CEMENT

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Cement is the binding agent in concrete and mortars and is thus a critical component of the construction industry. As shown in tables 1 through 3, overall production of (portland and masonry) cement in the United States declined about 1% in 1995 to about 77 million metric tons, of which 95% was portland cement. The United States remained the world's third largest cement producer; world output was estimated to have increased 3% in 1995 to about 1.4 billion tons.

In contrast to production, overall U.S. cement consumption increased modestly, with a large increase in imports more than offsetting the drop in production. Exports increased significantly in 1995 but remained a small fraction of total U.S. cement commerce. Plant valuation of U.S. cement shipments (from mills) in 1995, including those in Puerto Rico, was almost $5.5 billion and total shipments were worth about $6 billion. Both were up about 10% from the values in 1994, reflecting a significant unit price increase for the year. Using typical cement-to-concrete mass ratios, the value (delivered) of concrete in the United States in 1995 was estimated at about $22 billion.

In this report, "cement" refers exclusively to hydraulic cement, which is cement that will set and harden under water, and which is overwhelmingly the dominant category of cement manufactured in the United States and elsewhere in the world. Further, unless otherwise stated, only the portland and masonry varieties of hydraulic cement are covered in this report. Notably, with the exception of the trade tables, pure pozzolan cements and aluminous cements are not included; these account for only a small fraction of the total U.S. cement market.

Concrete is a controlled mixture of cement, fine and coarse aggregates, and water that, through complex cement hydration reactions, hardens into a rocklike mass of specifiable properties. Cement use largely mirrors the concrete market, which is served in the United States by more than 3,000 concrete manufacturers. Mortar is a mixture of masonry or similar cement, fine aggregate, and water that is used to bind together building blocks, such as bricks and stones.

Strictly, portland cement is an interground mixture of portland cement clinker and about 5% gypsum. The clinker mainly is composed of calcium silicates and is made through controlled burning at high temperature of a measured blend of calcareous rocks (usually limestone) with lesser quantities of silicious, aluminous, and ferriferous materials. The blend is adjusted according to the chemical composition of the raw materials and the type of portland cement desired. In the United States, there are basically five types (Types I through V) of portland cement, denoting such properties as high sulfate resistance, high early strength, etc. Elsewhere in the world, other designations may be used for portland cements of similar properties. Portland cement is almost always gray, but if care is taken to burn only iron-free raw materials, a more valuable version, white cement, can be obtained. Masonry cements are broadly similar to portland cements and can be made from the same clinker; chemical and other admixtures commonly are introduced during grinding to adjust the cement's final properties.

Portland cement can be interground with pozzolans to produce a variety of so-called blended cements. These are included under the portland cement designation in this report. Pozzolans are materials, such as certain rocks (mainly tuffs) and industrial byproducts (e.g., granulated blast furnace slag, fly ash, silica fume), that exhibit hydraulic cementitious properties when finely ground and mixed with free lime. Although popular overseas, blended cement production in the United States in 1995 remained small, particularly that by the cement manufacturers themselves. The majority of production of blended cement, and hence consumption of pozzolans, actually was by U.S. concrete manufacturers. The term masonry cement also is used broadly in this report and includes portland lime and plastic cements.

The data shown in tables 1 through 7, and 10 through 15, were compiled from annual U.S. Bureau of Mines (USBM) and U.S. Geological Survey (USGS)[1] questionnaires sent to domestic clinker and cement manufacturing plants and importers. In 1995, responses were received from 124 of the 130 facilities canvassed; the responding facilities accounted for 99% of total U.S. cement production and shipments. In 1994, responses were received for 126 of 131 facilities surveyed, recording 96% of total apparent production and shipments. Estimates were incorporated for the nonrespondents, based on monthly shipments data and/or past annual data. During the compilation of tables, data remained unavailable even for estimation purposes for one small plant in Nevada that commenced operations in 1995 and which was thus not included in the tables. Subsequent information shows that its production would not significantly alter the tabulations shown. Concrete producers were not surveyed and hence the true production and consumption of blended cement in the United States is underrepresented in this report.

Not all returned annual cement questionnaires were fully completed. Where followup inquiries were unsuccessful, estimates were made for any missing data and incorporated into the aggregated totals. For 1995, the missing data (and thus the estimates) in most cases constituted only very small percentages of the aggregated totals. The introduced estimation errors are thus considered insignificant. An important exception, as discussed in the Consumption section, is for portland cement

shipments by customer type (see table 14), where the cement producers readily admit to having incomplete knowledge.

As in previous years, there is an important discrepancy between the shipments data in the annual tables enumerated above and the shipments-to-final-customers data in tables 8 and 9. Tables 8 and 9 differ from the rest in that they are derived from monthly shipments surveys of cement companies. As a measure of cement consumption, these monthly-based data are preferred, for reasons discussed in more detail under the Consumption section. Integration of tables 8 and 9 data with the other tables has not been done to avoid creating additional internal inconsistencies.

Tables 16-20 show nonproprietary trade data from the Bureau of the Census in lieu of the proprietary data collected through the USGS monthly questionnaires. World production data shown in table 21 were developed by USGS country specialists from a variety of sources.

Some data are presented for State groupings or "districts" where required to protect proprietary data. Certain major cement-producing States have been subdivided along county lines to provide additional market information.[2]

The data in this report generally support conclusions in company annual reports and the trade literature that 1995 was overall a good year for the U.S. cement industry. Where not constrained by repairs, most plants operated at high capacity utilization levels. Domestic output of cement was inadequate to meet demand, which led to price increases and significantly improved company revenues. Imports increased to make up for the shortfall, but this had little dampening effect on prices. This was in marked contrast to the high import levels in the 1980's, when cheap imports were used to undercut domestic production. The difference in 1995 reflected post-1990 antidumping tariffs and the fact that, in the interim, more than one-half of the U.S. clinker production capacity has become foreign-owned.

A modest number of plant ownership and/or operational changes took place during the year. Lafarge Corp. completed purchase of the National Portland Cement grinding plant near Tampa, FL, from a subsidiary of Vencemos Pertigalete of Venezuela.[3] Lone Star Industries Inc. sold its 50% holdings in Hawaiian Cement to KRC Holdings, Inc.[4] Medusa Cement Corp. sold its Orlando, FL, terminal to Conrad Yelvington, Inc.; the terminal services are contracted to Tarmac America Inc.'s Pennsuco operation in Florida.[5] Tarmac had purchased the Pennsuco plant the previous year. Southdown Inc. bought Eastern Cement's Florida terminal.[6]

UNICEM SpA of Italy became the 100% owner of RC Cement Co., Inc. through the purchase of the 33% stake in RC Cement held by Italcimenti SpA.[7] Sunbelt Cement took over management of the Gulf Coast Portland Cement Co. terminal and grinding plant, near Houston, TX, from their mutual parent company, Cemex S.A. of Mexico. Although the grinding plant was taken out of (cement) operation in May 1995, the facility continued to operate as a terminal.[8] Similarly, Lehigh Portland Cement Co. operated its Cementon, NY, facility solely as a terminal in 1995, having idled its clinker and grinding lines the previous year.[9] Essroc Corp. idled its Egypt, PA, plant in April.[10]

Legislation and Government Programs

Like other heavy industries, the cement industry is affected by any number of Government economic and related policies, including periodic investigations into the cement industry's general business practices. The latest of these, an 18-month antitrust investigation by the Justice Department, was dropped without comment in November 1995. In recent years, Government policies of most concern to the cement industry have been those relating to trade (cement imports) and environmental issues.

Most of the cement trade issues have revolved around recent previous determinations of cement dumping by Japanese and Mexican cement companies and the resulting imposition of antidumping tariffs on imports from these countries. These tariffs have dramatically reduced cement and clinker imports from both countries and were under appeal by the Mexican company involved. U.S. administrative reviews in 1995 confirmed the earlier tariffs; further reviews were expected to be concluded in 1996 as were the findings of a North American Free Trade Agreement (NAFTA) appeals panel.

The Environmental Protection Agency (EPA) was studying a number of environmental issues related to cement manufacturing; these deliberations were of vital interest to the industry. Apart from the mining of 120 to 125 million tons per year of cement raw materials, most cement environmental issues relate to the manufacture of clinker. Clinker kilns burn large quantities of fossil and/or other organic fuels to thermochemically break down (calcine) calcareous rocks and instigate other clinker-forming chemical reactions. Both combustion and calcination evolve large quantities of carbon dioxide—a so-called greenhouse gas—and some form of carbon tax on fuels and electricity to reduce these emissions was under consideration by the EPA, in line with enacted or planned carbon taxes on Western European producers. The production cost increases from the imposition of carbon taxes likely would be high, as there is no known practical way to significantly reduce the calcination component of carbon dioxide emissions in clinker manufacture. Consumption of cement derived from clinker can be reduced through increased use of pozzolan extenders (as blended cement) but, to some degree, such use is constrained by cement specifications in existing construction codes.

Increasingly stringent Government restrictions on fuel-derived emissions of so-called NO_x and SO_x, and of dioxins and furans, are of concern to the industry, particularly to the degree that changing emission limits necessitate changes in testing procedures, equipment, and operating practices. These limits also affect the ability of plants to inexpensively utilize waste fuels.

Another major waste product of clinker manufacturing is cement kiln dust (CKD), made up of particles of clinker, incompletely reacted raw materials and solid fuels, and material eroded from the kiln's refractory brick lining. Almost all CKD

is captured either by electrostatic precipitation or baghouse filtration, either for reuse as kiln feed or a soil conditioner for farms, or for storage in a landfill. Nevertheless, worries remain regarding unacceptable levels in some CKD of hazardous trace element or organic contaminants, such as chromium chemicals from refractory bricks, and nickel and vanadium from fossil fuels. Objections have been raised by environmental groups and commercial waste incineration companies to perceived risks of contaminant emissions arising from the cement industry's increasing use of waste fuels.

Under amendments to the Resource Conservation and Recovery Act (RCRA) in 1980, the EPA was instructed to study so-called Bevill (amendment) wastes, including CKD, to see if such were to be regulated under the hazardous waste provisions of RCRA. The EPA completed its Report to Congress on CKD late in 1993; in this, CKD was described as posing little environmental or health risk, but some ground water contamination problems owing to CKD mismanagement were identified. The EPA issued an associated regulatory determination in January 1995 that reaffirmed the risk conclusions of the 1993 Report, and proposed, under the authority of RCRA Subtitle C (hazardous wastes), drafting in consultation with interested stakeholders a tailored set of management standards for CKD. Importantly, the 1995 determination ruled that the standards need not be the stringent ones in Subtitle C; that is, CKD was not ruled to be a hazardous waste. A perceived lack of rigor in the determinations language prompted the cement industry, in March 1995, to present to EPA a so-called Enforceable Agreement that laid out standards for CKD management. The EPA reviewed the industry proposal but, in November 1995, professed itself uncertain of its authority under RCRA to sign such an agreement. Further action on this issue was envisioned for 1996.

Production

In 1995, cement was produced in 37 States and in Puerto Rico by a total of 46 companies, including one State agency. Production and related data are shown in tables 2 through 4. The tables exclude one plant in Nevada that commenced production in 1995 but for which data were unavailable at the time of table compilation. Including this facility, by yearend 1995 there were a total of 118 cement plants in operation.

A number of cement companies were modernizing and/or upgrading their plants, in many cases to reduce energy and other costs. Royal Cement Co., Inc. commenced commercial operations at its Logandale, NV, plant. Installed clinker capacity, according to the company, was 200,000 tons per year. Two companies announced plans to construct new, as opposed to replacement, kilns. Florida Rock Industries was planning to build a 750,000-ton-per-year integrated facility at Newberry, FL, that was expected to be on-line in 1998.[11] Florida Crushed Stone Co. announced that it would be adding a second kiln to its existing Brooksville, FL, plant. The new kiln would double the plant's cement capacity to about 1.2 million tons per year.[12]

Portland Cement.—At yearend, there were 111 integrated portland cement plants making both clinker and cement, and 7 dedicated grinding plants. Table 2 shows the number of plants, reported portland cement production, capacity, and yearend stockpiles, on a district basis, with the single Nevada exception noted beforehand.

