TABLE 1
SALIENT CEMENT STATISTICS[1]

(Thousand metric tons unless otherwise specified)

		1999	2000	2001	2002	2003
United States:[2]						
Production:						
Cement[3]		85,952	87,846	88,900	89,732	92,843
Clinker		76,003	78,138	78,451	81,517	81,882
Shipments from mills and terminals:[4, 5]						
Quantity		103,271	105,557	112,510	108,500	111,000
Value[6]	thousands	$8,083,247 [7]	$8,292,625 [7]	$8,600,000	$8,250,000	$8,340,000
Average value[8]	dollars per metric ton	$78.27	$78.56	$76.50	$76.00	$75.00
Stocks at mills and terminals, yearend		6,367	7,566	6,600	7,680	6,610
Exports[9]		694	738	746	834	837
Imports for consumption:						
Cement[10]		24,578	24,561	23,694	22,198	21,015
Clinker		4,164	3,673	1,782	1,603	1,808
Total[11]		28,742	28,234	25,474	23,801	22,823
Consumption, apparent[12]		108,862	110,470	112,810	110,020	114,090
World, production[e, 13]		1,600,000	1,660,000 [r]	1,730,000	1,840,000 [r]	1,950,000

See footnotes at end of table.

TABLE 1--Continued
SALIENT CEMENT STATISTICS[1]

[e]Estimated. [r]Revised.
[1]Unless 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.
[2]Excludes Puerto Rico.
[3]Includes cement produced from imported clinker.
[4]Includes imported cement and cement made from imported clinker. Includes sales by import terminals.
[5]Shipments to final domestic customers. Data are from an annual survey of plants and terminals and may differ from the totals in tables 9 and 10, which are based on consolidated monthly surveys from companies.
[6]Value at mill or import terminal of cement shipments to final domestic customers.
[7]Although presented unrounded, the data contain estimates for survey nonrespondents.
[8]Total value at mill or import terminal divided by the total tonnage sold.
[9]All forms of hydraulic cement plus clinker.
[10]All forms of hydraulic cement or clinker, respectively.
[11]Data may not add to totals shown because of independent rounding.
[12]Production (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.
[13]Total 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 DISTRICT[1]

(Thousand metric tons unless otherwise specified)

	2002					2003				
			Capacity[2]		Stocks			Capacity[2]		Stocks
District[3]	Active plants	Production[4]	Finish grinding	Percentage utilized[5]	at yearend[6]	Active plants	Production[4]	Finish grinding	Percentage utilized[5]	at yearend[6]
Maine and New York	5	3,098	4,200 [7]	73.8 [7]	278 [7]	5	3,117	4,480 [7]	69.5 [7]	277 [7]
Pennsylvania, eastern[8]	7	4,665	5,311	87.8	326	7	4,327	5,320	81.3	321
Pennsylvania, western	3	1,460	1,724	84.7	156	3	1,393	1,660 [7]	83.8 [7]	128
Illinois	4	2,772 [r]	3,408	81.3	188	4	2,925	3,390 [7]	86.2 [7]	243
Indiana	4	2,935	3,502	83.8	278	4	2,928	3,663	79.9	177
Michigan and Wisconsin[9]	6	5,579	7,950 [7]	70.2 [7]	425	6	5,541	7,510 [7]	73.7 [7]	370 [7]
Ohio	2	1,024	1,497	68.4	58	2	1,032	1,530 [7]	67.4	36
Iowa, Nebraska, South Dakota	5	4,446	5,557	80.0	454	5	4,390	5,962	73.6	384
Kansas	4	2,352	3,100 [7]	75.9 [7]	204 [7]	4	2,270	3,024	75.1	193
Missouri	5	4,816	5,731	84.0	556	5	5,182	6,823	75.9	384
Florida[8]	6	3,949	6,680 [7]	59.1 [7]	383 [7]	7	4,190	7,390 [7]	56.7 [7]	452
Georgia, Virginia, West Virginia	4	2,781	4,621	60.2	202	4	2,803	4,620 [7]	60.7 [7]	200 [7]
Maryland	3	1,880	2,420 [7]	77.7 [7]	193 [7]	3	2,203	2,388	92.3	126
South Carolina	3	2,508	3,406	73.6	150	3	3,148	4,340 [7]	72.6	136
Alabama	5	4,544	5,438	83.6	345	5	4,332	5,220 [7]	83.0 [7]	218
Kentucky, Mississippi, Tennessee	4	3,004	3,489	86.1	365	4	3,151	3,490 [7]	90.3 [7]	196
Arkansas and Oklahoma	4	2,498	3,230 [7]	77.3 [7]	194 [7]	4	2,742	3,330 [7]	82.4 [7]	142
Texas, northern[8]	6	5,955	7,044	84.5	423	6	6,400	7,410 [7]	86.4 [7]	302
Texas, southern	5	4,592	5,452	84.2	247	5	4,652	5,450 [7]	85.3	241
Arizona and New Mexico	3	2,270	3,035	74.8	95 [r]	3	2,618	3,035	86.3	102
Colorado and Wyoming	4	2,145	2,520	85.1	96	3	2,470	3,310 [7]	74.6 [7]	115
Idaho, Montana, Nevada, Utah	7	2,874	3,584	80.2	321	7	2,992	4,060 [7]	73.7 [7]	304 [7]
Alaska and Hawaii	--	--	--	--	51	--	--	--	--	35
California, northern	3	2,594	2,880	90.1	182	3	2,489	2,880	86.4	185 [7]
California, southern[8]	8	8,572	10,227	83.8	374	8	9,103	10,300 [7]	88.3 [7]	315 [7]
Oregon and Washington	4	1,970	2,432	81.0	163	4	1,707	2,432	70.2	213
Independent importers, n.e.c.[9]	--	--	--	--	466 [7]	--	--	--	--	382 [7]
Total or average[10]	114	85,283	108,000 [7]	78.7 [7]	7,170 [7]	114	88,106	113,000 [7]	77.9 [7]	6,180 [7]
Puerto Rico	2	1,534	2,160 [7]	71.1 [7]	75 [7]	2	1,485	2,462	60.3	64
Grand total or average[10]	116	86,817	111,000 [7]	78.6 [7]	7,250 [7]	116	89,592	116,000 [7]	77.6 [7]	6,240 [7]

[r]Revised. -- Zero.

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

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

[3]District assignation is the location of the reporting facilities. Includes independent importers for which regional assignations were possible.

[4]Includes cement produced from imported clinker.

[5]Calculated relative to portland cement output.

[6]Includes imported cement. Includes mills and terminals.

[7]Data, even where they appear to be unrounded, contain estimates for nonrespondent or incompletely reporting facilities.

[8]Data, except for stockpiles, exclude one plant that reported cement (clinker) grinding capacity but reported no production of portland cement.

[9]Not elsewhere classified. Data include only those importers or terminals for which regional assignations were not possible.

[10]Data may not add to totals shown because of independent rounding.

TABLE 4
MASONRY CEMENT PRODUCTION AND STOCKS IN THE UNITED STATES, BY DISTRICT[1]

(Thousand metric tons unless otherwise specified)

	2002			2003		
District[2]	Active plants	Production[3]	Stocks at yearend[4]	Active plants	Production[3]	Stocks at yearend[4]
Maine and New York	4	116	8 [5]	4	117	15 [5]
Pennsylvania, eastern	6	247	51	6	246	44
Pennsylvania, western	3	94	11 [5]	3	96	9
Indiana	4	W	W	4	W	W
Michigan	5	292	50	5	237	37
Ohio	2	85	17 [5]	2	75	12
Iowa, Nebraska, South Dakota	2	W	W	2	W	W
Kansas	2	W	W	2	W	W
Missouri	2	W	W	1	W	W
Florida	5	591	34	5	674	35
Georgia, Virginia, West Virginia	5	343 [5]	33 [5]	5	371 [5]	38 [5]
Maryland	2	W	W	2	W	W
South Carolina	3	426	22	3	425	23
Alabama	4	380	75	4	565	51
Kentucky, Mississippi, Tennessee	3	83	13	3	W	W
Arkansas and Oklahoma	4	145	25 [5]	4	149	14
Texas, northern	4	160	11	4	155	11
Texas, southern	3	134	9	3	152	7
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
Alaska and Hawaii	1	W	W	1	4	--
California, northern, Oregon, Washington	3	79	10	3	73	8
California, southern	4	488 [5]	12 [5]	4	519	9
Independent importers, n.e.c.	--	--	2 [5]	--	--	5 [5]
Total[6]	77	4,449 [5, 7]	504 [5]	76	4,737 [5, 7]	434 [5]

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

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

[2]District assignation is the location of the reporting facilities. Includes independent importers for which regional assignations were possible.

[3]Includes cement produced from imported clinker.

[4]Includes imported cement.

[5]Data, even where apparently unrounded, contain estimates for nonrespondent or incompletely reporting facilities.

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

[7]Production from clinker accounted for 95% of the total. Production from finished cement accounted for the remainder.

