

STONE, CRUSHED

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Crushed stone, one of the most accessible natural resources, is a major basic raw material used by construction, agriculture, and other industries that use complex chemical and metallurgical processes. Despite the low value of its basic products, the crushed stone industry is a major contributor to and an indicator of the economic well-being of the Nation.

A total of 1.56 billion metric tons (Gt) of crushed stone was produced for consumption in the United States in 2000, a 30-million-metric-ton (Mt) or 2.0% increase compared with the total production of 1999. This tonnage represents the highest production level ever recorded in the United States, indicating a continued increase in the demand for construction aggregates (table 1).

About 70% of crushed stone production continued to be limestone and dolomite, followed, in descending order of tonnage, by granite, traprock, sandstone and quartzite, miscellaneous stone, marble, slate, calcareous marl, shell, and volcanic cinder and scoria (table 2).

Foreign trade of crushed stone continued to remain small. Exports decreased by 2.4% to 4 Mt, and their value decreased by 3.6% to \$29.7 million compared with that of 1999 (table 25).

Imports of crushed stone, including calcium carbonate, increased by 5.7% to 13 Mt, but the value decreased by 0.5% to \$105 million (table 26). Domestic apparent consumption of crushed stone, which is defined as production for consumption (sold or used) plus imports minus exports, was 1.57 Gt (tables 1, 25, 26).

Legislation and Government Programs

The Aviation Investment and Reform Act for the 21st

Century (Public Law 106-181) was signed by the President on April 5, 2000. The law is a 3-year reauthorization of Federal Aviation Administration (FAA) programs and releases an estimated \$1.9 billion in fiscal year 2000 for the Airport Improvement Program (AIP). In the following 3 years, the AIP funding will increase as follows: to \$3.2 billion in fiscal year 2001, \$3.3 billion in fiscal year 2002, and \$3.4 billion in fiscal year 2003. In addition to the AIP, funds are also included for air traffic control improvements, airport security, noise abatement programs, and environmental streamlining programs. The law restructures and reauthorizes programs of the FAA and ensures that the taxes travelers pay on airline tickets are used to maintain the aviation system as originally intended.

On September 13, 2000, the Mine Safety and Health Administration (MSHA) regulation named "Health Standards for Occupational Noise Exposure—30 CFR Parts 56, 57, 62, 70, and 71" became effective. This final comprehensive rule replaced MSHA's previous standards for occupational noise exposure in coal mines and metal and nonmetal mines. The final rule established uniform requirements to protect the Nation's miners from occupational noise-induced hearing loss. The rule is derived in part from existing MSHA noise standards and from the Department of Labor's existing occupational noise exposure standard for general industry promulgated by the Occupational Safety and Health Administration. As a result of the ongoing review of its safety and health standards, the MSHA determined that its noise standards, which were more than 20 years old, did not adequately protect miners from occupational noise-induced hearing loss.

On October 2, 2000, the MSHA final rule titled "Training and Retraining of Miners Engaged in Shell Dredging or Employed

Crushed Stone in the 20th Century

At the beginning of the 20th century, the production of crushed stone in the United States was relatively small, and the uses of this resource were limited. At that time, records of stone production were kept on the basis of value, without recording the tonnages produced and without making a distinction between crushed and dimension stone. The value of all stone produced in the United States in 1900 was \$43.8 million. In 1916, the U.S. Geological Survey reported for the first time quantities as well as values of domestic crushed stone production—77 million metric tons worth \$50 million. In 1900, stone was used for construction purposes, mainly roads and buildings, for cement and lime manufacturing, for agricultural purposes as a soil treatment agent, and as flux stone in steel manufacturing. Stone production was reported in all 45 States. Leading States, in order of total value of production, were Pennsylvania, Vermont, Ohio, New York, and Maine. Vermont and Maine were among the top 5 States, probably because a significant amount of dimension stone, which was always more valuable than crushed stone, was being produced in those States.