As shown in table 2, portland cement production in 1995 fell 1.4% to about 73.3 million tons. Grinding capacity for the country remained essentially unchanged, although there were regional differences resulting, for example, from grinding plant closures in New York in late 1994 and in southern Texas early in 1995, and various upgrades of some grinding facilities elsewhere. There continued to be significant excess grinding capacity. End of year cement stockpiles rose significantly to 5.4 million tons in part because of winter weather downturns in construction coupled with excess imports. The top five portland cement producer States, in descending order, were California, Texas, Pennsylvania, Michigan, and Missouri.

The USGS annual surveys no longer break out production tonnages by type of portland cement, but it may be presumed that output was proportional to the reported shipments of each type (see table 15). It may thus be assumed that Types I and II accounted for about 90% of total reported portland cement production. As previously noted, data on blended cement production (and shipments) are incomplete owing to a lack of information from the concrete sector.

Cement companies in the United States ranged from small, single plant operations, each accounting for less than 0.5% of total U.S. production capacity, to large multiplant corporations, ranging from 3% to almost 13% of U.S. capacity. In 1995, the top 10 portland cement producers, combined, accounted for 57.6% of total U.S. output and 58.5% of total cement grinding capacity. Their combined grinding capacity utilization averaged 79.5%. The top 10 companies, in declining order of production, were Holnam, Inc.; Lafarge Corp.; Southdown, Inc.; Ash Grove Cement Co.; Blue Circle Inc.; Essroc Materials, Inc.; Lone Star Industries, Inc.; Lehigh Portland Cement Co.; Medusa Corp.; and California Portland Cement Co.

Masonry Cement.—Production of masonry cement, as shown in table 3, was essentially stagnant in 1995 at approximately 3.6 million tons—about 5% of total U.S. cement output. Yearend stockpiles increased modestly. Masonry cement, as in 1994, was produced by 32 companies, at 84 plants nationwide.

Clinker.—District information for clinker production and capacity, excepting that for one new plant in Nevada, is given in table 4. Including the Nevada facility and 2 plants in Puerto Rico, clinker was produced in 1995 by 111 integrated cement plants operating a total of 207 kilns. Most clinker continued to be made by dry-process kilns. Clinker production in 1995 increased about 2% over that in 1994 to about 70 million tons. Of the top five clinker-producing States, the largest continued to be California, followed by Texas, Pennsylvania, Missouri, and Michigan.

There was a slight increase in overall kiln capacity utilization in 1995. Unlike the portland cement grinding capacities shown in table 2, which were reported to the USGS

on a plant basis, the clinker capacities shown in table 4 were calculated by the USGS based on each kiln's reported daily capacity and number of days reported for the year as scheduled downtime. Not included were any idle kilns requiring more than a few months to restart. The average operational kiln capacity in 1995 was about 371,000 tons per year, virtually unchanged from that in 1994.

The top 5 companies had almost 38% of both clinker capacity and production and the top 10 had 59% of capacity and 62% of production, respectively. The top 10 companies, in declining order of clinker capacity, were Holnam, Inc.; Lafarge Corp.; Southdown, Inc.; Ash Grove Cement Co.; Blue Circle Inc.; Essroc Materials, Inc.; Medusa Corp.; Lone Star Industries, Inc.; Lehigh Portland Cement Co.; and California Portland Cement Co.

Consumption of Raw Materials and Energy.—The nonfuel raw material mix used to produce cement, most of which went into producing the clinker component, is shown in table 5. As expected, almost 85% of the mix was calcareous rocks and the consumption increase thereof in 1995 mirrored that of clinker noted above. Among aluminous feeds, there was a 21% drop in shale consumption in 1995 that evidently was balanced, in terms of alumina credits, by an almost doubling of other aluminous feeds such as bauxite and alumina. The shale decrease appears also to have diminished the iron oxide and silica balances in the clinker meal feed. The iron oxide deficit appears to have been counterbalanced by the significant increase shown in table 5 for ferrous feeds, and possibly by the increase in tonnage of waste tires (some of which contain steel belting) burned as kiln fuel as shown in table 6. Any silica deficit resulting from the reduced consumption of shale appears to have been offset by the increase in purely silicious feeds.

Pozzolan consumption, to the degree split out in table 5, increased 32% in 1995. This would support a qualitative increase in blended cement production, and such is suggested by the apparent increase of at least 70% in blended cements shipments shown in table 15. However, no stoichiometric conclusions can be drawn because there are no unique proportions of pozzolans in blended cements. Further, the pozzolan consumption shown in table 5 greatly exceeds that needed to account for the blended cement shipments. Thus it appears that much of the pozzolan consumption shown was as kiln feed rather than for blended cements.

Fuel consumption, largely reflecting kiln operation, is shown in table 6. Coal use fell about 6% in 1995, only slightly offset by the footnoted 49% increase in the use of coke and a 6% increase in petroleum coke. Fuel oil consumption fell about 15%. Although the data are not shown on a State basis, there were no obvious regional or company trends in these shifts. In contrast, overall natural gas consumption increased by almost 65%, with especially large increases noted in Arkansas, Oklahoma, and Texas, and only a few States showing declines—mainly in the Great Lakes region. Overall consumption of liquid waste fuels (such as recycled/used oils and solvents) increased dramatically, despite the fact that about half of the reporting districts actually reported small declines. Solid wastes continued to be only a small component of total fuel use. Consumption of rubber tires for fuel increased 32%, but that of other solid waste fuels dropped 8%.

Electricity consumption data are dominated by the demands of the grinding circuits of cement mills. As shown in table 7, per unit electricity consumption did not significantly change in 1995.

Consumption

Shipment data for cement are used to approximate cement consumption levels in the United States. Only shipments to final customers are considered to represent "true" consumption. Shipments from a mill to other cement plants or distribution terminals of the same company, and those to other cement companies, are left uncounted until they are transferred to a final customer. "Final customer" is as indicated by the cement producer(s) and ignores the possibility that said customer (likely a concrete manufacturer) might put some cement into stockpiles extending beyond yearend (to be "consumed" the following year) or might resell cement to other users. However, although there are no data available on such storage or transfers, it is likely that the overall tonnage would involve no more than about 5% of any 1 month's shipments and would balance out over a period of months.

Cement shipments and derived data are given in tables 8 through 15. Two data collection methodologies are represented. Tables 8 and 9 are based on monthly shipment surveys of cement company headquarters. These forms generally are returned on a consolidated basis—one form covering all of the company's plants and, importantly, its terminals. In contrast, tables 10 through 15 were collected from general annual surveys of individual plants and certain, but not all, terminals.

Over the years, shipment data from the two sets of tables have shown significantly different totals, for reasons not fully understood. For example, per table 11, portland cement shipments by producers to final customers in 1995 totaled 76.414 million tons, including imported cement and clinker, and including Puerto Rico. Masonry cement shipments (see table 12) totaled 3.510 million tons. In contrast, the data for 1995 in table 8 show total portland cement shipments to final customers of 84.724 million tons, and masonry shipments of 3.243 million tons. Both sets of tables purport to include shipments of imported cement.

Differences are also seen on a State or district level. However, these are to be expected because whereas tables 8 and 9 show the district destinations of the shipments to final customers, tables 11, 12, and 14 show the originating districts of the cement shipments to final customers.

The functional reason for the discrepancy in totals appears to be in the data collection methodology. The monthly data (totaled in tables 8 and 9) are those used each month by individual cement companies for their own marketing analyses. There traditionally has been a more complete and prompt response by company headquarters to the monthly questionnaires than by individual plants to the lengthier annual

surveys. The difference in total shipment tonnages is believed largely to reflect the activities of certain cement distribution terminals. Annual shipment data submitted by the manufacturing facilities themselves would include shipments (including imports by the plant) to final customers via distribution terminals. However, the data could be incomplete because the plants might be unaware of some shipments by terminals of stockpiled material, or of cement imported directly by the terminals. Consolidated company monthly shipment data (tables 8 and 9) would track both plant and terminal activity and are thus considered "better" consumption data.

Although yielding the preferred consumption data, the monthly-based shipments surveys do not query details such as type of portland cement shipped, type of transportation used, and cement value. These data are available only from the annual surveys. For this reason, and to maintain internal consistency to the degree possible, the annual-based shipment data are retained for tables 10 through 15.

National Consumption.—As shown in table 8, overall portland cement consumption, defined as shipments to final customers in the United States, increased slightly in 1995 to about 82.9 million tons, excluding Puerto Rico. Exports also increased slightly, but remained a small component of the total market. Of the total shipments, those originating in the United States declined about 3% to about 71.8 million tons, in line with the decline in production shown in table 2. More than offsetting the decline was a 30% increase in portland cement imports (shown in table 8 as shipments of foreign origin). Overall, the consumption pattern reflected an increase in multiple-family residential construction and public construction. Partly offsetting this was a drop in single-family residential construction—this type of construction is sensitive to short-term changes in interest rates, which increased modestly in 1995.

Regional consumption of portland cement was mixed (see table 9). Winter and/or wet weather-related declines were seen in the Northeast and Midwest. The South showed a large increase and continued to be the dominant consumption region for the country. The greatest growth in the South was in Georgia, related in part to preparatory construction for the 1996 Summer Olympics. In the West, strong growth was seen in most of the Mountain States, owing in part to rapid population growth, much of it at the expense of California. Several of the Mountain States, especially Nevada, also had strong demand for cement in their burgeoning mining sectors. Colorado showed the most significant decline in the region, but even this was largely a return to more normal consumption patterns following the completion of Denver's new airport. As shown in table 8, the largest five portland-cement-consuming States, in declining order, were Texas, California, Florida, Ohio, and Georgia.

Masonry cement consumption fell slightly in 1995, with small declines seen in most States and/or regions.

Prices.—The price or value data shown in tables 11 through 13 represent ex-plant valuations by the mill. Unlike shipment tonnages by type (table 15), the USGS annual surveys do not query the values by type of portland cement. Instead, the values are supplied as totals for all shipments—one total for gray portland cement (all types), another for white portland, and another for masonry cement. Accordingly, the calculated unit values shown should be viewed as price indices rather than as actual prices for some specific type of cement. It may be assumed that the values shown for gray portland cement are dominated by those for Types I and II.

As shown in table 11, the total value of portland cement shipments from mills rose 10% to almost $5.2 billion. If the average price shown is applied to the total shipments by destination shown in table 8, the figure rises to about $5.7 billion. Although masonry cement shipments from mills rose in overall value 5.5% to about $300 million (see table 12), the same price applied to table 8 data would total about $278 million only. The lower value for table 8 reflects a significantly lower tonnage in that table. This suggests that some shipments to final customers reported by individual mills (table 12) may have in fact gone into stockpiles at terminals.

As shown in table 13, prices at the plant for gray portland cement rose 11% in 1995 to $66.89 per ton, and 8% for masonry cement to $85.64 per ton. Only white portland cement showed a decline, and that of only about 1% to $174.66 per ton.

The only data for domestic delivered prices for cement are those for Type I portland (per short ton) and masonry cement (per 70-pound bag) published monthly by the journal *Engineering News Record* (ENR). The data represent a survey of customers (likely to be ready mixed concrete producers for portland cement and building supply depots for masonry) in 20 cities in the United States. The ENR 20-city average delivered price in 1995 for Type I portland converts to $75.78 per metric ton, with a range over the year of only $3.52 per ton. Prices showed a general increase from January to December ($77.82). The ENR city data show a number of regional price differences, some of which differ significantly from those district (ex-plant) data shown in table 11. The variations probably reflect regional differences in shipment methods and local per-kilometer costs for the same. The 20-city average masonry cement price for the year was $4.33 per bag (literally converts to $136.37 per metric ton) and ranged only $0.35 per bag over the year.