TABLE 5
CLINKER CAPACITY AND PRODUCTION IN THE UNITED STATES IN 2003, BY DISTRICT[1]

(Thousand metric tons unless otherwise specified)

District	Active plants[2]				Number of kilns[3]	Daily capacity[4]	Average days of routine maintenance	Apparent annual capacity[5]	Production[6]	Percentage of capacity utilized	Yearend stocks[7]
	Process used										
	Wet	Dry	Both	Total							
Maine and New York	3	1	--	4	5	10.6	22.6 [8]	3,620 [8]	2,905	80.2 [8]	191 [8]
Pennsylvania, eastern	2	5	--	7	14	16.5	32.1	5,375	4,121	76.7	293
Pennsylvania, western	2	1	--	3	7	5.0	26.6 [8]	1,680 [8]	1,377	81.9 [8]	91
Illinois	--	4	--	4	8	8.6	19.9	2,923	2,572	88.0	197
Indiana	1	3 [9]	--	4	8	10.4	24.6	3,503	2,975	84.9	98
Michigan	1	2	--	3	8	14.0	39.3	4,584	4,001	87.3	334
Ohio	1	1	--	2	3	3.3	23.1	1,138	993	87.2	21
Iowa, Nebraska, South Dakota	--	4	1	5	9	13.9	20.9	4,729	4,060	85.8	192
Kansas	1	3	--	4	9	8.8	37.5	2,924	2,203	75.3	162
Missouri	2	3	--	5	6	15.8	17.5	5,481	4,869	88.8	194
Florida	1	5	--	6	8	15.3	23.4 [8]	5,220 [8]	3,868	74.1 [8]	153
Georgia, Virginia, West Virginia	1	3	--	4	6	9.6	26.8 [8]	3,230 [8]	2,422	75.0 [8]	241
Maryland	1	2	--	3	4	8.1	15.3	2,898	2,083	71.9	40
South Carolina	1	1	1	3	8	14.8	20.5	4,950	2,628	53.1	113
Alabama	--	5	--	5	5	16.4	15.2	5,765	4,590	79.6	222 [8]
Kentucky, Mississippi, Tennessee	1	3	--	4	4	10.1	23.5	3,426	3,041	88.8	205
Arkansas and Oklahoma	2	2	--	4	10	8.1	19.1	2,806	2,489	88.7	103
Texas, northern	2	3	1	6	15	20.5	19.8	7,100	6,077	85.6	243
Texas, southern	--	4	1	5	6	13.6	15.9	4,722	4,231	89.6	206
Arizona and New Mexico	--	3	--	3	7	8.6	9.9	3,101	2,554	82.4	187
Colorado and Wyoming	--	3	--	3	4	8.8	18.0	2,996	2,350	78.4	130
Idaho, Montana, Nevada, Utah	3	4	--	7	9	8.9 [8]	20.2 [8]	3,060 [8]	2,759	90.1 [8]	81 [8]
California, northern	--	3	--	3	3	8.7	16.6	3,066	2,363	77.1	93
California, southern	--	8	--	8	17	28.9	11.7	9,814	8,920	90.9	561
Oregon and Washington	1	2	--	3	3	6.3	59.9	1,878	1,430	76.1	84
Total or average[10]	26	78	4	108	186	293.7 [8]	23.7 [8]	100,000 [8]	81,882	81.9 [8]	4,440 [8]
Puerto Rico	--	2	--	2	2	5.9	36.5	1,919	1,434	74.7	118
Grand total or average[10]	26	80	4	110	188	299.6 [8]	23.6 [8]	102,000 [8]	83,315	81.8 [8]	4,560 [8]

-- Zero.

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

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

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

[4]Sum of reported daily kiln capacities for each plant in district.

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

[6]If annual survey data were unavailable for an annual survey nonrespondent plant, monthly survey clinker production data for the facility were summed and incorporated.

[7]Includes imported clinker and clinker stockpiles at grinding plants.

[8]Data, even where apparently unrounded, contain estimates for nonrespondent or incompletely reporting facilities.

[9]Includes one semidry kiln.

[10]Data 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	2002		2003	
	Clinker	Cement[3]	Clinker	Cement[3]
Calcareous:				
Limestone (includes aragonite, marble, chalk, coral)	107,000	1,330	109,000	1,530
Cement rock (includes marl)	16,200	39	12,700	44
Cement kiln dust (CKD)[4]	688	164	289	149
Lime[5]	196	34	22	27
Other	5	18	235	32
Aluminous:				
Clay	4,770	--	3,950	--
Shale	3,230	9	2,630	8
Other[6]	540	--	618	--
Ferrous, iron ore, pyrites, millscale, other	1,260	--	1,340	--
Siliceous:				
Sand and calcium silicate	2,960	2	2,860	2
Sandstone, quartzite soils, other	692	--	587	2
Fly ash	1,960	64	2,250	39
Other ash, including bottom ash	990	--	1,100	--
Granulated blast furnace slag[7]	60	369	17	333
Other blast furnace slag	162	--	214	--
Steel slag	481	--	448	--
Other slags	67	4	113	--
Natural rock pozzolans[8]	--	28	--	25
Other pozzolans[9]	165	7	129	49
Other:				
Gypsum and anhydrite	--	4,740	--	5,000
Other, n.e.c.	21	52	70	68
Total[10]	141,000	6,860	139,000	7,300
Clinker, imported, raw materials equivalent[11]	--	5,230	--	4,240
Grand total[10]	141,000	12,100	139,000	11,500

-- Zero.

[1]Nonfuel raw materials. Includes Puerto Rico.

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

[3]Includes portland, blended, and masonry cements.

[4]Data are underreported.

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

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

[7]Includes both ground (GGBFS) and unground material.

[8]Includes pozzolana and burned clays and shales except where reported directly as clay or shale.

[9]Includes diatomite, silica fume, other microcrystalline silica, and other pozzolans, whether or not used as such.

[10]Data may not add to totals shown because of independent rounding.

[11]Converted 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 PROCESS[1, 2]

Kiln process	Clinker produced[3]			Fuel consumed					Waste fuel		
	Active plants	Quantity (thousand metric tons)	Percentage of total	Coal[4] (thousand metric tons)	Coke[5] (thousand metric tons)	Petroleum coke (thousand metric tons)	Oil[6] (thousand liters)	Natural gas (thousand cubic meters)	Tires (thousand metric tons)	Solid (thousand metric tons)	Liquid (thousand liters)
2002:											
Wet	27	14,599	17.6	1,990	15	500	22,900	45,000	87	73	725,000
Dry	80	64,633	77.9	7,170	3	1,380	69,700	367,000	210	39	188,000
Both	3	3,727	4.5	540	--	30	--	67,000	6	--	47,800
Total[7]	110	82,959	100.0	9,690	17	1,910	92,600	479,000	304	112	962,000
2003:											
Wet	26	13,259	15.9	1,830	--	528	24,300	33,400	92	234	686,000
Dry	79	65,201	78.3	6,940	3	1,420	61,200	286,000	291	52	185,000
Both	4	4,855	5.8	696	--	26	--	58,100	5	31	39,000
Total[7]	109	83,315	100.0	9,460	3	1,980	85,400	377,000	387	317	910,000

-- Zero.
[1]All fuel data have been rounded to three significant digits.
[2]Includes Puerto Rico.
[3]Clinker data were all reported; although not rounded, data are thought to be accurate to no more than three significant digits.
[4]All reported to be bituminous.
[5]Data are likely to be all or mostly misreported petroleum coke.
[6]Distillate and residual fuel oils; excludes used oils included under liquid wastes.
[7]Data may not add to totals shown because of independent rounding.

TABLE 8
ELECTRIC ENERGY USED AT CEMENT PLANTS IN THE UNITED STATES, BY PROCESS[1]

Plant process	Electric energy used[2]						Finished cement produced[3] (thousand metric tons)	Average consumption (kilowatthours per metric ton of cement produced)
	Generated at plant		Purchased		Total			
	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Quantity (million kilowatthours)	Percentage		
2002:								
Integrated plants:								
Wet	--	--	27	2,190	2,190	16.8	16,044	136
Dry	5	539	80	9,700	10,200	78.6	69,150	148
Both	--	--	3	595	595	4.6	3,742	159
Total or average[4]	5	539	110	12,500	13,000	100.0	88,936	146
Grinding plants[5]	--	--	6	175	175	--	2,192	80
Exclusions[6]	--	--	2	--	--	--	136	--
2003:								
Integrated plants:								
Wet	--	--	26	2,190	2,190	16.5	15,618	140
Dry	5	526	79	9,760	10,300	77.4	72,895	141
Both	--	--	4	814	814	6.1	5,816	140
Total or average[4]	5	526	109	12,800	13,300	100.0	94,329	141
Grinding plants[5]	--	--	6	166	166	--	2,169	77
Exclusions[6]	--	--	2	--	--	--	139	--

-- Zero.
[1]Includes Puerto Rico.
[2]Electricity data are rounded because they include estimates for a number of nonrespondent plants or incomplete reporting by respondent facilities.
[3]Includes portland and masonry cements. Data are all reported and have not been rounded.
[4]Data may not add to totals shown because of independent rounding.
[5]Excludes plants that reported production only of masonry cement.
[6]Tonnage of cement produced by plants that reported production of masonry cement only.