In 2000, a total of 1.56 billion metric tons of crushed stone valued at \$8.4 billion was produced in the United States for consumption, the highest production level ever recorded, indicating a continued increase in the demand for construction aggregates. About 70% of the crushed stone produced was limestone and dolomite, followed, in descending order of tonnage, by granite, traprock, sandstone and quartzite, miscellaneous stone, marble, slate, calcareous marl, shell, and volcanic cinder and scoria. About 84% of the total crushed stone produced by 1,500 companies operating 3,800 active quarries in 49 States was used as construction aggregates, mostly for highway and road construction and maintenance; 13%, for chemical and metallurgical uses, including cement and lime manufacture; 2%, for agricultural uses; and 1%, for special uses and products. Leading States, in order of production, were Texas, Florida, Pennsylvania, Illinois, Georgia, Missouri, Ohio, North Carolina, Virginia, and Tennessee, together accounting for 51% of the total output. Foreign trade in crushed stone was very small throughout the century, compared to the total U.S. production.

at Sand, Gravel, Surface Stone, Surface Clay, Colloidal Phosphate, or Surface Limestone Mines—30 CFR Parts 46 and 48” became effective. This final rule amends MSHA’s existing health and safety training regulations by establishing new training requirements for shell dredging, sand, gravel, surface stone, surface clay, colloidal phosphate, and surface limestone mines. This final rule implements the training requirements of section 115 of the Federal Mine Safety and Health Act of 1997 and provides for effective miner training at the affected mines. At the same time, the final rule allows mine operators the flexibility to tailor their training programs to the specific needs of their miners and operations.

Production

Domestic production data for crushed stone are derived by the U.S. Geological Survey (USGS) from voluntary surveys of U.S. producers. Of the 4,432 crushed stone operations on the mailing list, 3,453 operations with 3,577 quarries owned by 1,367 companies were active. Of the 3,453 active operations, 2,705 operations with 2,791 quarries, representing 78.3% of the total number of active operations, reported to the USGS. Their total production represented 85.3% of the total U.S. crushed stone output. It should be noted that a total of 146 sales yards were active in 2000 in 24 States (table 24). Of the 2,705 reporting operations with 2,791 quarries, 921 operations with 863 quarries and 58 sales yards owned by 139 companies did not report a breakdown by end use. Their production represented 29.6% of the U.S. total and is included in table 13 under “Unspecified, reported” uses. The nonrespondents’ production was estimated by using employment data and/or adjusted production reports from prior years. The estimated production from 748 nonresponding operations with 786 quarries owned by 537 companies represented 14.7% of the U.S. total and is included in table 13 under “Unspecified, estimated” uses. Information regarding the number of active operations, active quarries, type of processing plants, and number of sales yards by State is provided in table 24.

A total of 77 underground mines that are included in the total number of active operations produced 48.2 Mt of crushed stone in 2000. Active underground mines were in 15 States. The five leading States, in descending order of tonnage, were Kentucky, Nebraska, Illinois, Iowa, and Indiana. Their production represented 21.7% of the total U.S. crushed stone produced underground.

A total of 933 quarries were either idle or presumed to have been idle in 2000 because no information was available to estimate their production. Since the 1999 survey, 64 operations were closed down. Most of the idle or closed operations were small, temporary quarries, some of them operated by State or local governments. Operations in U.S. territories are not included in the above count.

Of the total 1.56 Gt of crushed stone produced for consumption in the United States in 2000, 1.1 Gt, or 70.4%, was limestone and dolomite; 246 Mt, or 15.8%, was granite; and 114 Mt, or 7.3%, was traprock. The remaining 111 Mt, or 6.5%, was shared, in descending order of quantity, by sandstone and quartzite, miscellaneous stone, marble, calcareous marl, slate, shell, and volcanic cinder and scoria (table 2).

A comparison of the four geographic regions of the United States indicates that, in 2000, the South continued to lead the Nation in the production of crushed stone with 745 Mt, or 47.8% of the total; followed by the Midwest with 444 Mt, or 28.5%; and the Northeast with 207.7 Mt, or 13.3%. About 76%

of the total U.S. crushed stone output was produced in the South and the Midwest (table 3).