Table 10 shows portland cement shipments from mills by method of transportation. As in previous years, bulk shipments dominated deliveries to both terminals and final customers. Trucks were by far the preferred form of cement deliveries to final customers.

Cement Customer Types.—Although presented in unrounded form, the data in table 14—on portland cement shipments by customer type—are probably the least reliable of all the data collected by the USGS annual cement survey. This lack of reliability is not because of a lack of cooperation by the industry in providing data, but reflects the fact that the questionnaire asks for more details than most cement plants or companies have. Disregarding incomplete or incompatible accounting by some mills, the inherent problem is that knowing a customer's identity (type) is not necessarily the same thing as knowing a customer's use(s) for the cement. Qualitative knowledge of a customer's uses of cement does not equate to quantitative knowledge. Quantitative knowledge does not

eliminate conflicts in assigning tonnages to the 15 use(r) categories on the questionnaire.

For example, it may be known that a certain ready mixed concrete customer used X tons of cement (in ready mixed concrete) for road paving contracts. The dilemma for the cement company is whether to register those tons under the ready mixed category or under road paving. Another example would be the "government agencies" use category on the questionnaire—perhaps some government cement purchases really are for ready mixed concrete, or road paving, or other duplicative use(s). And there is an "Other" category on the questionnaire that some cement plants use as a catchall. Further, although generally listed as exact tonnages, some data back-calculate to simple (broad) percentages of the total shipments—the breakdown being the "best guess" of that cement plant. In a few instances, the apportioning appears to have been guided by past breakdowns published by the USBM.

Within these limitations, it is still clear from table 14 that the dominant customer type/use for portland cement in 1995, as in previous years, was for ready mixed concrete. As listed, cement for ready mixed concrete (customers) accounted for about 61% of total cement shipments (56% in 1994). However, it is likely that 50% to 60% of total shipments listed as "Government and miscellaneous" also are ready mixed concrete, which would then have that use accounting for about 70% of total shipments. The (footnoted) breakout of the "Contractors" category likely understates true consumption for road paving—some cement for this purpose no doubt resides under the "Government and miscellaneous" and "ready mixed concrete" categories. In contrast, the data for concrete products manufacturers, buildings materials dealers, and oil well cement use are probably fairly accurate. Overall, the usage breakdowns are broadly similar to those in 1994.

The district-level breakdowns of shipments, by customer type, in table 14 reflect the origin of the cement. Accordingly, they are only an indirect regional indicator of portland cement usage.

Types of Portland Cement Consumed.—General use (Types I and II) portland continued to dominate cement consumption, accounting for almost 91% of total portland cement shipments from mills shown in table 15. Types I through V together accounted for about 97% of total portland cement shipments for both 1994 and 1995. Shipments, by type, were largely unchanged in 1995 for most types of portland cement. Oil well cement consumption declined significantly in 1995, reflecting lackluster demand by the petroleum exploration industry. Blended cement shipments rose almost 80% but still accounted for only about 1% of total portland cement shipments. However, as previously noted, the blended cement data underrepresent true consumption because they exclude such cements mixed by concrete manufacturers. Data on this consumption are very incomplete and estimates would be further limited by the wide range of permissible pozzolan contents in blended cements.

Foreign Trade

Bureau of the Census trade data on hydraulic cement and clinker, including pozzolan and aluminous cements, are shown in tables 16 through 20. As can be inferred from some value entries, the material traded included high value specialty cements.

Total exports of cement and clinker rose significantly in 1995 (see table 16) but, overall, continued to be very small compared to imports. By comparison with table 8, about 65% of total export tonnage was of portland and/or masonry cement. Most of the exports went to Canada.

As shown in table 17, total imports of cement and clinker increased almost 23% by tonnage in 1995, due in part to a generally strong dollar during the year and shortfalls in supplies from domestic sources. The cement component of imports was about 11 million tons, or about 80% of the total. This is about 5% less than the import component of portland and masonry cement shipments to final customers in table 8. The difference, if not just an artifact of different data sources, would appear to indicate a component of stockpiled material in sales to final customers of imported cement. Canada was the largest source of cement plus clinker imports, accounting for 35% of the total. Imports from Canada were up 15% in 1995. Other major sources were Spain, up 12%; Venezuela, up 79%; and Greece, up 36%. Imports from Mexico, although up 33%, were still well below levels prior to the imposition of antidumping tariffs. Clinker imports rose 29% in 1995 (see table 18) and were dominated by material from Canada. Imports by customs district are given in table 19.

The white cement component of imports in 1995 totaled about 0.4 million tons (see table 20). The top five sources[13] were Canada, at about 38% of the imports; Denmark, 20%; Spain, 17%; Mexico, 14%; and Colombia, 5%.

World Review

World hydraulic cement production, which likely included a much higher component of blended cements than was the case in the United States, was estimated to have risen 3% in 1995 to about 1.4 billion tons (see table 21). China was overwhelmingly the dominant cement producer, with about 31% of total world output. The remaining top 10 producers, in descending order of production, were Japan, the United States, India, the Republic of Korea, Germany, Russia, Italy, Turkey, and Thailand.

It is evident from even a cursory review of the 1995 cement trade literature that the centers of new cement plant construction are now firmly entrenched outside of Western Europe, the United States, and Canada. Worldwide, literally dozens of new plants—seemingly all of them boasting state-of-the-art technologies and many of them very large—were either under construction or in advanced stages of planning. Another trend evident was that of privatization of state-owned facilities.

Although home to most of the world's largest cement companies, Western Europe's cement consumption was stagnating in 1995 and most capital investment in the industry

there was on plant modernization. In contrast, a number of both new plants and plant upgrades were underway in several Eastern European countries. A lot of Western European capital was moving into Eastern Europe and the former Soviet Union, in step with privatization opportunities and liberalized investment and taxation laws, and in line with the perception that these countries not only had significant market growth potential but could also provide inexpensive cement for export.

Many countries in the Middle East and some in North Africa were expanding or upgrading their cement capacities, for reasons of low energy costs (e.g., Persian Gulf region), abundant raw materials (e.g., Iran and Turkey), or strategic locations with respect to exports (e.g., Saudi Arabia and Turkey). Much of the expansion was geared toward exports. Iran and Turkey probably had the greatest domestic demand potentials. In much of Africa, the cement industry was less active. Probably the greatest growth potential was in South Africa, where public spending on housing was expected to increase dramatically. Although recommissioning of mothballed production capacity in South Africa was likely, installation of new capacity was less certain, given market disruptions anticipated from the mandated dissolution of the controlling cement cartel scheduled for September 1996.

In Latin America, new capacity was being added in a number of countries, especially Brazil and Mexico, both to meet burgeoning domestic demand and for exports. Most notably, Cemex S.A. of Mexico brought on line in 1995 its Tepeaca plant which, at 3.1-million-ton-per-year capacity, was reportedly one of the largest single-kiln operations in the world.

The other major area of growth in cement capacity and demand was Asia, particularly in China, India, Indonesia, the Philippines, and Vietnam. Japan and Taiwan were among the few Asian countries expected to experience significant declines in production, Japan because of rising production costs and a slowing economy, and Taiwan because of rapid exhaustion of cement raw materials reserves. For some high-growth countries, especially Indonesia, the rapid growth in cement capacity planned over the next 4 years was predicted to lead to large surpluses. These surpluses, anticipated to be available at low cost, are expected to become a major factor in world cement trade and could constrain expansion programs in Europe and North America.

Outlook

World cement demand and production is anticipated to grow steadily at 2% to 4% over the next decade, with the developing world generating and absorbing much of the increase. Demand could grow even more if current research to find new uses for cement is successful—particularly for high-strength cement/concrete substitutes for other construction materials.

Cement production and demand in the United States is anticipated to grow only modestly in both the near and intermediate terms. In the near term, an important constraint is likely to be interest rates, which especially influence the important single-family residential construction market. A modest production constraint for 1996 could be the growth seen in 1995 of yearend cement stockpiles. In both the near and longer terms, the availability of public construction funding will be important, including disruptions caused by any shifting of project authority from the Federal to the State level. For the underpenetrated road paving market, an important factor will be the degree to which the cement industry can persuade construction planners to emphasize long-term costs, where concrete has an advantage, over short-term costs, where asphalt is cheaper.

A dilemma for the U.S. cement industry is the degree and timetable for upgrading its clinker manufacturing capacity. A large percentage of current U.S. capacity is installed either in wet kilns or in old, small-capacity, dry kilns. These are relatively energy-inefficient and have higher per-unit production costs than modern, high-capacity plants. The cost differential is likely to grow in the future. To remain competitive, these older plants will need (costly) equipment upgrades or replacements, but such may not be economical given increased availability of low-cost cement for importation. And much of this imported material is likely to be sourced from modern plants owned by the same giant European cement firms that currently dominate the U.S. industry.

A critical factor for the U.S. cement industry will be future restrictive environmental legislation, particularly any governing the industry's ability to cheaply utilize waste fuels and any that restrict or tax carbon dioxide emissions. Given increasing cooperative participation of the U.S. Government in the global environmental debate, some form of future U.S. carbon dioxide regulation is possible. Such would lead to higher cement production costs and would put U.S. cement at increasing competitive disadvantage to imports from countries lacking equivalent legislation. Absent tariff protection from such imports, some shutdown of domestic capacity could occur. Environmental cost increases could lead to a significant rise in production and consumption of blended cements in the United States. Although partial substitution of pozzolans for portland cement reduces the per-unit environmental costs of finished cement production, the advantage is partly illusory because (synthetic) pozzolan production itself has an environmental cost, albeit assigned to other industries, such as iron- and steelmaking.

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[1]Minerals information activities of the former U.S. Bureau of Mines were transferred to the U.S. Geological Survey in Jan. 1996.

[2]State subdivisions are as follows:

California, northern.—Counties north of San Luis Obispo and Kern Counties and west of Inyo and Mono Counties.

California, southern.—Inyo, Kern, Mono, San Luis Obispo, and all counties further south.

Chicago, metropolitan.—Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will Counties in Illinois.

Illinois.—All other counties in the State.

New York, eastern.—All counties east of Broome, Chenango, Lewis, Madison, Oneida, and St. Lawrence Counties, but excluding counties within Metropolitan New York.

New York, western.—Broome, Chenango, Lewis, Madison, Oneida, and St. Lawrence Counties, and all those further west.

New York, metropolitan.—The five counties of New York City (Bronx, Kings, New York, Queens, and Richmond) plus Nassau, Rockland, Suffolk, and Westchester Counties.

Pennsylvania, eastern.—All counties east of Centre, Clinton, Franklin, Huntingdon, and Potter Counties.

Pennsylvania, western.—Centre, Clinton, Franklin, Huntingdon, and Potter Counties, and all those further west.

Texas, northern.—All counties north of Burnet, Crockett, Jasper, Jeff Davis, Llano, Madison, Mason, Menard, Milam, Newton, Pecos, Polk, Robertson, San Jacinto, Schleicher, Tyler, Walker, and Williamson Counties.

Texas, southern.—The named counties above and all those further south.

[3]Lafarge Corp., 1995, Annual Report.

[4]Reuters News Service, Sept. 20, 1995, quoted in The Monitor, Portland Cement Assoc. July 1995.

[5]Rock Products Cement Edition, May 1995, p. 9.

[6]———. July 1996, pp. 35-36.

[7]Reuters News Service, July 10, 1995, quoted in The Monitor, Portland Cement Assoc. May 1995.

[8]Sunbelt Cement, tel. communication to USGS.

[9]Company report to the USGS, 1996.

[10]Company report to the USGS, 1996.

[11]International Cement Review, Mar. 1995, p. 12.

[12]———. Dec. 1995, p. 5.

[13]Bureau of the Census, data quoted in: Cement in Jan. 1996, Mineral Industry Surveys, USGS, table 5.