TABLE 9
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN[1, 2]

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2002	2003[3]	2002	2003[3]
Destination:				
Alabama	1,479	1,598	145	162
Alaska[4]	137	165	--	(5)
Arizona	3,293	3,608	107	109
Arkansas	946	1,094	61	69
California, northern	4,567	4,681	106	111
California, southern	8,066	8,574	411	450
Colorado	2,612	2,290	24	27
Connecticut[4]	746	757	14	15
Delaware[4]	193	174	11	11
District of Columbia[4]	186	195	1	(5)
Florida	7,828	8,588	681	766
Georgia	3,087	3,445	292	321
Hawaii	312	340	5	5
Idaho	567	590	1	1
Illinois, excluding Chicago	1,728	1,756	22	26
Illinois, metropolitan Chicago[4]	2,384	2,234	62	62
Indiana	2,081	2,176	92	93
Iowa	1,734	1,718	8	7
Kansas	1,498	1,540	15	15
Kentucky	1,228	1,337	96	107
Louisiana[4]	1,679	1,832	52	62
Maine	208	219	5	5
Maryland	1,309	1,343	85	85
Massachusetts[4]	1,395	1,264	21	20
Michigan	3,146	3,052	146	142
Minnesota[4]	1,998	2,068	48	50
Mississippi	910	983	56	64
Missouri	2,500	2,664	44	47
Montana	323	375	1	1
Nebraska	1,184	1,207	9	8
Nevada	1,843	2,026	20	23
New Hampshire[4]	244	233	6	5
New Jersey[4]	1,975	1,886	79	75
New Mexico	824	813	8	9
New York, eastern	698	645	28	26
New York, western[4]	804	819	30	29
New York, metropolitan[4]	1,655	1,685	67	75
North Carolina[4]	2,510	2,469	294	305
North Dakota[4]	311	330	3	3
Ohio	3,763	3,830	192	189
Oklahoma	1,363	1,481	48	54
Oregon	1,040	1,005	1	1
Pennsylvania, eastern	2,187	1,948	65	61
Pennsylvania, western	1,133	1,166	68	68
Rhode Island[4]	167	197	3	3
South Carolina	1,369	1,499	135	138
South Dakota	423	452	2	2
Tennessee	1,809	1,885	210	223
Texas, northern	6,270	6,680	195	192
Texas, southern	6,002	6,359	141	191
Utah	1,166	1,200	1	(5)
Vermont[4]	116	136	3	3
Virginia	2,119	2,100	157	169
Washington	1,899	1,903	2	2
West Virginia	424	432	26	27
Wisconsin	2,054	2,229	29	30
Wyoming	413	424	1	1
Total[6]	103,905	107,699	4,435	4,745

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	
	2002	2003[3]	2002	2003[3]
Destination--Continued:				
Foreign countries[7]	438	483	(5)	(5)
Puerto Rico	1,882	1,858	--	--
Grand total[6]	106,225	110,040	4,436	4,745
Origin:				
United States	85,431	89,598	4,400	4,701
Puerto Rico	1,542	1,484	--	--
Foreign countries[8]	19,250	18,960	37	44
Total shipments[6]	106,225	110,042	4,436	4,745

-- Zero.

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

[2]Data are developed from consolidated monthly surveys of shipments by companies and may differ from data in tables 1, 11-13, 15, and 16, which are from annual surveys of individual plants and importers. Includes any revisions to monthly data available through September 30, 2004. Although presented unrounded, data are thought to be accurate to no more than three significant digits.

[3]Data incorporate monthly revisions available through the June 2003 data cycle.

[4]Has no cement plants.

[5]Less than 1/2 unit.

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

[7]Includes shipments to U.S. possessions and territories.

[8]Imported cement distributed in the United States as reported by domestic producers and other importers. Data do not match the imports calculated from tables 19 and 22.

TABLE 10
CEMENT SHIPMENTS, BY DESTINATION (REGION AND CENSUS DISTRICT)[1, 2]

	Portland cement				Masonry cement			
	Quantity (thousand metric tons)		Percentage of U.S. total		Quantity (thousand metric tons)		Percentage of U.S. total	
Region and census district	2002	2003	2002	2003	2002	2003	2002	2003
Northeast:								
New England[3]	2,877	2,806	3	3	52	51	1	1
Middle Atlantic[4]	8,452	8,149	8	8	338	334	8	7
Total[5]	11,329	10,955	11	10	390	385	9	8
South:								
South Atlantic[6]	19,024	20,245	18	19	1,683	1,822	38	38
East South Central[7]	5,426	5,803	5	5	507	556	11	12
West South Central[8]	16,259	17,446	16	16	497	568	11	12
Total[5]	40,709	43,494	39	40	2,686	2,946	60	62
Midwest:								
East North Central[9]	15,154	15,277	15	14	542	542	12	11
West North Central[10]	9,649	9,979	9	9	130	132	3	3
Total[5]	24,803	25,256	24	23	672	674	15	14
West:								
Mountain[11]	11,041	11,326	11	11	163	171	4	4
Pacific[12]	16,021	16,668	15	15	525	569	11	12
Total[5]	27,063	27,994	26	26	688	740	16	16
Grand total[5]	103,905	107,699	100	100	4,435	4,745	100	100

[1]Excludes Puerto Rico. Includes imported cement shipped by importers and cement ground from imported clinker. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.
[2]Data are based on table 9.
[3]Includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.
[4]Includes New Jersey, New York, and Pennsylvania.
[5]Data may not add to totals shown because of independent rounding.
[6]Includes Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia.
[7]Includes Alabama, Kentucky, Mississippi, and Tennessee.
[8]Includes Arkansas, Louisiana, Oklahoma, and Texas.
[9]Includes Illinois, Indiana, Michigan, Ohio, and Wisconsin.
[10]Includes Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.
[11]Includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.
[12]Includes Alaska, California, Hawaii, Oregon, and Washington.

TABLE 11
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				
			From plant to consumer		From terminal to consumer		Total shipments to consumer
	In bulk	In containers[3]	In bulk	In containers[3]	In bulk	In containers[3]	
2002:							
Railroad	11,600	29	1,620	--	368	1	1,990
Truck	2,590	220	55,700	2,350	45,100	586	104,000
Barge and boat	9,320	--	127	1	108	--	236
Total[4]	23,500	248	57,400	2,350	45,600	587	106,000 [5]
2003:							
Railroad	12,200	7	1,770	--	411	19	2,200
Truck	4,380	142	56,800	2,030	46,300	745	106,000
Barge and boat	7,910	--	141	1	44	--	186
Total[4]	24,400	149	58,700	2,030	46,800	764	108,000 [5]

-- Zero.
[1]Includes Puerto Rico. Includes imported cement and cement made from imported clinker.
[2]Data are rounded to no more than three significant digits because they include estimates.
[3]Includes packages, bags, and jumbo bags.
[4]Data may not add to totals shown because of independent rounding.
[5]Shipments calculated on the basis of an annual survey of plants and importers; may differ from totals in tables 9 and 10, which are based on consolidated monthly data.

TABLE 12

PORTLAND CEMENT SHIPPED BY PRODUCERS AND IMPORTERS IN THE UNITED STATES, BY DISTRICT[1]

District[3, 4]	2002			2003		
		Value[2]			Value[2]	
	Quantity (thousand metric tons)	Total (thousands)	Average (dollars per metric ton)	Quantity (thousand metric tons)	Total (thousands)	Average (dollars per metric ton)
Maine and New York	3,440 [5]	$264,000 [5]	$76.50 [5]	2,142	$158,000 [5]	$74.00 [5]
Pennsylvania, eastern	4,608	336,981	73.13	4,336	317,000 [5]	73.00 [5]
Pennsylvania, western	1,407	110,000 [5]	78.50 [5]	1,404	106,000 [5]	75.50 [5]
Illinois	2,844	209,835	73.77	2,988	215,000 [5]	72.00 [5]
Indiana	2,900	194,945	67.23	2,830 [5]	196,379	69.39
Michigan and Wisconsin	6,540 [5]	490,000 [5]	75.00 [5]	6,600 [5]	490,000 [5]	74.00 [5]
Ohio	1,051	80,446	76.52	1,078	85,872	79.64
Iowa, Nebraska, South Dakota	4,892	379,492	77.57	4,869	378,034	77.65
Kansas	2,048	157,373	76.85	2,051	156,000 [5]	76.00 [5]
Missouri	5,886	407,544	69.24	6,291	426,931	68.87
Florida	7,413	558,389	75.32	8,289	638,000 [5]	77.00 [5]
Georgia, Virginia, West Virginia	2,747	209,000 [5]	76.00 [5]	2,730	193,000 [5]	70.50 [5]
Maryland	2,094	155,565	74.30	2,483	165,935	66.82
South Carolina	2,857	200,330	70.13	3,210	198,000 [5]	61.50 [5]
Alabama	4,290 [5]	282,000 [5]	65.50 [5]	4,275	269,000 [5]	63.00 [5]
Kentucky, Mississippi, Tennessee	2,990	208,000 [5]	69.50 [5]	3,183	218,000 [5]	68.50 [5]
Arkansas and Oklahoma	2,520 [5]	181,000 [5]	72.00 [5]	2,797	196,459	70.24
Texas, northern	6,004	434,000 [5]	72.00 [5]	6,660 [5]	449,000 [5]	67.50 [5]
Texas, southern	5,967	404,128	67.72	6,020 [5]	408,030	67.78
Arizona and New Mexico	3,509	318,164	90.66	3,676	342,180	93.08
Colorado and Wyoming	2,521	191,479	75.96	2,329	169,619	72.82
Idaho, Montana, Nevada, Utah	2,860	232,000 [5]	81.00 [5]	3,097	245,000 [5]	79.00 [5]
Alaska and Hawaii	410	53,313	130.11	454	58,952	129.80
California, northern	3,441	273,661	79.53	3,751	302,695	80.69
California, southern	9,546	720,350	75.46	9,881	740,801	74.97
Oregon and Washington	2,099	165,000 [5]	78.50 [5]	1,897	145,334	76.61
Independent importers, n.e.c.[6]	7,213	558,000 [5]	77.50 [5]	7,140 [5]	555,000 [5]	78.00 [5]
Total or average[7]	104,000 [5, 8]	7,770,000 [5]	74.50 [5]	106,000 [5, 8]	7,820,000 [5]	73.50 [5]
Puerto Rico	1,885	W	W	1,848	W	W
Grand total[7]	106,000 [5]	W	W	108,000 [5, 8]	W	W

W Withheld to avoid disclosing company proprietary data.

[1]Includes 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.

[2]Values 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 ton.

[3]District is the location of the reporting facility, not the location of sales.

[4]Includes shipments by independent importers where regional assignations were possible.

[5]Data are rounded (unit values to the nearest $0.50) because they contain estimated data.

[6]Importers for which district assignations were not possible.

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

[8]Shipments calculated on the basis of an annual survey of plants and importers; may differ from tables 9 and 10, which are based on consolidated company monthly data.

TABLE 13
MASONRY CEMENT SHIPPED BY PRODUCERS AND IMPORTERS IN THE UNITED STATES, BY DISTRICT[1, 2]

District[4]	2002 Quantity (thousand metric tons)	2002 Value[3] Total (thousands)	2002 Value[3] Average (dollars per metric ton)	2003 Quantity (thousand metric tons)	2003 Value[3] Total (thousands)	2003 Value[3] Average (dollars per metric ton)
Maine and New York	97 [5]	$9,640 [5]	$100.00 [5]	112 [5]	$11,600 [5]	$104.00 [5]
Pennsylvania, eastern	230	25,400 [5]	110.00 [5]	317 [5, 6]	36,700 [5, 6]	116.00 [5, 6]
Pennsylvania, western	88	9,980 [5]	114.00 [5]	W	W	W
Illinois, Indiana, Ohio	484	55,184 [5]	114.00 [5]	494	57,040	115.43
Michigan	273	28,400	104.00	269	27,500 [5]	102.50 [5]
Iowa, Nebraska, South Dakota	44 [5]	4,940 [5]	113.00 [5]	32	5,291	165.72
Kansas and Missouri	131	11,746	89.90	146	13,804	94.76
Florida	610	65,583	107.50	675	83,093	123.04
Georgia, Maryland, Virginia, West Virginia	388	54,800 [5]	141.00 [5]	428	53,200 [5]	124.50 [5]
South Carolina	389	37,616	96.59	416	42,767	102.71
Alabama	428 [5]	47,300 [5]	111.00 [5]	488	48,100 [5]	98.50 [5]
Kentucky, Mississippi, Tennessee	93	10,900 [5]	117.00 [5]	118	13,500 [5]	114.00 [5]
Arkansas and Oklahoma	135 [5]	13,800 [5]	102.00 [5]	159	15,220	95.52
Texas, northern	133	16,100 [5]	121.00 [5]	130	17,500 [5]	134.50 [5]
Texas, southern	139	13,454	96.49	160	16,586	103.45
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	143	14,500 [5]	102.00 [5]	148	14,500 [5]	98.00 [5]
Alaska and Hawaii	4	887	223.77	4	724	173.05
California, northern; Oregon; Washington	79	7,933	100.00	76	6,487	85.08
California, southern	487	44,237	90.75	535	48,379	90.51
Independent importers, n.e.c.[7]	27	3,370	124.00	28	3,600 [5]	130.00 [5]
Total or average[8]	4,400 [5, 9]	476,000 [5]	108.00 [5]	4,740 [5, 9]	516,000 [5]	109.00 [5]

W Withheld to avoid disclosing company proprietary data; included in "Pennsylvania, eastern."

[1]Shipments are to final customers and include imported cement and cement made from imported clinker. Data excludes 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.

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

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

[4]District location is that of the reporting facilities, not necessarily the location of sales.

[5]Data are rounded (unit values to the nearest $0.50) because they contain a component of estimates.

[6]Data include "Pennsylvania, western."

[7]Importers for which district assignations were not possible.

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

[9]Tonnages based on an annual survey of plants and terminals and may differ from the totals in tables 9 and 10, which represent consolidated monthly surveys of companies.

TABLE 14
AVERAGE MILL NET VALUE OF CEMENT IN THE UNITED STATES[1, 2]

(Dollars per metric ton)

Year	Gray portland cement	White portland cement	All portland cement	Prepared masonry cement	All classes of cement
2002	74.00	157.00	74.50	108.00	76.00
2003	72.50	159.00	73.50	109.00	75.00

[1]Excludes 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.

[2]Data are rounded to the nearest $0.50 because of the inclusion of a significant component of estimates.

TABLE 15
PORTLAND CEMENT SHIPMENTS IN 2003, BY DISTRICT AND TYPE OF CUSTOMER[1]

(Thousand metric tons)

District[2, 3]	Ready-mixed concrete	Concrete product manufacturers[4]	Contractors[5]	Building material dealers	Oil well, mining, waste[6]	Government and miscellaneous[7]	Total[8, 9]
Maine and New York	1,480	450	8	198	--	9	2,142
Pennsylvania, eastern	2,600	1,260	136	236	2	104	4,336
Pennsylvania, western	904	223	119	144	7	7	1,404
Illinois	2,410	190	78	36	167	104	2,988
Indiana	2,070	432	227	80	7	10	2,830
Michigan and Wisconsin	5,200	729	349	265	10	48	6,600
Ohio	907	97	48	26	--	--	1,078
Iowa, Nebraska, South Dakota	3,610	603	440	52	80	83	4,869
Kansas	1,570	132	281	34	12	2	2,051
Missouri	5,090	524	549	91	1	34	6,291
Florida	6,140	1,470	229	391	--	54	8,289
Georgia, Virginia, West Virginia	2,130	332	161	84	12	3	2,730
Maryland	1,830	394	119	65	1	74	2,483
South Carolina	2,150	653	240	130	2	32	3,210
Alabama	3,240	677	159	168	22	12	4,275
Kentucky, Mississippi, Tennessee	2,580	366	146	78	11	4	3,183
Arkansas and Oklahoma	2,070	186	416	37	66	19	2,797
Texas, northern	4,390	588	1,250	81	306	40	6,660
Texas, southern	4,470	552	481	158	343	20	6,020
Arizona and New Mexico	2,550	564	219	191	19	130	3,676
Colorado and Wyoming	1,740	295	172	62	48	12	2,329
Idaho, Montana, Nevada, Utah	2,510	201	95	55	208	33	3,097
Alaska and Hawaii	391	57	5	1	--	--	454
California, northern	3,190	299	128	132	--	2	3,751
California, southern	6,790	2,340	349	325	63	9	9,881
Oregon and Washington	1,510	189	50	93	14	45	1,897
Independent importers, n.e.c.[10]	5,410	875	333	397	41	78	7,140
Total[9]	79,000	14,700	6,790	3,610	1,440	969	106,000
Puerto Rico	1,110	193	73	475	--	1	1,848
Grand total[9]	80,100	14,900	6,860	4,090	1,440	970	108,000

-- Zero.

[1]Includes 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.

[2]District location is that of the reporting facilities and may include sales by them into other districts.

[3]Includes shipments by independent importers for which district assignations were possible.

[4]Grand total shipments to concrete product manufacturers include brick and block--6,230; precast and prestressed--3,810; pipe--1,890; and other or unspecified--2,943.

[5]Grand total shipments to contractors include airport--215; road paving--3,600; soil cement--660; and other or unspecified--2,385.

[6]Grand total shipments include oil well drilling--1,190; mining--180; and waste stabilization--73.

[7]Includes shipments for which customer types were not specified.

[8]District totals are not rounded except in accord with the data in table 12.

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

[10]Shipments by independent importers for which district assignations were not possible.