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Industrial Minerals.

International Cement Review.

Rock Products (incl. Cement Edition).

World Cement.

Zement-Kalk-Gyps International.

TABLE 1
SALIENT CEMENT STATISTICS

(Thousand metric tons unless otherwise specified)

		1991	1992	1993	1994	1995
United States 1/						
Production 2/		67,193	69,585	73,807	77,948	76,906
Shipments from mills 2/ 3/		68,999	69,203	74,079 4/	80,490 4/	79,924 4/
Value 2/ 3/	thousands	3,832,096	3,779,286	4,174,818 4/	4,981,017 4/	5,471,268 4/
Average value per ton 2/ 3/ 5/		56	55	56 4/	62 4/	68 4/
Stocks at mills, 2/ Dec. 31		6,009	5,272	4,788	4,805	5,813
Exports 6/		633	746	625	633	759
Imports for consumption 4/ 6/		7,893	6,166	7,060	11,303	13,848
Consumption, apparent 7/		72,413 r/	74,124 r/	79,198 r/	86,370 r/	86,612
World: Production e/		1,181,793 r/	1,239,683 r/	1,301,527 r/	1,380,052 r/	1,421,342

e/ Estimated. r/ Revised.

1/ Excludes Puerto Rico.

2/ Portland and masonry cement only. Includes imported cement, and cement made from imported clinker.

3/ Shipments calculated based on annual survey of plants; may differ from tables 8 and 9, which are based on consolidated company monthly data.

4/ Includes Puerto Rico.

5/ Value received, f.o.b. mill.

6/ Hydraulic cement plus clinker.

7/ Production of cement plus imports of cement (excluding clinker) minus exports of cement minus change in stocks.

TABLE 2
PORTLAND CEMENT PRODUCTION, CAPACITY, AND STOCKS IN THE UNITED STATES, BY DISTRICT 1/

(Thousand metric tons unless otherwise specified)

	1994					1995				
			Capacity 2/		Stocks 3/			Capacity 2/		Stocks 3/
District	Plants active	Production 4/	Finish grinding	Percent utilized	at mills, Dec. 31	Plants active	Production 4/	Finish grinding	Percent utilized	at mills, Dec. 31
New York and Maine	5	3,005	4,141	72.6	217	4	2,937	3,937	74.6	317
Pennsylvania, eastern	8	4,014	4,878	82.3	196	8	4,045	5,019	80.6	355
Pennsylvania, western	4	1,616	2,009	80.4	111	4	1,565	2,009	77.9	146
Illinois	4	2,585	3,217	80.4	127	4	2,559	3,379	75.7	210
Indiana	4	2,291	2,867	79.9	116	4	2,328	2,597	89.6	253
Michigan	5	5,160	6,532	79.0	226	5	5,399	6,999	77.1	336
Ohio	3	1,054	1,588	66.4	37	3	1,049	1,588	66.1	94
Iowa, Nebraska, South Dakota	6	3,891	5,758	67.6	291	5	3,724	5,576	66.8	364
Kansas	4	1,644	1,801	91.3	127	4	1,725	1,774	97.2	185
Missouri	5	4,725	5,059	93.4	340	5	4,362	5,059	86.2	395
Florida	6	3,371	4,382	76.9	291	6	3,166	4,382	72.3	195
Georgia and South Carolina	5	3,256	4,599	70.8	154	5	3,226	4,587	70.3	187
Maryland, Virginia, West Virginia	6	3,237	3,987	81.2	203	6	3,079	4,018	76.6	358
Alabama	5	3,976	4,573	86.9	268	5	4,091	4,755	86.0	261
Kentucky, Mississippi, Tennessee	4	1,983	2,128	93.2	139	4	2,107	2,474	85.2	216
Arkansas and Oklahoma	4	2,434	2,694	90.3	166	4	2,544	2,717	93.6	202
Texas, northern	6	3,809	4,512	84.4	209	6	3,807	4,512	84.4	229
Texas, southern	6	4,815	5,529	87.1	182	5 5/	4,285	4,717	90.8	227
Arizona and New Mexico	3	1,967	2,288	86.0	51	3	2,061	2,333	88.3	47
Colorado and Wyoming	4	1,822	2,377	76.7	97	4	1,851	2,377	77.9	90
Idaho, Montana, Nevada, Utah	6	2,180	2,422	90.0	174	6 6/	2,206	2,445	90.2	155
Alaska, Hawaii, Oregon, Washington	4	1,861	2,295	81.1	180	4	1,824	2,295	79.5	179
California, northern	3	2,616	2,776	94.2	141	3	2,554	2,867	89.1	107
California, southern	8	7,023	7,933	88.5	258	8	6,808	7,899	86.2	250
Total or average 7/	118	74,335	90,346	82.3	4,301	115 6/	73,303	90,316	81.2	5,358
Puerto Rico	2	1,405	1,956	71.8	31	2	1,414	2,004	70.6	40

1/ Includes Puerto Rico. Includes data for three white cement facilities as follows: California (1), Pennsylvania (1), and Texas (1). Includes data for grinding plants as follows: California (1), Florida (2), Iowa (1), Michigan (1), Ohio (1), Pennsylvania (1), and Texas (1).

2/ Grinding capacity based on fineness necessary to grind Types I and II cement, making allowance for downtime required for maintenance.

3/ Includes imported cement.

4/ Includes cement produced from imported clinker.

5/ One additional plant was operational January through April; data for it are included in tonnages shown.

6/ Excludes one plant that commenced production in 1995 but for which data were unavailable at the time of data compilation.

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

TABLE 3
MASONRY CEMENT PRODUCTION AND STOCKS IN THE UNITED STATES, BY DISTRICT 1/

(Thousand metric tons unless otherwise specified)

District	1994			1995		
	Plants active	Production	Stocks 2/ at mills, Dec. 31	Plants active	Production	Stocks 2/ at mills, Dec. 31
New York and Maine	5	89	17	4	100	18
Pennsylvania, eastern	6	161	25	6	186	38
Pennsylvania, western	4	84	13	4	81	13
Illinois	1	W	W	1	--	W
Indiana	4	W	31	4	W	W
Michigan	5	235	24	5	229	26
Ohio	2	W	W	2	W	W
Iowa, Nebraska, South Dakota	4	58	12	4	51	17
Kansas	3	24	W	3	31	10
Missouri	1	W	W	1	W	W
Florida	4	400	W	4	383	31
Georgia and South Carolina	4	417	39	4	436	43
Maryland, Virginia, West Virginia	6	571	52	6	528	79
Alabama	5	312	36	5	306	45
Kentucky, Mississippi, Tennessee	3	105	11	3	108	15
Arkansas and Oklahoma	4	104	14	4	110	19
Texas, northern	4	106	10	4	W	8
Texas, southern	5	151	15	5	98	7
Arizona and New Mexico	3	W	W	3	W	W
Colorado and Wyoming	2	W	W	2	W	W
Idaho, Montana, Nevada, Utah	4	W	W	4	W	W
Alaska, Hawaii, Oregon, Washington	2	W	2	2	W	2
California, northern	1	W	W	1	W	W
California, southern	2	W	W	3	149	W
Total or average 3/	84	3,613	400	84	3,603	455

W Withheld to avoid disclosing company proprietary data; included in "Total or average."

1/ Puerto Rico did not produce any masonry cement.

2/ Includes imported cement.

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

TABLE 4
CLINKER CAPACITY AND PRODUCTION IN THE UNITED STATES IN 1995, BY DISTRICT

District	Active plants 1/				Number of kilns	Daily capacity (thousand metric tons)	Average number of days maintenance	Apparent annual capacity 2/ (thousand metric tons)	Production 3/ (thousand metric tons)	Percent utilized
	Process used									
	Wet	Dry	Both	Total						
New York and Maine	3	1	--	4	5	9	61	2,904	2,915	100.4
Pennsylvania, eastern	2	5	--	7	14	13	30	4,461	4,245	95.2
Pennsylvania, western	3	1	--	4	8	6	37	1,942	1,711	88.1
Illinois	--	4	--	4	8	8	33	2,508	2,345	93.5
Indiana	2	2	--	4	8	8	28	2,854	2,435	85.3
Michigan	1	2	--	3	8	13	27	4,464	4,150	93.0
Ohio	1	1	--	2	3	3	16	1,094	902	82.4
Iowa, Nebraska, South Dakota	--	4	1	5	9	13	49	4,120	3,472	84.3
Kansas	2	2	--	4	11	6	41	1,796	1,643	91.5
Missouri	2	3	--	5	7	13	35	4,349	4,160	95.7
Florida	2	2	--	4	7	9	34	2,992	2,787	93.1
Georgia and South Carolina	2	2	1	5	11	11	35	3,722	3,250	87.3
Maryland, Virginia, West Virginia	2	3	--	5	15	11	19	3,726	3,096	83.1
Alabama	--	5	--	5	7	14	31	4,462	3,683	82.5
Kentucky, Mississippi, Tennessee	2	2	--	4	5	6	21	2,161	2,096	97.0
Arkansas and Oklahoma	2	2	--	4	10	8	28	2,609	2,500	95.8
Texas, northern	3	3	--	6	14	12	38	3,903	3,688	94.5
Texas, southern	--	4	1	5	6	13	29	4,263	4,174	97.9
Arizona and New Mexico	--	3	--	3	9	6	13	2,267	1,975	87.1
Colorado and Wyoming	1	3	--	4	6	6	28	1,986	1,840	92.6
Idaho, Montana, Nevada, Utah	4	2	--	6	9	6	28	2,016	2,090	103.7
Alaska, Hawaii, Oregon, Washington	1	3	--	4	4	4	45	1,372	1,600	116.6
California, northern	--	3	--	3	3	9	55	2,589	2,553	98.6
California, southern	--	8	--	8	17	22	47	7,145	6,674	93.4
Total or average 4/	35	70	3	108	204	232	33	75,702	69,983	92.4
Puerto Rico	--	2	--	2	2	5	W	1,583	1,274	80.5

W Withheld to avoid disclosing company proprietary data.

1/ Includes white cement producing facilities.

2/ Calculated, based on individual company data, using 365 days minus reported days for maintenance multiplied by the reported 24 hour capacity.

3/ Includes production reported for plants that shut down during the year.

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

TABLE 5
RAW MATERIALS USED IN PRODUCING CEMENT
IN THE UNITED STATES 1/ 2/ 3/

(Thousand metric tons)

Raw materials	1994	1995
Calcareous:		
Limestone (includes aragonite, marble, chalk)	78,427	80,142
Cement rock (includes marl)	24,243	24,164
Coral	675	680
Aluminous:		
Clay	4,189	4,294
Shale	5,514	4,378
Other (includes staurolite, bauxite, aluminum dross, alumina, volcanic material, other)	500	967
Siliceous:		
Sand and calcium silicate	2,095	2,210
Sandstone, quartzite, other	588	741
Ferrous: Iron ore, pyrites, millscale, other	1,186	1,523
Other:		
Gypsum and anhydrite	3,873	3,997
Blast furnace slag	33	130
Fly ash	1,125	1,396
Other, n.e.c.	135	82
Total 4/	122,582	124,704

1/ Includes Puerto Rico.
2/ Nonfuel materials only.
3/ Includes portland and masonry cement.
4/ Data may not add to totals shown because of independent rounding.