TABLE 16
PORTLAND CEMENT SHIPPED FROM PLANTS IN THE UNITED STATES TO DOMESTIC CUSTOMERS, BY TYPE[1, 2]

(Thousand metric tons)

Type	2002	2003
General use and moderate heat (Types I and II) (gray)	90,800	89,500
High early strength (Type III)	3,820	3,750
Sulfate resisting (Type V)	7,300	10,600
Block	607	752
Oil well	889	1,090
White[3]	952	985
Blended:		
Portland, natural pozzolans	187	142
Portland, granulated blast furnace slag	753	747
Portland, fly ash	218	240
Other blended cement[4]	365	438
Total[5]	1,520	1,570
Expansive and regulated fast setting	66	52
Miscellaneous[6]	55	88
Grand total[5, 7]	106,000	108,000

[1]Includes Puerto Rico. Includes imported cement.
[2]Data have been rounded to three significant digits.
[3]Mostly Types I and II, but may include Types III-V and block varieties.
[4]Includes blends with other pozzolans, such as cement kiln dust and silica fume.
[5]Data may not add to totals shown because of independent rounding.
[6]Includes low heat (Type IV), waterproof, and other portland cements.
[7]Data are based on an annual survey of plants and importers; may differ from tables 9 and 10, which are based on monthly consolidated data from companies.

TABLE 17
U.S. EXPORTS OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

Country of destination	2002		2003	
	Quantity	Value[2]	Quantity	Value[2]
Bahamas, The	17	1,822	11	1,416
Brazil	1	90	1	108
Canada	704	45,809	720	50,291
China	1	149	4	251
Dominican Republic	2	277	24	1,672
Egypt	(3)	8	1	54
El Salvador	--	--	1	98
Finland	--	--	2	75
Greece	(3)	127	1	190
Hong Kong	(3)	59	1	97
Israel	(3)	19	1	40
Jamaica	37	1,510	(3)	59
Japan	2	270	1	109
Korea, Republic of	1	70	3	156
Mexico	46	4,860	35	3,817
Netherlands Antilles	2	112	(3)	31
Nigeria	1	53	1	30
Oman	(3)	46	8	401
Panama	1	90	1	97
Peru	(3)	100	1	45
Portugal	1	33	--	--
Russia	1	80	1	34
Saudi Arabia	1	35	1	33
Singapore	2	79	1	23
Spain	2	117	1	99
Switzerland	(3)	19	1	59
Taiwan	1	128	2	158
Thailand	(3)	26	1	22
Trinidad and Tobago	(3)	101	1	124
Turks and Caicos Island	(3)	10	6	305
Ukraine	1	30	(3)	11
United Arab Emirates	2	98	1	101
United Kingdom	(3)	5	1	31
Venezuela	1	83	2	338
Other	7 r	1,428 r	2	1,221
Total[4]	834	57,743	837	61,596

rRevised. -- Zero.

[1]Includes portland and masonry cements.

[2]Free 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.

[3]Less than 1/2 unit.

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

Source: U.S. Census Bureau.

TABLE 18
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

	2002			2003		
		Value			Value	
Country of origin	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Brazil	99	4,236	4,276	266	8,927	11,677
Bulgaria	356	14,467	18,902	151	6,318	7,770
Canada	5,181	302,930	321,946	5,601	299,839	333,191
China[4]	2,165	66,204	88,884	1,823	58,315	80,752
Colombia	1,579	57,158	75,475	1,766	65,167	85,618
Croatia	25	5,052	6,214	36	6,700	8,122
Cyprus	75	1,845	1,849	--	--	--
Denmark	333	17,013	24,903	433	19,581	29,497
Egypt	9	913	1,115	58	2,972	4,177
France	85	15,544	16,761	90	9,535	10,703
Germany	42	381	810	3	970	2,181
Greece	1,785	58,637	78,030	1,188	36,602	50,550
Indonesia	272	5,568	9,698	--	--	--
Italy	(5)	113	122	(5)	29	31
Korea, Republic of	1,625	40,312	61,792	1,745	46,463	69,511
Lebanon	94	1,877	3,117	--	--	--
Mexico	1,228	52,366	64,620	891	41,950	53,767
Netherlands	41	3,009	3,974	5	3,021	3,630
Norway	508	21,558	22,418	471	20,479	20,561
Peru	372	12,433	17,303	459	14,101	20,419
Philippines	294	6,841	10,567	206	5,353	8,151
Spain	327	15,449	19,771	355	17,799	23,855
Sweden	1,047	33,504	42,954	924	29,521	38,298
Switzerland[6]	18	557	778	29	839	1,198
Taiwan	115	3,628	4,643	395	14,674	18,095
Thailand	4,259	117,969	177,581	3,344	98,199	149,254
Turkey	684	22,412	30,388	1,077	35,246	50,672
Venezuela	1,530	52,021	72,614	1,664	57,397	81,472
Other	20 r	5,059 r	6,216 r	262	12,805	16,606
Total[7]	24,169	939,056	1,187,718	23,242	912,802	1,179,758

rRevised. -- Zero.

[1]Includes portland, masonry, and other hydraulic cements. Includes imports into Puerto Rico.

[2]Customs 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.

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

[4]China may be underrepresented; it is believed that all or some imports reported to be from Japan may be from China.

[5]Less than 1/2 unit.

[6]The country origin of these imports is thought to be misreported.

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

Source: U.S. Census Bureau.

TABLE 19

U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY[1]

(Thousand metric tons and thousand dollars)

Customs district and country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Anchorage, AK:						
Canada	8	449	850	10	596	1,149
China	18	779	1,089	--	--	--
Korea, Republic of	66	1,900	2,810	132	3,947	5,854
Total[4]	93	3,128	4,748	142	4,543	7,004
Baltimore, MD:						
Belgium	(5)	4	6	--	--	--
Greece	250	9,648	12,826	--	--	--
Netherlands	1	613	672	1	988	1,129
Total[4]	251	10,266	13,504	1	988	1,129
Boston, MA:						
Netherlands	(5)	133	164	(5)	88	106
Venezuela	210	7,593	10,061	176	6,148	8,230
Total[4]	210	7,725	10,225	176	6,237	8,336
Buffalo, NY:						
Canada	639	39,470	41,700	704	41,222	43,558
Denmark	(5)	5	5	--	--	--
France	--	--	--	(5)	35	36
United Kingdom	4	742	792	7	1,387	1,574
Total[4]	643	40,217	42,498	711	42,644	45,168
Charleston, SC:						
China	--	--	--	8	761	1,011
Colombia	593	20,692	29,225	506	17,839	24,721
Egypt	--	--	--	39	1,523	2,120
Greece	429	13,514	17,595	272	8,586	12,103
Indonesia	158	2,550	4,950	--	--	--
Netherlands	--	--	--	(5)	32	40
Sri Lanka	--	--	--	7	223	524
Spain	44	275	660	8	273	274
Thailand	70	1,153	2,299	--	--	--
United Kingdom	2	815	946	3	1,144	1,287
Total[4]	1,296	38,999	55,674	843	30,381	42,081
Chicago, IL:						
Canada	31	1,737	1,934	35	1,872	1,962
Japan	(5)	69	75	(5)	43	49
Netherlands	1	391	495	1	343	423
United Kingdom	(5)	3	4	--	--	--
Total[4]	32	2,199	2,508	37	2,258	2,434
Cleveland, OH:						
Canada	744	40,333	41,147	697	36,531	37,923
United Kingdom	--	--	--	1	248	319
Total[4]	744	40,333	41,147	698	36,779	38,242
Columbia-Snake, ID-OR-WA:						
Canada	104	5,479	5,780	56	2,712	2,854
China	412	13,379	18,081	481	15,305	21,222
Total[4]	516	18,859	23,861	538	18,017	24,075
Detroit, MI:						
Brazil	99	4,236	4,276	50	2,132	2,165
Canada	1,244	82,524	84,182	1,553	91,252	99,513
Denmark	(5)	36	41	--	--	--
France	--	--	--	(5)	3	3
Netherlands	--	--	--	(5)	19	24
Norway	--	--	--	23	910	920
Sweden	--	--	--	(5)	5	9
Total[4]	1,344	86,795	88,499	1,626	94,321	102,634
Duluth, MN, Canada	221	11,966	15,251	189	8,865	10,093
El Paso, TX, Mexico	406	15,250	19,284	189	10,245	11,913

See footnotes at end of table.

TABLE 19--Continued

U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY[1]

(Thousand metric tons and thousand dollars)

Customs district and country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Great Falls, MT:						
Canada	9	403	531	14	585	741
France	--	--	--	(5)	5	5
Total[4]	9	403	531	14	590	746
Honolulu, HI:						
China	126	3,339	4,762	32	835	1,206
Philippines	153	3,728	5,282	206	5,353	8,151
Thailand	39	937	1,328	77	2,097	3,498
Total[4]	318	8,005	11,373	314	8,285	12,856
Houston-Galveston, TX:						
Belgium	--	--	--	(5)	9	12
Brazil	--	--	--	3	369	394
Chile	2	483	558	--	--	--
Colombia	116	4,887	7,301	140	6,844	9,289
Denmark	5	187	340	--	--	--
Egypt	9	837	1,030	19	1,447	2,053
France	(5)	209	252	(5)	121	149
Germany	(5)	13	15	(5)	146	182
Japan	(5)	22	30	--	--	--
Korea, Republic of	1,394	34,606	52,180	1,393	37,139	54,894
Peru	284	9,346	13,068	312	10,843	15,293
Philippines	82	1,739	2,784	--	--	--
Thailand	167	10,302	11,850	79	3,154	4,114
Turkey	14	1,207	1,625	--	--	--
United Arab Emirates	--	--	--	6	396	406
United Kingdom	(5)	133	153	(5)	198	247
Venezuela	65	2,043	2,649	73	2,557	3,570
Total[4]	2,137	66,015	93,835	2,026	63,223	90,602
Laredo, TX:						
China	(5)	27	34	--	--	--
Mexico	146	16,344	17,179	124	13,840	14,580
Total[4]	147	16,371 r	17,213 r	124	13,840	14,580
Los Angeles, CA:						
Australia	(5)	17	19	--	--	--
China[6]	1,219	35,732	47,462	709	22,708	30,636
Colombia	1	254	317	2	208	301
Egypt	--	--	--	(5)	3	4
Germany	(5)	6	7	--	--	--
Italy	--	--	--	(5)	25	26
Japan[6]	--	--	--	223	7,059	9,759
Netherlands	(5)	9	12	--	--	--
Taiwan	115	3,628	4,643	395	14,674	18,095
Thailand	607	15,586	23,032	646	19,304	29,278
United Kingdom	(5)	69	79	(5)	58	73
Total[4]	1,943	55,302	75,571	1,976	64,039	88,172
Miami, FL:						
Belgium	2	379	402	2	315	334
Colombia	23	1,138	1,490	32	1,673	2,245
Denmark	--	--	--	17	539	706
Germany	(5)	11	14	(5)	11	14
Greece	351	11,716	14,847	318	9,599	12,567
Ireland	--	--	--	(5)	10	14
Jamaica	--	--	--	(5)	3	3
Spain	283	15,164	19,099	326	16,878	22,370
Sweden	809	25,688	32,620	913	28,133	36,632
Thailand	--	--	--	--	--	--
Turkey	217	6,088	8,041	388	11,123	15,043

See footnotes at end of table.

TABLE 19--Continued

U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY[1]

(Thousand metric tons and thousand dollars)

Customs district and country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Miami, FL--Continued:						
United Kingdom	(5)	104	132	1	125	162
Venezuela	57	1,725	2,264	71	2,557	3,742
Total[4]	1,743	62,012	78,908	2,067	70,967	93,833
Milwaukee, WI:						
Canada	143	8,049	8,569	270	14,605	14,988
Cyprus	75	1,845	1,849	--	--	--
Total[4]	218	9,894	10,417	270	14,605	14,988
Minneapolis, MN, Germany	(5)	7	11	--	--	--
Mobile, AL:						
Colombia	--	--	--	53	1,681	2,180
Lebanon	94	1,877	3,117	--	--	--
Thailand	399	8,492	14,772	287	6,846	11,182
United Kingdom	1	174	199	(5)	25	43
Venezuela	7	221	276	27	800	1,126
Total[4]	501	10,765	18,364	368	9,352	14,530
New Orleans, LA:						
Bulgaria	121	4,698	6,373	--	--	--
China	11	1,072	1,263	16	1,374	1,672
Colombia	28	967	1,255	22	773	1,055
Croatia	21	4,181	5,106	35	6,551	7,955
Greece	206	6,833	8,865	104	3,114	4,474
India	(5)	10	10	--	--	--
Israel	(5)	13	19	--	--	--
Korea, Republic of	165	3,805	6,802	220	5,377	8,762
Netherlands	(5)	44	53	(5)	23	27
Peru	56	2,062	2,883	116	2,312	3,746
Thailand	1,171	30,522	45,944	768	21,401	36,558
Turkey	71	2,945	3,510	242	11,771	16,336
United Kingdom	--	--	--	(5)	46	61
Total[4]	1,850	57,151	82,082	1,523	52,742	80,646
New York City, NY:						
Brazil	--	--	--	(5)	17	20
Colombia	--	--	--	(5)	30	51
Croatia	1	326	363	(5)	149	167
Denmark	8	684	684	--	--	--
France	--	--	--	(5)	2	2
Germany	(5)	8	9	(5)	10	12
Greece	131	4,255	5,826	274	8,414	11,853
Italy	(5)	3	3	(5)	5	5
Netherlands	3	1,177	1,452	1	774	945
Norway	508	21,558	22,418	448	19,568	19,641
Poland	--	--	--	3	65	69
Sweden	238	7,815	10,334	1	1,052	1,239
Switzerland	18	557	778	(5)	6	6
Turkey	179	4,993	7,330	190	4,765	8,214
United Kingdom	5	1,521	1,994	1	729	819
Venezuela	101	4,002	5,497	20	715	1,052
Total[4]	1,192	46,898	56,685	941	36,301	44,094
Nogales, AZ:						
Australia	--	--	--	(5)	6	8
Germany	(5)	25	29	(5)	6	6
Mexico	668	19,938	27,234	571	17,081	26,343
Netherlands	--	--	--	(5)	9	14
Total[4]	668	19,963	27,263	572	17,102	26,371

See footnotes at end of table.

TABLE 19--Continued
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY[1]

(Thousand metric tons and thousand dollars)

Customs district and country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Norfolk, VA:						
Bulgaria	235	9,770	12,529	151	6,318	7,770
Canada	48	1,546	1,793	78	2,536	2,909
Colombia	--	--	--	131	4,264	5,288
France	85	15,335	16,509	90	9,369	10,508
Germany	(5)	7	10	(5)	11	13
Greece	211	6,999	9,911	--	--	--
Indonesia	114	3,018	4,748	--	--	--
Netherlands	1	291	359	1	437	542
United Kingdom	1	181	256	(5)	18	23
Venezuela	--	--	--	69	2,771	3,590
Total[4]	694	37,147	46,114	520	25,723	30,643
Ogdensburg, NY:						
Canada	306	16,424	16,881	361	20,276	20,840
Germany	(5)	2	2	--	--	--
Netherlands	--	--	--	(5)	12	12
United Kingdom	(5)	15	15	--	--	--
Total[4]	306	16,440	16,898	361	20,288	20,853
Pembina, ND, Canada	217	9,287	9,694	239	9,823	18,480
Philadelphia, PA:						
Belgium	(5)	12	12	(5)	3	3
Colombia	22	750	814	--	--	--
Germany	42	300	714	3	787	1,953
Netherlands	36	272	645	(5)	267	331
Sweden	--	--	--	(5)	88	115
Thailand	39	876	950	235	5,411	6,276
Total[4]	139	2,210	3,135	239	6,556	8,678
Portland, ME, Canada	83	7,814	8,157	92	8,796	8,805
Providence, RI:						
Philippines	59	1,374	2,501	--	--	--
Turkey	118	3,616	5,402	115	3,352	4,959
Venezuela	536	18,944	27,372	486	17,271	24,696
Total[4]	713	23,934	35,275	601	20,623	29,654
San Diego, CA:						
China	4	430	433	--	--	--
Thailand	500	16,728	22,480	465	17,785	23,343
Total[4]	503	17,158	22,913	466	17,785	23,343
San Francisco, CA:						
China	260	7,797	10,082	478	14,695	20,642
Thailand	505	15,062	23,109	554	15,911	25,118
Total[4]	765	22,859	33,191	1,033	30,607	45,760
San Juan, PR:						
Belgium	3	211	392	4	247	477
China	114	3,649	5,678	99	2,637	4,362
Colombia	29	1,029	1,268	20	757	1,030
Costa Rica	--	--	--	(5)	5	7
Denmark	215	7,858	12,623	277	8,955	14,141
Mexico	7	834	923	7	784	931
Panama	(5)	5	6	1	15	17
Spain	(5)	10	12	(5)	6	7
Venezuela	--	--	--	12	376	514
Total[4]	369	13,596	20,902	419	13,782	21,486
Savannah, GA:						
Brazil	--	--	--	(5)	26	55
Colombia	--	--	--	1	166	224
Egypt	(5)	76	85	--	--	--
Italy	(5)	110	119	--	--	--
Netherlands	(5)	80	122	(5)	29	36

See footnotes at end of table.