TABLE 6
CLINKER PRODUCED AND FUEL CONSUMED BY THE CEMENT INDUSTRY 1/
IN THE UNITED STATES, 2/ BY PROCESS

	Clinker produced			Fuel consumed			Waste fuel		
Kiln process	Plants active	Quantity (thousand metric tons)	Percent of total	Coal (thousand metric tons)	Oil (thousand liters)	Natural gas (thousand cubic meters)	Tires (thousand metric tons)	Solid (thousand metric tons)	Liquid (thousand liters)
1994:									
Wet	36	18,605	26.7	3,197	10,913	174,815	26	58	369,078
Dry	71	49,333	70.7	6,984	37,858	411,657	90	16	230,577
Both	3	1,849	2.6	303	--	63,676	4	--	--
Total 3/	110	69,787	100.0	10,484 4/	48,771	650,148	120	74	599,655
1995:									
Wet	35	18,775	26.3	2,965	13,624	327,798	31	62	626,436
Dry	72	50,529	70.9	6,954	28,190	635,786	122	6	258,150
Both	3	1,953	2.7	253	--	105,459	5	--	--
Total 3/	110	71,257	100.0	10,171 5/	41,814	1,069,044	158	68	884,586

1/ Includes portland and masonry cement.
2/ Includes Puerto Rico.
3/ Data may not add to totals shown because of independent rounding.
4/ Includes 305,000 tons of coke and 1,389,000 tons of petroleum coke.
5/ Includes 455,000 tons of coke and 1,475,000 tons of petroleum coke.

TABLE 7
ELECTRIC ENERGY USED AT CEMENT PLANTS 1/
IN THE UNITED STATES, 2/ BY PROCESS

Kiln process	Electric energy used: Generated by cement plants, Number of plants	Electric energy used: Generated by cement plants, Quantity (million kilowatt-hours)	Electric energy used: Purchased, Number of plants	Electric energy used: Purchased, Quantity (million kilowatt-hours)	Electric energy used: Total, Quantity (million kilowatt-hours)	Electric energy used: Total, Percent	Finished cement produced (thousand metric tons) 3/	Average consumption (kilowatt-hours per ton of cement produced) 3/
1994:								
Wet	--	--	35	2,675	2,675	24.6	19,295	139
Dry	5	593	69	7,288	7,882	72.5	51,409	153
Both	--	--	3	310	310	2.9	1,957	158
Total 4/	5	593	107	10,273	10,866	100.0	72,661	150
Percent of total electric energy used	--	5.5	--	94.5	--	--	--	--
Adjustments 5/	--	--	3	--	--	--	3,079	--
1995:								
Wet	--	--	34	2,682	2,682	24.6	19,317	139
Dry	5	574	70	7,355	7,930	72.7	51,730	153
Both	--	--	3	298	298	2.7	1,946	153
Total 4/	5	574	107	10,465	11,039	100.0	72,994	149
Percent of total electric energy used	--	5.3	--	94.7	--	--	--	--
Adjustments 5/	--	--	3	--	--	--	1,723	--

1/ Includes portland and masonry cement.

2/ Includes Puerto Rico.

3/ This table continues the past practice of allocating total electricity consumed to portland cement instead of total cement. The electricity data are, in fact, for the cement plants overall and include usage for masonry cement. If masonry cement is included, the total average electricity consumption becomes 145 kilowatt-hours per ton of cement for both 1994 and 1995.

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

5/ Tonnage of cement by three plants that did not report any electricity consumption.

TABLE 8
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN 1/ 2/

(Thousand metric tons)

Destination and origin	Portland cement 1994	Portland cement 1995	Masonry cement 1994	Masonry cement 1995
Destination:				
Alabama	1,432	1,389	131	121
Alaska	103	108	W	W
Arizona	2,158	2,266	W	W
Arkansas	880	937	56	54
California, northern	2,872	2,984	--	2
California, southern	5,328	5,118	W	W
Colorado	1,746	1,634	29	21
Connecticut 3/	624	607	12	13
Delaware 3/	230	223	9	9
District of Columbia 3/	112	107	(4/)	(4/)
Florida	5,623	5,769	458	465
Georgia	2,751	3,045	201	214
Hawaii	396	358	6	5
Idaho	456	463	1	1
Illinois, excluding Chicago	1,516	1,439	30	31
Chicago, metropolitan 3/	2,077	1,864	49	45
Indiana	1,876	1,859	98	92
Iowa	1,515	1,429	13	12
Kansas	1,277	1,339	18	15
Kentucky	1,163	1,195	94	91
Louisiana 3/	1,706	1,747	52	50
Maine	227	210	5	5
Maryland	1,083	1,092	84	79
Massachusetts 3/	1,119	1,036	27	26
Michigan	2,585	2,712	120	126
Minnesota 3/	1,518	1,579	39	32
Mississippi	920	865	75	52
Missouri	2,386	2,234	48	44

See footnotes at end of table.

TABLE 8-Continued
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN 1/ 2/

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	1994	1995	1994	1995
Montana	278	274	1	1
Nebraska	1,014	982	12	9
Nevada	1,358	1,483	(4/)	(4/)
New Hampshire 3/	242	256	7	7
New Jersey 3/	1,427	1,410	62	57
New Mexico	665	708	6	7
New York, eastern	514	491	22	29
New York, western	821	754	33	31
New York, metropolitan 3/	1,010	1,078	38	39
North Carolina 3/	2,151	2,218	253	263
North Dakota 3/	245	310	3	3
Ohio	3,482	3,533	199	181
Oklahoma	1,114	1,105	43	38
Oregon	946	1,027	(4/)	(4/)
Pennsylvania, eastern	1,967	1,806	61	57
Pennsylvania, western	1,102	1,002	73	66
Rhode Island 3/	152	117	3	3
South Carolina	981	1,035	113	106
South Dakota	338	302	5	4
Tennessee	1,711	1,805	187	193
Texas, northern	3,817	4,115	134	146
Texas, southern	4,053	4,225	108	91
Utah	1,020	1,286	2	2
Vermont 3/	101	105	3	3
Virginia	1,716	1,757	146	138
Washington	1,723	1,669	6	6
West Virginia	437	412	33	30
Wisconsin	1,889	1,838	41	35
Wyoming	275	215	2	1
U.S. total 5/	82,232	82,925	3,250	3,150
Foreign countries 6/	377	393	75	93
Puerto Rico	1,392	1,405	--	--
Total shipment 5/	84,001	84,724	3,325	3,243
Origin:				
United States 7/	73,739 r/	71,750	3,283	3,185
Puerto Rico	1,392	1,405	--	--
Foreign 8/	8,870	11,568	42	57
Total shipment 5/	84,001	84,724	3,325	3,243

r/ Revised. W Withheld to avoid disclosing company proprietary data; included with "Foreign countries."

1/ Includes cement produced from imported clinker and imported cement shipped by domestic producers, Canadian cement manufacturers, and other importers. Includes Puerto Rico.

2/ Data are developed from monthly consolidated surveys of shipments by company and may differ from data in tables in 1, 10, 11, 12, 14, and 15, which are from annual surveys of individual plants.

3/ Has no cement producing plants.

4/ Less than 1/2 unit.

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

6/ Includes shipments to U.S. possessions and territories. Includes States indicated by the symbol W.

7/ Includes cement produced from imported clinker by domestic producers.

8/ Imported cement distributed in the United States by domestic producers, Canadian cement manufacturers, and other importers.

TABLE 9
CEMENT SHIPMENTS, BY DESTINATION (REGION AND SUBREGION) 1/ 2/

Region and subregion	Portland cement: Thousand metric tons 1994	Portland cement: Thousand metric tons 1995	Portland cement: Percent of grand total 1994	Portland cement: Percent of grand total 1995	Masonry cement: Thousand metric tons 1994	Masonry cement: Thousand metric tons 1995	Masonry cement: Percent of grand total 1994	Masonry cement: Percent of grand total 1995
Northeast:								
New England 3/	2,466	2,330	3	3	57	56	2	2
Middle Atlantic 4/	6,841	6,540	8	8	289	278	9	9
Total 5/	9,307	8,870	11	11	346	334	11	11
South:								
Atlantic 6/	15,084	15,658	19	19	1,297	1,303	40	41
East Central 7/	5,226	5,255	6	6	487	457	15	15
West Central 8/	11,570	12,129	15	15	392	379	12	12
Total 5/	31,881	33,042	39	40	2,176	2,139	67	68
Midwest:								
East 9/	13,425	13,245	16	16	537	511	17	16
West 10/	8,294	8,174	9	10	137	120	4	4
Total 5/	21,719	21,419	25	26	674	631	21	20
West:								
Mountain 11/	7,956	8,330	10	10	42	32	1	1
Pacific 12/	11,368	11,264	14	14	12	12	(13/)	(13/)
Total 5/	19,325	19,594	24	24	54	44	2	1
Grand total 5/	82,232	82,925	100	100	3,250	3,150	100	100

1/ Includes imported cement shipped by importers. Excludes Puerto Rico.

2/ Data are developed from monthly consolidated surveys of shipments by company and may differ from data in tables 1, 10, 11, 12, 14, and 15, which are from annual surveys of individual plants.

3/ New England includes: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

4/ Middle Atlantic includes: New Jersey, New York, and Pennsylvania.

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

6/ Atlantic includes: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia.

7/ East Central includes: Alabama, Kentucky, Mississippi, and Tennessee.

8/ West Central includes: Arkansas, Louisiana, Oklahoma, and Texas.

9/ East Includes: Illinois, Indiana, Michigan, Ohio, and Wisconsin.

10/ West includes: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

11/ Mountain region includes: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.

12/ Pacific region includes: Alaska, California, Hawaii, Oregon, and Washington.

13/ Less than 1/2 unit.

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

(Thousand metric tons)

	Shipments from plant to terminal: In bulk	Shipments from plant to terminal: In containers 2/	Shipments to ultimate consumer: From plant to consumer: In bulk	Shipments to ultimate consumer: From plant to consumer: In containers 2/	Shipments to ultimate consumer: From terminal to consumer: In bulk	Shipments to ultimate consumer: From terminal to consumer: In containers 2/	Shipments to ultimate consumer: Total shipments to consumer 3/ 4/
1994:							
Railroad	8,871	56	3,205	419	840	15	4,479
Truck	2,667	124	41,701	2,010	25,712	818	70,241
Barge and boat	8,046	--	659	3	294	--	956
Other 5/	1,742	--	643	36	533	16	1,228
Total 3/	21,326	180	46,208	2,468	27,378	849	76,903
1995:							
Railroad	10,388	64	2,396	377	951	78	3,803
Truck	2,763	222	43,917	1,922	25,964	645	72,449
Barge and boat	7,898	--	105	26	32	--	162
Other 5/	1,853	--	--	--	--	--	--
Total 3/	22,902	286	46,418	2,325	26,947	723	76,414

1/ Includes Puerto Rico. Includes imported cement and cement made from foreign clinker.

2/ Includes bags and jumbo bags.

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

4/ Shipments calculated based on annual survey of plants; may differ from tables 8 and 9, which are based on consolidated company monthly data.

5/ Includes cement used at plant.