TABLE 19--Continued

U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY[1]

(Thousand metric tons and thousand dollars)

Customs district and country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Savannah, GA--Continued:						
Thailand	144	3,445	6,902	--	--	--
Turkey	3	213	213	--	--	--
United Kingdom	(5)	16	21	(5)	75	116
Venezuela	--	--	--	29	860	1,130
Total[4]	147	3,939	7,463	32	1,157	1,562
Seattle, WA:						
Canada	1,187	60,879	67,795	1,187	50,949	59,728
Japan	(5)	50	83	1	176	277
Thailand	173	4,153	6,682	147	3,968	6,189
Total[4]	1,360	65,082	74,560	1,335	55,093	66,194
St. Albans, VT:						
Canada	199	16,571	17,681	115	9,134	9,534
United Kingdom	(5)	12	13	(5)	13	15
Total[4]	199	16,583	17,695	115	9,146	9,549
St. Louis, MO, Croatia	2	545	745	--	--	--
Tampa, FL:						
Brazil	--	--	--	213	6,383	9,043
Canada	--	--	--	3	85	113
Colombia	766	27,441	33,806	803	29,077	36,594
Denmark	105	8,242	11,209	139	10,087	14,650
Greece	207	5,671	8,160	220	6,888	9,554
Peru	33	1,025	1,352	31	946	1,381
Spain	--	--	--	19	578	793
Sweden	--	--	--	9	242	304
Switzerland	--	--	--	29	833	1,192
Thailand	424	10,191	17,081	86	2,322	3,698
Turkey	82	3,350	4,269	142	4,236	6,120
Venezuela	494	15,186	21,186	651	21,370	30,938
Total[4]	2,111	71,108	97,063	2,344	83,049	114,379
U.S. Virgin Islands:						
Bangladesh	--	--	--	1	62	87
Barbados	--	--	--	1	48	67
Spain	--	--	--	2	114	160
Trinidad and Tobago	--	--	--	(5)	4	4
Venezuela	53	2,071	2,965	44	1,682	2,478
Total[4]	53	2,071	2,965	48	1,909	2,796
Washington, DC, Venezuela	2	64	95	--	--	--
Wilmington, NC:						
Colombia	--	--	--	56	1,854	2,640
Thailand	24	523	1,152	--	--	--
Venezuela	5	173	249	7	290	407
Total[4]	29	696	1,401	63	2,143	3,047
Grand total[4]	24,169	939,056	1,187,718	23,242	912,802	1,179,758

[r]Revised. -- Zero.

[1]Includes all varieties of hydraulic cement and clicker.

[2]Customs 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.

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

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

[5]Less than 1/2 unit.

[6]China may be underrepresented; it is believed that all or some imports reported to be from Japan may be from China.

Source: U.S. Census Bureau.

TABLE 20
U.S. IMPORTS FOR CONSUMPTION OF GRAY PORTLAND CEMENT, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

Country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Brazil	--	--	--	213	6,413	9,078
Bulgaria	356	14,467	18,902	151	6,318	7,770
Canada	4,108	223,559	240,196	4,320	217,568	242,875
China[4]	2,150	64,614	87,072	1,800	56,720	78,643
Colombia	1,456	52,284	69,271	1,660	60,531	78,882
Egypt	--	--	--	283	8,323	13,604
Denmark	216	7,416	12,347	39	1,523	2,120
Germany	42	340	764	(5)	6	6
Greece	1,523	51,016	67,171	992	30,453	42,148
Indonesia	272	5,568	9,698	--	--	--
Korea, Republic of	1,625	40,312	61,792	1,745	46,463	69,511
Mexico	1,017	29,426	39,980	694	20,534	30,844
Netherlands	36	263	637	(5)	9	14
Norway	488	19,957	20,698	422	17,334	17,380
Peru	340	11,408	15,951	312	10,843	15,293
Philippines	294	6,841	10,567	205	5,353	8,151
Spain	210	5,493	7,256	217	6,487	9,025
Sweden	1,047	33,504	42,954	922	28,381	36,945
Taiwan	115	3,628	4,643	395	14,674	18,095
Thailand	3,919	107,949	162,793	3,162	91,450	139,885
Turkey	658	20,325	27,984	1,042	32,999	46,880
Venezuela	1,452	48,746	68,718	1,557	53,565	76,531
Other[4]	1	538 r	615	237	7,453	10,166
Total[6]	21,325	747,654	970,009	20,368	723,400	953,846

rRevised. -- Zero.

[1]Includes imports into Puerto Rico.

[2]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.

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

[4]China may be underrepresented; it is believed that all or some imports reported to be from Japan (here included with "Other") may be from China.

[5]Less than 1/2 unit.

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

Source: U.S. Census Bureau.

TABLE 21
U.S. IMPORTS FOR CONSUMPTION OF WHITE CEMENT, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

Country	2002			2003		
		Value			Value	
	Quantity	Customs[2]	C.i.f.[3, 4]	Quantity	Customs[2]	C.i.f.[3, 4]
Belgium	5	595	799	5	562	811
Brazil	--	--	--	3	395	449
Canada	219	27,314	28,542	243	29,850	30,982
China	4	433	438	--	--	--
Colombia	13	1,518	1,934	20	2,012	2,588
Denmark	117	9,596	12,556	149	11,258	15,894
Egypt	9	837	1,030	19	1,450	2,057
Greece	6	497	641	--	--	--
Mexico	175	20,139	21,466	150	17,477	18,516

See footnotes at end of table.

TABLE 21--Continued
U.S. IMPORTS FOR CONSUMPTION OF WHITE CEMENT, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

	2002			2003		
		Value			Value	
Country	Quantity	Customs[2]	C.i.f.[3, 4]	Quantity	Customs[2]	C.i.f.[3, 4]
Norway	21	1,601	1,719	26	2,235	2,261
Spain	118	9,956	12,515	138	11,312	14,830
Thailand	120	6,394	7,364	34	3,512	3,777
Turkey	26	2,087	2,404	36	2,248	3,791
United Arab Emirates	--	--	--	6	396	406
Venezuela	35	1,299	1,398	17	655	955
Other	1	518	555	(5)	552	592
Total[6]	867	82,784	93,361	848	83,914	97,909

-- Zero.

[1]Includes imports into Puerto Rico.

[2]Customs 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 chages incurred in bringing the merchandise to the United States.

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

[4]Values 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.

[5]Less than 1/2 unit.

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

Source: U.S. Census Bureau.

TABLE 22
U.S. IMPORTS FOR CONSUMPTION OF CLINKER, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

	2002			2003		
		Value			Value	
Country	Quantity	Customs[2]	C.i.f.[3]	Quantity	Customs[2]	C.i.f.[3]
Brazil	99	4,236	4,276	49	2,120	2,150
Canada	704	39,530	39,953	965	45,383	51,972
China	11	1,099	1,297	16	744	969
Colombia	109	3,355	4,270	86	2,624	4,148
Cyprus	75	1,845	1,849	--	--	--
France	84	14,229	15,305	89	8,216	9,235
Greece	173	4,496	6,554	196	6,149	8,401
Lebanon	94	1,877	3,117	--	--	--
Peru	33	1,025	1,352	147	3,257	5,127
Thailand	221	3,625	7,423	148	3,238	5,592
Venezuela	--	--	--	90	3,173	3,982
Other	(4) r	8 r	9 r	52	1,743	2,113
Total[5]	1,603	75,325	85,405	1,838	76,647	93,689

rRevised. -- Zero.

[1]For all types of hydraulic cement. Includes imports into Puerto Rico.

[2]Customs 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.

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

[4]Less than 1/2 unit.

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

Source: U.S. Census Bureau.

TABLE 23
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country	1999	2000	2001	2002	2003[e]
Afghanistan[e]	116	50	50	60	70
Albania[e]	106	110	39	50	50
Algeria[e]	7,500	8,300	8,300	9,000	9,000
Angola	207 [r]	201 [r]	200 [r, e]	250 [r, e]	250
Argentina	7,187	6,114	5,545	3,910	3,900
Armenia	287	219	300	400	500
Australia[e]	7,450	7,500	7,500	7,550	8,000
Austria	3,817	3,776	3,863	3,800 [e]	3,800
Azerbaijan	177	200 [e]	500	800	1,000
Bahrain	156	89	89	67	70
Bangladesh[3]	2,085	3,580	5,005	5,000 [e]	5,000
Barbados	253 [r]	268	250	298	300
Belarus	2,100	1,847	1,803	2,171 [r]	2,472 [4]
Belgium	7,277	7,150	7,500 [e]	8,000 [e]	8,000
Benin[e]	200	250	250	250	250
Bhutan[e]	150	150	160	160	160
Bolivia	1,201	1,072	983 [r]	1,010 [r]	1,000
Bosnia and Herzegovina[e]	300	300	300	300	300
Brazil	40,270	39,208	38,927	38,027 [r]	37,980 [4]
Brunei	208	232	227	241 [r]	235 [4]
Bulgaria	2,060	2,209	2,088 [r]	2,137 [r]	2,100 [4]
Burkina Faso[e]	180 [r]	100 [r]	50	30 [r]	30
Burma	338	393	378	400 [r, e]	600
Cambodia[e]	--	--	-- [r]	-- [r]	--
Cameroon	850	890	930 [e]	950 [e]	900
Canada	12,634	12,612	12,986	13,200	14,063 [4]
Chile	3,036	3,491	3,513 [r]	3,522 [r]	3,550
China	573,000	597,000	661,040	725,000 [r]	813,190 [p]
Colombia[e]	9,200	9,750	6,830 [r]	6,604 [r, 4]	6,800
Congo (Brazzaville)	--	20 [e]	--	-- [e]	--
Congo (Kinshasa)	159	161	192	190 [e]	190
Costa Rica[e]	1,100	1,150	1,100	1,100	1,130
Cote d'Ivoire[e]	650	650	650	650	650
Croatia	2,712	2,852	3,246	3,378	3,654 [4]
Cuba	1,785	1,633	1,324	1,327 [r]	1,300
Cyprus	1,157	1,398	1,369	1,600 [e]	1,600
Czech Republic	4,241	4,093	3,550	3,500 [e]	3,500
Denmark	1,926	2,009	2,010 [e]	2,010 [e]	2,020 [4]
Dominican Republic	2,283 [r]	2,505 [r]	2,746 [r]	3,050 [r]	2,907 [p]
Ecuador	2,300	2,800 [e]	2,920 [r]	3,000 [r]	3,100
Egypt	23,313	24,143	24,500 [e]	28,000 [r, e]	29,100
El Salvador	1,031	1,064	1,174	1,318	1,391
Eritrea[e]	45	45	45	45	45
Estonia	358	329	405	466 [r]	470 [4]
Ethiopia	638	880	900 [r]	900 [r]	1,200
Fiji[e]	95	95	95	95	100
Finland	1,310	1,422	1,325	1,350	1,360 [4]
France	20,219	20,137	19,839	20,000 [e]	20,000
French Guiana[e]	88	88	58 [4]	62	62
Gabon	180	210	304 [r]	350 [r, e]	350
Georgia	341 [r]	348	335 [r]	347 [r]	300 [4]
Germany	35,912	34,727	30,989	30,000 [e]	30,000
Ghana	1,870	1,950	1,900 [e]	1,900 [e]	1,900
Greece	13,908	14,530	15,000	15,500	16,000 [4]
Guadeloupe[e]	230	230	230	230	230
Guatemala	1,600	1,600	1,600 [e]	1,600 [e]	1,650
Guinea	297	300	315 [r]	360 [r]	360
Haiti	--	--	204	290	200
Honduras	980	1,100	1,100 [e]	1,100 [e]	1,000
Hong Kong	1,387	1,284	1,279 [r]	1,206 [r]	1,250