TABLE 11
PORTLAND CEMENT SHIPPED BY PRODUCERS IN THE UNITED STATES, BY DISTRICT 1/ 2/ 3/

District	1994 Quantity (thousand metric tons) 4/	1994 Value (thousands)	1994 Average per ton	1995 Quantity (thousand metric tons) 4/	1995 Value (thousands)	1995 Average per ton
New York and Maine	3,099	$163,141	$52.64	2,916	$230,337	$78.99
Pennsylvania, eastern	4,141	221,121	53.40	3,899	241,352	61.90
Pennsylvania, western	1,520	95,171	62.61	1,486	99,139	66.72
Illinois	2,524	147,721	58.53	1,651	109,030	66.04
Indiana	2,293	132,487	57.78	2,510	154,462	61.54
Michigan	5,135	329,409	64.15	5,098	340,461	66.78
Ohio	1,063	70,273	66.11	985	68,237	69.28
Iowa, Nebraska, South Dakota	3,722	239,483	64.34	3,790	262,662	69.30
Kansas	1,708	104,988	61.47	1,703	107,345	63.03
Missouri	5,054	283,013	56.00	4,778	295,352	61.81
Florida and Puerto Rico	5,242	395,381	75.43	5,604	451,319	80.54
Georgia and South Carolina	3,334	215,100	64.52	3,296	236,681	71.81
Maryland, Virginia, West Virginia	3,338	185,519	55.58	3,262	214,854	65.87
Alabama	3,839	239,220	62.31	3,910	272,509	69.70
Kentucky, Mississippi, Tennessee	2,323	144,977	62.41	2,346	156,550	66.73
Arkansas and Oklahoma	2,401	140,899	58.68	2,506	158,566	63.27
Texas, northern	3,350	192,328	57.41	3,556	228,525	64.26
Texas, southern	4,872	242,347	49.74	4,908	293,380	59.78
Arizona and New Mexico	1,932	126,565	65.51	2,309	160,069	69.32
Colorado and Wyoming	1,951	135,254	69.33	1,841	149,462	81.19
Idaho, Montana, Nevada, Utah	2,341	175,730	75.07	2,432	185,221	76.16
Alaska, Hawaii, Oregon, Washington	1,568	124,158	79.18	1,520	136,987	90.12
California, northern	1,933	123,062	63.66	2,032	139,534	68.67
California, southern	6,341	339,231	53.50	6,212	357,611	57.57
Total 5/ 6/ 7/ or average	76,903	4,696,198	61.07	76,414	5,170,697	67.67

1/ Includes data for three white cement facilities as follows: California (1), Pennsylvania (1), and Texas (1). Includes data for grinding plants as follows: California (1), Florida (2), Iowa (1), Michigan (1), Ohio (1), Pennsylvania (1), and Texas (1).

2/ Includes cement produced from imported clinker.

3/ Cement imported and distributed by domestic producers only.

4/ Shipments calculated based on annual survey of plants; may differ from tables 8 and 9, which are based on consolidated company monthly data.

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

6/ Does not include cement consumed at plant.

7/ Total includes imports shipped to final customers.

TABLE 12
MASONRY CEMENT SHIPPED BY PRODUCERS IN THE UNITED STATES, BY DISTRICT 1/

District	1994 Quantity (thousand metric tons) 2/	1994 Value (thousands)	1994 Average per ton	1995 Quantity (thousand metric tons) 2/	1995 Value (thousands)	1995 Average per ton
New York and Maine	91	$6,823	$75.21	87	$6,986	$80.30
Pennsylvania, eastern	187	13,518	72.34	180	13,211	73.39
Pennsylvania, western	83	7,658	92.76	80	7,394	92.43
Illinois, Indiana, Michigan, Ohio	723	60,056	83.06	678	59,226	87.35
Iowa, Kansas, Missouri, Nebraska, South Dakota	206	12,852	62.41	189	12,678	67.08
Florida	358	31,022	86.57	415	38,023	91.62
Georgia and South Carolina	396	36,406	91.83	413	40,351	97.70
Maryland, Virginia, West Virginia	531	35,151	66.23	480	36,395	75.82
Alabama	317	29,401	92.86	302	30,277	100.25
Kentucky, Mississippi, Tennessee	119	8,848	74.45	117	9,476	80.99
Arkansas, Oklahoma, Texas	354	26,075	73.70	290	24,368	84.03
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	110	8,821	80.36	111	9,099	81.97
Alaska, California, Hawaii, Oregon, Washington	110	7,738	70.49	165	12,288	74.47
Total 3/ 4/ or average	3,587	284,819	79.40	3,510	300,571	85.63

1/ Excludes Puerto Rico (does not produce masonry cement).

2/ Shipments calculated based on annual survey of plants; may differ from tables 8 and 9, which are based on consolidated company monthly data.

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

4/ Total includes imports shipped by independent importers.

TABLE 13
AVERAGE MILL VALUE OF CEMENT IN THE UNITED STATES 1/

(Per metric ton)

Year	Gray portland cement	White portland cement	All portland cement	Prepared masonry cement 2/	All classes of cement
1994	60.28	177.04	61.07	79.40	61.88
1995	66.89	174.66	67.67	85.64	68.46

1/ Includes Puerto Rico. Mill value is the actual value of sales to customers, f.o.b. plant, less all discounts and allowances, less all freight charges from producing plant to distribution terminal if any, less total cost of operating terminal, if any, less cost of paper bags and pallets.

2/ Masonry cement made at cement plants only.

TABLE 14
PORTLAND CEMENT SHIPMENTS IN 1995, BY DISTRICT OF ORIGIN AND TYPE OF CUSTOMER 1/ 2/

(Thousand metric tons)

District of origin	Ready mixed concrete	Concrete product manufacturers 3/	Contractors 4/	Building material dealers	Oil well, mining, waste 5/	Government and miscellaneous 6/	Total 7/
New York and Maine	1,732	322	48	119	--	696	2,916
Pennsylvania, eastern	1,594	644	135	216	25	1,284	3,899
Pennsylvania, western	911	175	140	75	16	168	1,486
Illinois	1,296	229	65	16	15	30	1,651
Indiana	1,990	372	45	80	11	13	2,510
Michigan	2,102	595	208	248	14	1,932	5,098
Ohio	698	187	49	34	6	13	985
Iowa, Nebraska, South Dakota	2,722	497	342	82	34	112	3,790
Kansas	1,167	119	175	35	20	187	1,703
Missouri	2,799	351	461	112	--	1,054	4,778
Florida and Puerto Rico	2,168	583	206	632	--	2,013	5,604
Georgia and South Carolina	2,344	606	181	119	2	44	3,296
Maryland, Virginia, West Virginia	2,279	615	227	112	7	22	3,262
Alabama	1,643	419	210	245	--	1,393	3,910
Kentucky, Mississippi, Tennessee	1,863	279	110	67	3	24	2,346
Arkansas and Oklahoma	1,343	91	358	37	40	636	2,506
Texas, northern	1,932	215	494	106	389	419	3,556
Texas, southern	3,121	266	316	123	139	944	4,908
Arizona and New Mexico	1,721	252	168	50	30	89	2,309
Colorado and Wyoming	1,481	150	127	67	16	--	1,841
Idaho, Montana, Nevada, Utah	1,849	220	212	25	52	75	2,432
Alaska, Hawaii, Oregon, Washington	919	98	148	79	--	274	1,520
California, northern	1,584	243	103	46	45	12	2,032
California, southern	4,306	920	225	160	117	485	6,212
Total 7/	46,772	8,762	4,758	3,198	978	11,946	76,414

1/ Includes imports shipped by independent importers.

2/ Shipments calculated based on annual survey of plants; may differ from tables 8 and 9, which are based on consolidated company monthly data.

3/ Concrete product manufacturers in thousand metric tons include: brick/ block-1,519; precast-1,063; pipe-711; and others-5,317. Remainder includes unspecified amounts of brick/ block, precast, and pipe.

4/ Contractors in thousand metric tons include: road paving-1,740; soil cement-577 and other-2,237. Remainder includes unspecified amounts of road paving, and soil cement.

5/ Oil well, mining, and waste included in thousand metric tons: oil well drilling-713; mining-81; and waste stabilization-184.

6/ Includes shipments designated as going to "unspecified" customers.

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

TABLE 15
PORTLAND CEMENT SHIPPED FROM PLANTS
IN THE UNITED STATES, 1/ 2/ BY TYPE

Type	1994 Quantity (thousand metric tons)	1995 Quantity (thousand metric tons)
General use and moderate heat (Types I and II), (Gray)	69,810	69,247
High early strength (Type III)	2,618	2,658
Sulfate resisting (Type V)	1,763	1,694
Block	463	493
Oil well	937	750
White	519	549
Blended:		
Portland-slag and portland pozzolan	422	754
Other blended cement 3/	W	63
Expansive	W	W
Regulated fast setting	W	W
Miscellaneous 4/	304	155
Total 5/ 6/	76,903	76,414

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ Includes Puerto Rico.
2/ Shipments calculated based on annual survey of plants; may differ from tables 8 and 9, which are based on consolidated company monthly data.
3/ Includes blends with fly ash and silica fume.
4/ Includes waterproof and lowheat (Type IV).
5/ Data may not add to totals shown because of independent rounding.
6/ Does not include cement consumed at plant.

TABLE 16
U.S. EXPORTS OF HYDRAULIC CEMENT AND CEMENT CLINKER, 1/ BY COUNTRY

(Thousand metric tons and thousand dollars)

Country of destination	1994 Quantity	1994 Value 2/	1995 Quantity	1995 Value 2/
Bahamas, The	9	546	3	282
Canada	510	35,272	582	40,434
Ghana	(3/)	31	(3/)	6
Mexico	62	4,221	17	1,871
Netherlands	1	223	1	230
Other	52	4,896	156	10,153
Total 4/	633	45,189	759	52,975

1/ Includes portland and masonry cement.
2/ Free alongside ship (f.a.s.) value. The value of exports at the U.S. seaport, or border port of export, based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier at the U.S. port of exportation. 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: Bureau of the Census.

TABLE 17
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, 1/ BY COUNTRY

(Thousand metric tons and thousand dollars)

	1994			1995		
		Value			Value	
Country of origin	Quantity	Customs 2/	C.i.f. 3/	Quantity	Customs 2/	C.i.f. 3/
Canada	4,268	168,603	183,314	4,886	198,056	217,926
Colombia	709	24,830	31,351	804	30,993	38,026
France	474	27,088	32,538	508	24,639	30,905
Greece	914	31,919	44,060	1,245	44,326	61,549
Japan	14	668	891	(4/)	352	415
Mexico	640	25,573	31,097	850	31,938	39,491
Spain	1,342	54,585	64,771	1,501	56,336	71,906
Venezuela	803	32,735	42,090	1,435	56,965	71,317
Other	2,139	77,036	107,620	2,618	97,458	137,990
Total 5/	11,303	443,038	537,731	13,848	541,064	669,525

1/ Includes portland, masonry, and other hydraulic cements. Includes Puerto Rico.
2/ Customs value: 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/ C.i.f. (Cost, insurance and freight): import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry. It is computed by adding "freight" to the "customs value."
4/ Less than 1/2 unit.
5/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 18
U.S. IMPORTS FOR CONSUMPTION OF CLINKER, 1/ BY COUNTRY

(Thousand metric tons and thousand dollars)

	1994			1995		
		Value			Value	
Country	Quantity	Customs 2/	C.i.f. 3/	Quantity	Customs 2/	C.i.f. 3/
Australia	103	3,675	5,414	114	4,534	6,177
Canada	913	31,674	32,261	1,375	46,658	50,560
Colombia	212	6,370	7,914	139	4,785	5,834
France	154	13,535	15,319	163	8,062	10,061
Greece	--	--	--	104	3,308	4,709
Mexico	(4/)	7	8	--	--	--
New Zealand	27	837	1,253	22	680	1,043
Spain	33	912	1,262	--	--	--
Other	766	22,773	31,540	940	30,646	41,356
Total 5/	2,208	79,783	94,970	2,858	98,674	119,742

1/ For all types of hydraulic cement.
2/ Customs value: 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/ C.i.f. (Cost, insurance and freight): import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry. It is computed by adding "freight" to the "customs value."
4/ Less than 1/2 unit.
5/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 19
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER,
BY CUSTOMS DISTRICT AND COUNTRY

(Thousand metric tons and thousand dollars)

Customs district and country	1994			1995		
		Value			Value	
	Quantity	Customs 1/	C.i.f. 2/	Quantity	Customs 1/	C.i.f. 2/
Anchorage:						
Canada	1	13	28	4	165	289
China	56	2,147	3,097	64	2,489	3,469
Japan	14	478	672	--	--	--
United Kingdom	--	--	--	(4/)	4	5
Total 3/	71	2,638	3,797	67	2,657	3,763
Baltimore:						
Brazil	(4/)	39	46	(4/)	36	41
Greece	9	289	410	112	4,064	5,272
Japan	(4/)	24	24	--	--	--
Netherlands	--	--	--	(4/)	25	29
Spain	53	1,618	3,094	42	1,482	1,482
United Kingdom	(4/)	68	92	(4/)	130	174
Venezuela	13	507	507	48	2,366	2,366
Total 3/	74	2,545	4,173	203	8,104	9,365
Boston:						
Canada	13	632	707	--	--	--
Germany	(4/)	16	22	--	--	--
Netherlands	--	--	--	(4/)	23	27
United Kingdom	(4/)	9	9	--	--	--
Total 3/	14	656	739	(4/)	23	27
Buffalo:						
Canada	532	27,683	30,046	651	32,703	35,358
United Kingdom	(4/)	1	1	--	--	--
Total	532	27,685	30,048	651	32,703	35,358
Charleston:						
Canada	43	1,451	2,147	--	--	--
Germany	(4/)	6	8	(4/)	13	17
Greece	23	627	1,020	--	--	--
United Kingdom	(4/)	58	78	(4/)	75	103
Venezuela	12	443	598	93	3,863	5,197
Total	78	2,585	3,852	93	3,951	5,317
Chicago:						
Japan	(4/)	47	56	(4/)	80	96
Netherlands	--	--	--	(4/)	6	24
Sweden	--	--	--	(4/)	4	6
Total 3/	(4/)	47	56	(4/)	90	126
Cleveland:						
Canada	522	18,032	19,145	504	17,496	18,237
Denmark	--	--	--	(4/)	2	3
Germany	--	--	--	(4/)	12	15
Netherlands	--	--	--	(4/)	76	91
Total 3/	522	18,032	19,145	504	17,587	18,346
Columbia Snake:						
China	243	9,241	11,660	273	10,682	14,654
Colombia	4	123	125	11	385	385
France	--	--	--	(4/)	1	2
Netherlands	(4/)	1	1	--	--	--
Total 3/	248	9,366	11,786	285	11,068	15,040
Detroit:						
Canada	1,171	45,712	47,525	1,518	60,156	65,627
Netherlands	(4/)	10	10	--	--	--
Taiwan	--	--	--	(4/)	3	3
Total 3/	1,171	45,721	47,535	1,518	60,159	65,629
Duluth: Canada	239	8,620	9,964	208	7,963	9,108
El Paso: Mexico	80	3,037	3,944	268	8,937	11,798
Great Falls:						
Canada	220	6,373	7,092	242	7,162	8,258
United Kingdom	(4/)	29	35	(4/)	15	19
Total 3/	220	6,402	7,127	242	7,178	8,277

See footnotes at end of table.

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

(Thousand metric tons and thousand dollars)

Customs district and country	1994			1995		
		Value			Value	
	Quantity	Customs 1/	C.i.f. 2/	Quantity	Customs 1/	C.i.f. 2/
Honolulu:						
Australia	103	3,675	5,414	114	4,534	6,177
France	--	--	--	(4/)	12	17
New Zealand	27	837	1,253	22	680	1,043
Venezuela	26	814	1,404	--	--	--
Total	157	5,326	8,071	137	5,227	7,237
Houston-Galveston:						
Colombia	7	324	438	24	884	1,380
Denmark	6	308	309	--	--	--
France	68	2,868	3,219	--	--	--
Japan	(4/)	70	82	(4/)	65	77
Spain	529	21,811	23,203	574	19,985	25,750
Switzerland	33	1,404	1,734	--	--	--
United Kingdom	(4/)	23	31	(4/)	50	63
Total	644	26,807	29,016	598	20,984	27,270
Laredo:						
China	--	--	--	(4/)	3	4
Mexico	48	3,978	4,560	51	4,755	5,211
Total	49	3,978	4,560	52	4,758	5,215
Los Angeles:						
Croatia	--	--	--	1	165	251
France	(4/)	22	26	--	--	--
Japan	(4/)	50	57	(4/)	70	79
Mexico	355	13,393	15,811	225	8,229	10,049
New Zealand	--	--	--	(4/)	265	332
Spain	24	828	1,103	--	--	--
United Kingdom	--	--	--	(4/)	5	8
Total 3/	380	14,293	16,996	227	8,734	10,719
Miami:						
Belgium	3	251	340	3	251	340
Brazil	--	--	--	(4/)	5	5
Colombia	306	11,523	14,636	224	9,221	11,509
Denmark	31	1,886	2,841	22	1,119	1,949
Germany	--	--	--	(4/)	9	12
Greece	35	1,275	1,647	--	--	--
Norway	64	2,275	2,892	--	--	--
Spain	288	13,331	15,364	350	15,732	19,364
Sweden	158	4,425	6,469	337	10,044	14,118
United Kingdom	(4/)	3	3	--	--	--
Venezuela	47	1,755	2,336	63	2,170	3,040
Total 3/	932	36,724	46,527	999	38,550	50,337
Milwaukee:						
Canada	179	6,056	6,226	188	6,361	6,561
Germany	(4/)	1	2	--	--	--
Total 3/	179	6,057	6,228	188	6,361	6,561
Minneapolis: Germany	(4/)	25	26	(4/)	11	13
Mobile:						
Bulgaria	56	1,407	2,201	162	4,315	6,811
France	54	1,491	1,843	63	1,936	2,064
Greece	--	--	--	69	2,086	2,947
Macao	24	619	850	--	--	--
Morocco	20	543	778	--	--	--
Tunisia	--	--	--	25	695	1,055
Venezuela	--	--	--	82	2,705	3,601
Total 3/	155	4,060	5,673	401	11,737	16,478
New Orleans:						
Bulgaria	24	599	917	35	874	1,338
Canada	--	--	--	145	4,293	5,745
Colombia	43	1,610	2,197	169	6,414	8,528
Croatia	--	--	--	5	605	885
Denmark	103	3,618	5,438	--	--	--

See footnotes at end of table.

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

(Thousand metric tons and thousand dollars)

Customs district and country	1994			1995		
		Value			Value	
	Quantity	Customs 1/	C.i.f. 2/	Quantity	Customs 1/	C.i.f. 2/
New Orleans:--continued						
France	230	9,741	12,755	400	15,359	20,497
Greece	363	12,486	17,357	359	12,560	17,385
Italy	179	6,165	8,612	362	14,440	20,044
Netherlands	--	--	--	(4/)	6	8
Norway	--	--	--	103	3,548	5,180
Spain	99	3,613	4,726	37	1,360	1,771
Sweden	--	--	--	39	1,302	1,887
Tunisia	26	741	1,115	52	1,462	2,111
Turkey	474	14,162	20,311	213	6,530	9,702
Ukraine	34	900	1,247	--	--	--
Venezuela	34	1,351	1,826	6	278	369
Total 3/	1,612	54,988	76,500	1,928	69,033	95,448
New York:						
France	--	--	--	(4/)	5	6
Greece	300	11,102	15,300	182	6,652	8,952
Netherlands	(4/)	107	114	(4/)	79	83
Norway	78	2,522	3,496	245	9,348	12,684
Spain	208	8,157	10,614	218	8,246	10,472
United Kingdom	(4/)	10	11	(4/)	50	61
Total 3/	586	21,899	29,535	645	24,379	32,258
Nogales: Mexico	156	5,110	6,724	303	9,733	12,117
Norfolk:						
Croatia	--	--	--	(4/)	4	9
Denmark	117	5,865	7,198	236	9,366	12,245
France	84	11,740	12,998	45	7,294	8,282
Greece	183	6,140	8,325	492	17,908	25,466
Netherlands	(4/)	16	17	(4/)	144	161
Spain	(4/)	180	199	--	--	--
United Kingdom	--	--	--	(4/)	8	11
Venezuela	33	1,260	1,701	--	--	--
Total 3/	418	25,200	30,438	773	34,725	46,175
Ogdensburg:						
Canada	408	13,246	14,688	353	12,446	13,752
United Kingdom	--	--	--	(4/)	12	12
Total	408	13,246	14,688	354	12,458	13,764
Pembina: Canada	120	5,104	5,983	167	7,024	8,104
Philadelphia:						
Germany	(4/)	6	15	(4/)	76	89
Japan	--	--	--	(4/)	54	65
New Zealand	--	--	--	(4/)	66	85
Total	(4/)	6	15	(4/)	196	239
Portland:						
Bulgaria	28	733	1,028	--	--	--
Canada	10	469	622	8	410	526
Total	38	1,201	1,649	8	410	526
Providence: Spain	--	--	--	35	1,247	1,464
San Diego:						
Mexico	1	56	58	3	281	312
Spain	28	1,261	1,545	--	--	--
Total 3/	29	1,317	1,603	3	281	312
San Francisco:						
China	(4/)	2	2	--	--	--
France	(4/)	32	37	(4/)	30	34
Japan	--	--	--	(4/)	36	44
New Zealand	1	738	977	1	1,138	1,417
United Kingdom	--	--	--	(4/)	15	16
Total 3/	1	771	1,016	1	1,220	1,512
San Juan:						
Belgium	10	838	1,418	12	931	1,582
Canada	--	--	--	26	937	1,578

See footnotes at end of table.

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

(Thousand metric tons and thousand dollars)

Customs district and country	1994			1995		
		Value			Value	
	Quantity	Customs 1/	C.i.f. 2/	Quantity	Customs 1/	C.i.f. 2/
San Juan:--continued						
Colombia	(4/)	22	29	42	1,720	1,872
Denmark	13	1,157	1,853	9	754	1,260
Germany	(4/)	5	5	--	--	--
Mexico	--	--	--	(4/)	3	4
Netherlands	--	--	--	(4/)	28	49
Spain	(4/)	7	8	(4/)	8	11
Turkey	(4/)	4	7	--	--	--
Venezuela	--	--	--	(4/)	2	2
Total 3/	23	2,033	3,319	90	4,383	6,358
Savannah:						
Bahamas, The	--	--	--	6	244	247
Bulgaria	--	--	--	24	643	1,049
Denmark	--	--	--	3	162	298
Greece	--	--	--	30	1,056	1,525
United Kingdom	--	--	--	30	749	1,246
Venezuela	--	--	--	91	3,274	3,691
Total 3/	--	--	--	184	6,127	8,057
Seattle:						
Canada	663	31,141	33,400	762	36,158	38,719
China	17	646	896	(4/)	9	11
Colombia	100	3,349	3,963	149	5,457	5,540
Japan	--	--	--	(4/)	46	54
Total 3/	780	35,136	38,259	911	41,671	44,323
St. Albans:						
Canada	78	2,699	3,543	110	4,780	6,065
Netherlands	(4/)	102	116	(4/)	117	136
Total 3/	79	2,801	3,660	110	4,897	6,201
Tampa:						
Canada	44	481	877	--	--	--
Colombia	241	7,531	9,427	184	6,911	8,812
Denmark	79	4,510	6,931	58	3,712	5,894
France	37	1,195	1,661	(4/)	3	3
Spain	113	3,779	4,915	244	8,275	11,591
Sweden	79	2,721	3,705	152	5,147	7,154
Turkey	38	1,248	1,616	--	--	--
Venezuela	450	17,578	22,406	883	34,960	43,529
Total 3/	1,081	39,043	51,538	1,522	59,008	76,983
U.S. Virgin Islands:						
Colombia	8	348	536	--	--	--
Martinique	4	28	30	--	--	--
Netherlands Antilles	--	--	--	2	64	67
Panama	--	--	--	4	73	98
Trinidad and Tobago	8	284	337	--	--	--
Venezuela	49	3,683	4,130	32	1,628	1,847
Total 3/	70	4,343	5,034	38	1,765	2,012
Washington: Netherlands	(4/)	3	4	--	--	--
Wilmington:						
Canada	25	893	1,321	--	--	--
Netherlands	--	--	--	(4/)	7	13
Venezuela	139	5,344	7,183	139	5,719	7,675
Total 3/	164	6,237	8,503	139	5,726	7,688
Grand total 3/	11,303	443,038	537,731	13,848	541,064	669,525

1/ Customs value: 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.

2/ C.i.f. (Cost, insurance and freight): import value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry. It is computed by adding "freight" to the "customs value."