See footnotes at end of table.

TABLE 23--Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country	1999	2000	2001	2002	2003[e]
Hungary	2,979	3,326	3,452	3,510 [r]	3,500 [4]
Iceland	131	144	125	130 [e]	135 [4]
India[e]	90,000	95,000	100,000	102,000 [r]	110,000
Indonesia	23,925	27,789	31,300	34,640 [r]	35,000
Iran	22,080	23,880	26,640 [r]	28,600 [r]	30,000
Iraq[e]	5,000 [r]	6,000 [r]	6,000 [r]	6,834 [r, 4]	1,000
Ireland[e]	2,466 [4]	2,620 [4]	2,600	2,500	2,500
Israel[e]	6,354 [4]	5,703 [r, 4]	4,700 [r]	5,150 [r]	5,150
Italy	37,299	38,925	39,804	40,000 [e]	38,000
Jamaica	504	521	596	614	620
Japan	80,120	81,097	76,550	71,828 [r]	71,000
Jordan	2,687	2,640	3,173	3,558 [r]	3,515 [4]
Kazakhstan	838	1,175	2,029	2,129	2,570 [4]
Kenya	1,440 [r, e]	1,367 [r]	1,319 [r]	1,463 [r]	1,537 [4]
Korea, North[e]	4,000	4,600 [r]	5,160	5,320	5,500
Korea, Republic of	48,157	51,255	52,046	55,514	59,199 [4]
Kuwait	1,435	1,540	1,600 [e]	1,600 [e]	1,600
Kyrgyzstan	386	500	469	533	770
Laos[e]	80	92	92	240	250
Latvia	W	W	W	W	W [4]
Lebanon	2,714	2,808	2,890	2,852	2,950
Liberia[e]	15	71 [r]	63 [r, 4]	54 [r, 4]	30
Libya[e]	3,000	3,000	3,000	3,300 [r]	3,300
Lithuania	666	570	529	605	600
Luxembourg	742	749	750 [e]	750 [e]	750
Macedonia	520	585	450	450 [e]	450
Madagascar	46	51	52	33 [r, e]	33
Malawi	187	156	181	174	190
Malaysia	10,104	11,445	13,820	14,336	17,243 [4]
Martinique[e]	220	220	220	220	220
Mauritania[e]	100	110	110	110	110
Mexico	29,413	31,677	29,966	31,069	32,000
Moldova	50	222	200	300	300
Mongolia	104	92	68	148	150
Morocco	7,530	8,100	10,000 [e]	10,200 [e]	10,400
Mozambique	216	270	265	285 [r]	362 [4]
Namibia[e]	(5)	--	--	--	--
Nepal[e, 3]	290	300	285	290	295
Netherlands	3,480	3,450	3,450 [e]	3,400 [e]	3,400
New Caledonia	-- [e]	100 [e]	93	100	100
New Zealand	1,030 [r]	1,070 [r]	1,080 [r]	1,090 [r, e]	1,100
Nicaragua	350	360 [e]	514 [r]	513 [r]	513
Niger[e]	30	40	40	55	55
Nigeria[e]	2,500	2,500	2,400 [r]	2,100 [r]	2,100
Norway	1,827	1,851	1,870 [e]	1,850 [e]	1,860 [4]
Oman	1,217	1,238	1,370	1,400 [e]	1,400
Pakistan[e]	9,600	9,900	9,900	9,900	10,000
Panama[e]	760 [4]	760	760	760	770
Paraguay	730	650	650	650 [e]	650
Peru	3,799	3,906	3,950	5,654 [r]	5,998 [4]
Philippines	12,556	11,959	8,653	12,614 [r]	10,000
Poland	15,555	15,046	11,918	11,700 [r, e]	12,000 [4]
Portugal	10,147	10,343	10,300 [e]	10,000 [e]	10,000
Qatar[e]	1,025 [4]	1,210 [r]	1,300 [r]	1,350 [r]	1,400
Réunion[e]	380 [4]	380 [r]	380 [r]	380 [r]	380
Romania	6,252	6,058	5,668	5,680	5,700 [4]
Russia	28,400	32,400	35,300	37,700	41,000
Rwanda	66	71	91 [r]	101 [r]	115
Saudi Arabia	16,313	18,107	20,608	22,000 [r]	23,000
Senegal[e]	1,000	1,000	1,000	2,150 [r]	2,150

See footnotes at end of table.

TABLE 23--Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country	1999	2000	2001	2002	2003[e]
Serbia and Montenegro	1,575	2,117	2,418	2,396	200 [4]
Sierra Leone	45 [r]	73 [r]	113 [r]	144 [r]	170 [4]
Singapore	1,660	1,150	600 [e]	200 [e]	150 [4]
Slovakia	4,718	3,045	3,123	3,100 [e]	3,100
Slovenia[e]	1,224 [4]	1,300	1,300	1,250	1,250
South Africa, sales[6]	8,068	7,971	8,036	8,525	8,883 [4]
Spain, including Canary Islands	35,782	38,115	40,512	42,500 [e]	42,000
Sri Lanka	976	1,008	1,108	1,018	1,000 [4]
Sudan	231	146	190	220 [r, e]	320
Suriname[e]	60	60	65 [4]	65	65
Sweden	2,298	2,651	2,600	2,700 [e]	2,650 [4]
Switzerland	3,548	3,771	3,950	4,000 [e]	3,800 [4]
Syria	5,134 [r]	4,631 [r]	5,428 [r]	5,450 [r, e]	5,450
Taiwan	18,283	17,572	18,128	19,363	18,474 [4]
Tajikistan	30	50	70	100	120
Tanzania	833	833	900	1,026 [r]	1,186 [4]
Thailand	25,354	25,499	27,913	36,842 [r]	32,530 [4]
Togo[e]	600	700	800	800	800
Trinidad and Tobago	688	743	708	744 [r]	750
Tunisia	4,864	5,657	5,721	6,022	6,038 [4]
Turkmenistan[e]	450	450	450	450	450
Turkey	34,258	35,825	30,125	32,577	33,000
Uganda	347	369 [r]	434 [r]	502 [r]	505
Ukraine	5,828	5,311	5,800	7,142	9,000
United Arab Emirates[e]	7,069 [4]	6,100	6,100	6,500	6,600
United Kingdom	12,697	12,452	11,854	12,000 [e]	12,000
United States, including Puerto Rico[7]	87,777	89,510	90,450 [8]	91,266	94,329 [4]
Uruguay	789	700 [e]	1,015	1,000 [e]	1,050
Uzbekistan[e]	4,471 [4]	3,521 [4]	4,000	4,000	4,000
Venezuela[e]	8,500	8,600	8,700	7,000	7,000
Vietnam	10,489	13,298	15,374	19,481	22,600
Yemen[e]	1,454 [4]	1,400	1,400	1,400	1,400
Zambia[e]	300	380	215 [r, 4]	230 [r, 4]	480
Zimbabwe[e]	1,000	1,000	800	600	400
Total	1,600,000	1,660,000 [r]	1,730,000	1,840,000 [r]	1,950,000

[e]Estimated. [p]Preliminary. [r]Revised. W Withheld to avoid disclosing company proprietary data; not included in "Total." -- Zero.

[1]World 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 believed to be accurate to no more than three significant digits.

[2]Table includes data available through August 17, 2004. Data may include clinker exports for some countries.

[3]Data for year ending June 30 of that stated.

[4]Reported figure.

[5]Less than 1/2 unit.

[6]Data are revised 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: 1999--939,907; 2000--1,020,113; 2001--1,129,356; 2002--1,099,044; and 2003--1,280,000.

[7]Portland and masonry cements only.