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

4/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 20
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER 1/

(Thousand metric tons and thousand dollars)

	Gray hydraulic cement		White portland cement		Hydraulic cement clinker		Total 2/	
Year	Quantity	Value (customs)	Quantity	Value (customs)	Quantity	Value (customs)	Quantity	Value (customs)
1994	8,635	329,012	459	34,243	2,208	79,783	11,303	443,038
1995	10,554	407,537	436	34,854	2,858	98,674	13,848	541,064

1/ Includes Puerto Rico.
2/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 21
HYDRAULIC CEMENT: WORLD PRODUCTION BY COUNTRY 1/

(Thousand metric tons)

Country	1991	1992	1993	1994	1995 e/
Afghanistan e/	112	115	115	115	115
Albania e/	600	200	200	200	200
Algeria	6,319	6,400	6,400 e/	6,060 r/	6,200
Angola e/	260	300	250	300	300
Argentina	3,399	5,051	5,647	6,306 r/	6,400
Armenia 2/	XX	400 r/	200	100 r/	200
Australia	6,108	5,412	5,500 e/	6,000 e/	6,000
Austria	5,016	5,031	4,941	5,000 e/	5,000
Azerbaijan 2/	XX	800 r/	600 r/	500 r/	200
Bahrain	150	220	225	225 e/	225
Bangladesh 3/	275	273	275	280 e/	280
Barbados	200 e/	175 e/	62 r/	78 r/	80
Belarus 2/	XX	2,300 r/	1,900 r/	1,488 r/	1,235 4/
Belgium	7,184	8,073	7,612 r/	8,000 e/	8,000
Benin e/	320	370	380	380	380
Bhutan	116	116	108	120 e/	140
Bolivia	592	600	654 r/	708 r/	700
Bosnia and Herzegovina e/ 5/	XX	150	150	150	150
Brazil	27,490	23,903 r/	24,843 r/	25,229 r/	25,500
Bulgaria	2,374	2,132 r/	2,007 r/	2,200 r/	2,100
Burma	443 r/	464 r/	400 r/	470 r/	517 4/
Cameroon	521 r/	519 r/	520 r/ e/	520 r/ e/	520
Canada	9,396	5,698	6,672	10,584 r/	10,722 4/
Chile	2,251	2,645	3,021 r/	2,995 r/	3,000
China	252,610	308,220	367,880	421,180 r/	445,610 4/
Colombia	6,302	6,807	7,930 r/	9,322 r/	9,624 4/
Congo	103	115	114 e/	114 e/	100
Costa Rica	700 e/	700 e/	860 r/	940 r/	990
Côte d'Ivoire e/	500	510	500	500	500
Croatia 5/	XX	1,768	1,683	1,700 e/	1,700
Cuba	2,000 e/	2,000 e/	1,049 r/	1,081 r/	1,200
Cyprus	1,134	1,131	1,089	1,053 r/	1,021 4/
Czech Republic 6/	XX	XX	5,393	5,303	4,825 4/
Czechoslovakia 7/	8,299	8,500	XX	XX	XX
Denmark (sales)	2,016	2,072	2,270	2,430 r/	2,000
Dominican Republic	1,235 r/	1,365 r/	1,271 r/	1,276 r/	1,453 4/
Ecuador	2,300 e/	2,250 e/	2,098 r/	2,164 r/	2,300
Egypt	16,427	17,000	16,000	16,000 e/	16,000
El Salvador	680	419	861	850	875
Eritrea e/	XX	XX	30	300 r/	350
Estonia e/ 2/	XX	600	500	402 r/ 4/	417 4/
Ethiopia	290	300	270 e/	260	611 4/
Fiji	79	84	80	94	78 4/
Finland	1,324	1,129	835	864 r/	900
France	26,507	21,165	20,464 r/	21,296 r/	21,000
Gabon	117	116	132	126 e/	130
Georgia 2/	XX	500 r/	300 r/	100 r/	100
Germany	34,396	37,529	36,649	40,380	40,000

See footnotes at end of table.

TABLE 21--Continued
HYDRAULIC CEMENT: WORLD PRODUCTION BY COUNTRY 1/

(Thousand metric tons)

Country	1991	1992	1993	1994	1995 e/
Ghana	750	1,024	1,203	1,346	1,400
Greece	11,808	10,668	12,618	12,636	12,000
Guadeloupe e/	240	235	230	230	230
Guatemala	1,440	1,400 e/	1,119 r/	1,480	1,560
Haiti e/	250	200	100	75	50
Honduras	693	650 e/	723 r/	615 r/	655
Hong Kong	1,677	1,643	1,712	1,927	1,913 4/
Hungary	2,529	2,236	2,533	2,813	3,000
Iceland	106	100	86	81 r/	82
India e/	51,000	50,000	53,812 4/	60,000 r/	70,000
Indonesia	16,153	17,280	18,934	19,000 e/	19,500
Iran e/	15,000	15,200 r/	16,000 r/	16,000 r/	16,300
Iraq e/	5,000	10,000	12,000	15,000 r/	18,000
Ireland e/	1,600	1,600	1,600	1,550	1,500
Israel e/	3,550	3,500	3,500	3,500	3,500
Italy	40,806	41,347	34,771 r/	33,192 r/	35,000
Jamaica	384 r/	475 r/	451	445 r/	523 4/
Japan	89,564	88,253	88,046	91,624 r/	90,474 4/
Jordan	1,363 r/	3,134 r/	3,514 r/	4,000 r/ e/	4,000
Kazakstan 2/	XX	6,400 r/	4,000 r/	2,000 r/	1,800
Kenya	1,423	1,508	1,417 r/	1,420 r/ e/	1,500
Korea, North e/	16,000	17,000	17,000	17,000	17,000
Korea, Republic of	34,999	44,444	47,313	50,730 r/	55,130 4/
Kuwait	98 r/	533 r/	500 e/	1,000 r/ e/	2,000
Kyrgyzstan 2/	XX	1,100 r/	700 r/	400 r/	300
Latvia e/ 2/	XX	400	300	244 r/ 4/	204 4/
Lebanon e/	900	1,500 r/	2,500 r/	2,800 r/	3,000
Liberia	2	8	8 e/	-- e/	--
Libya	2,369	2,300	2,300 e/	2,300 e/	2,300
Lithuania e/ 2/	XX	1,500 r/	1,000 r/	736 r/ 4/	649 4/
Luxembourg e/	688 4/	600	600	620	600
Macedonia 5/	XX	516 r/	499 r/	486 r/	500
Madagascar e/	60	60	60	60	60
Malawi	120	112	127	122 r/	139
Malaysia	7,451	8,366	8,797	9,928 r/	10,667 4/
Mali e/	20	20	20	20	20
Martinique e/	245	240	220	225	225
Mauritania	105	122	111	374	375
Mexico	25,100	26,880	27,120	29,700	23,971 4/
Moldova 2/	XX	700 r/	100 r/	39 r/	49 4/
Mongolia	227	133	82	86	109 4/
Morocco e/	5,770	6,340 4/	6,350 r/	6,500 r/	6,500
Mozambique e/	80	30	20	20	20
Nepal	136	196	190	190 e/	220
Netherlands e/	3,546 4/	3,300	3,400	3,400	3,400
New Caledonia	90	90	90 e/	90 e/	100
New Zealand	576	579	600 e/	700 r/ e/	700
Nicaragua	239 r/	277 r/	255 r/	309 r/	350
Niger	20	29	29 e/	30 e/	30
Nigeria e/	3,500	3,500	3,500	2,600 r/ 4/	2,600
Norway	1,147	1,266	1,344	1,444	1,400
Oman	995	970	1,000	1,200 r/	1,400
Pakistan	7,762	7,793	8,321	8,100 r/	8,586 4/
Panama	300 e/	250 e/	571 r/	615 r/	350
Paraguay	326 e/	326 e/	490 r/	570 r/	570
Peru e/	2,200	2,089 4/	2,089	2,100	2,100
Philippines	6,913	6,667 r/	7,962	9,600	9,800
Poland	12,012	11,908	12,228	13,834 r/	13,884 4/
Portugal e/	7,473	7,638	7,600	7,500	7,500
Qatar	527	544	544 e/	550 r/ e/	580
Romania	6,692	6,271	6,240	5,998 r/	6,000
Russia 2/	XX	61,700 r/	49,900 r/	37,200 r/	36,400
Rwanda e/	60	60	60	10	5
Saudi Arabia	11,371	15,324 r/	15,300 e/	16,000 e/	16,000

See footnotes at end of table.

TABLE 21--Continued
HYDRAULIC CEMENT: WORLD PRODUCTION BY COUNTRY 1/

(Thousand metric tons)

Country	1991	1992	1993	1994	1995 e/
Senegal	503	601	590	590 r/ e/	590
Serbia and Montenegro 5/	XX	2,036	1,088	1,612	1,696 4/
Singapore e/	2,000	1,900	1,900	1,900	1,900
Slovakia e/ 6/	XX	XX	2,500	2,500	2,500
Slovenia e/ 5/	XX	950	950	1,000	1,000
Somalia e/	10	25	25	25	25
South Africa	7,427	7,028	7,356	7,905	9,071 4/
Spain (including Canary Islands)	25,119 r/	24,615 r/	22,878 r/	25,150 r/	25,000
Sri Lanka	400 e/	817	676	925	900
Sudan e/	170	250	250	250	250
Suriname e/	50	50	50	50	50
Sweden	2,395	2,289	2,200 e/	2,100 e/	2,100
Switzerland	4,700	4,260	4,000 e/	4,000 e/	4,000
Syria	3,500	3,700	4,500 r/	5,000 r/ e/	6,000
Taiwan	19,399	21,644	23,971	22,722	22,478 4/
Tajikistan 2/	XX	400 r/	300 r/	200	100
Tanzania e/	540	540	540	490 r/	800
Thailand	18,054	21,832	26,870	28,000 e/	26,500
Togo	388	350	350 e/	350 e/	350
Trinidad and Tobago	485	482	527	583	600
Tunisia	4,009 r/	3,999 r/	4,269 r/	4,300 r/ e/	4,300
Turkmenistan 2/	XX	1,100 r/	1,100 r/	700 r/	400
Turkey	26,091	28,607	31,241 r/	29,493 r/	33,153 4/
Uganda e/	50	50	50 r/	125 r/	130
Ukraine 2/	XX	20,100 r/	15,000 r/	11,400 r/	11,000
U.S.S.R. 8/	127,000 e/	XX	XX	XX	XX
United Arab Emirates	3,473	3,800	4,000 r/ e/	5,000 r/ e/	6,000
United Kingdom	12,297 r/	11,006	11,039 r/	12,493 r/	12,500
United States (including Puerto Rico)	68,465 r/	70,883 r/	75,117	79,353 r/	78,320 4/
Uruguay e/	500	500	500	700 r/	600
Uzbekistan 2/	XX	5,900 r/	5,300 r/	4,800 r/	3,500
Venezuela	6,337	6,585	6,842	6,900 e/	6,900
Vietnam e/	3,000	5,000	6,500	7,200	7,500
Yemen	850	800	800 e/	800 e/	1,000
Yugoslavia 9/	7,500 e/	XX	XX	XX	XX
Zaire	250 e/	174	149	150 e/	100
Zambia	367	347 e/	350 e/	280 r/	300
Zimbabwe e/	865 4/	900	1,000	900	1,000
Total e/ 10/	1,181,793 r/	1,239,683 r/	1,301,527 r/	1,380,052 r/	1,421,342

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

1/ Table includes data available through Sept. 1996.

2/ Formerly part of the U.S.S.R.; data were not reported separately until 1992.

3/ Data are for the year ending June 30 of that stated.

4/ Reported figure.

5/ Formerly part of Yugoslavia; data were not reported separately until 1992.

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

7/ Dissolved Dec. 31, 1992.

8/ Dissolved in Dec. 1991.

9/ Dissolved in Apr. 1992.

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