Of the nine geographic divisions, as shown in figure 1, the South Atlantic led the Nation in the production of crushed stone with 385 Mt, or 24.7% of the U.S. total. It was followed by the East North Central division with 281 Mt, or 18.0%; and the West South Central division with 191 Mt, or 12.2%.

Crushed stone was produced in every State except Delaware. The 10 leading producing States, in descending order of tonnage, were Texas, Pennsylvania, Florida, Georgia, Illinois, Missouri, Ohio, North Carolina, Virginia, and Tennessee. Their combined production represented 52.2% of the national total.

Leading U.S. producing companies, in descending order of tonnage, were Vulcan Materials Co.; Martin Marietta Aggregates; Hanson Building Materials America; Oldcastle, Inc./Materials Group; CSR America, Inc.; Lafarge Corp.; Rogers Group, Inc.; Florida Rock Industries, Inc.; CEMEX, Inc.; and Oglebay Norton Co.

A review of production by size of operation at the national level indicates that in 2000, 846.6 Mt, or 54.3% of total crushed stone, was produced by 477 operations reporting more than 1 million metric tons per year; 384.6 Mt, or 24.6%, was produced by 588 operations reporting between 500,000 and 999,999 metric tons per year (t/yr); and 325.7 Mt, or 20.9%, was produced by operations reporting less than 500,000 t/yr (table 7).

In 2000, consolidation in the aggregates industry continued but at a slower pace. Most of the acquisitions were made by the major producers of aggregates, most of which were publicly owned. These companies tried to expand their base of operations in new areas of the country or acquired operations or companies with significant amounts of reserves. Stricter environmental and permitting regulations make it more difficult to start a new operation than to acquire an existing one. Some of the acquired companies continue to operate as semi-independent organizations but with the benefit of financial and managerial support provided by the larger new owner.

Effective January 1, 2000, Seattle-based Lone Star Northwest changed its name to Glacier Northwest because the company is no longer part of Lone Star Industries, Inc., and did not own the rights to use the Lone Star name (Rock Products, 2000a).

In January, Vulcan Materials Co. of Birmingham, AL, announced the purchase of Garves W. Yates & Sons Co. located in Abilene, TX. The purchase included six quarry sites and four portable aggregates plants. Kiewit Materials Co. of Omaha, NE, acquired Solano Concrete Co., Inc. The company operates a quarry and an aggregates producing plant located in northern California (Rock Products, 2000j).

Also in January, Aggregates Industries, Inc., announced that all its U.S. divisions will now be operating under the Aggregates Industries name. The name change symbolizes the evolution of Aggregates Industries into a unified U.S. company. The divisions affected by the name change include: U.S. Bardon Trimount of Saugus, MA; Bardon Mid-Atlantic of Greenbelt, MD; CAMAS Colorado of Denver, CO; CAMAS Minnesota of Minneapolis, MN; CAMAS Minndak of Fargo, ND; and Bill Smith Sand and Gravel Co. of Otsego, MI. The name change will also be applied to all Aggregates Industries operating businesses in the United Kingdom (Rock Products, 2000b).

In February, Oldcastle Materials Group of Washington, DC, announced the acquisition of The Shelly Co. of Thornville, OH, which operates 3 quarries and 10 sand and gravel pits and supplies markets in southern Ohio and in West Virginia.

Shelly's aggregates reserves are estimated to be more than 200 Mt (Rock Products, 2000c). Martin Marietta Materials, Inc., of Raleigh, NC, announced the acquisition of the Perry Stone Co., which operates a limestone quarry north of Columbus, OH, and another limestone quarry at Philippi, WV (Rock Products, 2000h). Aggregates Industries, Inc., of Bethesda, MD, acquired Holst Excavating Co., which operates five limestone quarries and two sand and gravel pits southeast of Minneapolis/St. Paul, MN. Permitted reserves of Holst Excavating Co. are estimated to be more than 200 Mt (Rock Products, 2000a).

On February 14, Graniterock Co. of Watsonville, CA, celebrated its 100th year in business as a family-owned crushed stone producer. In 1993, Graniterock received the Baldrige Award that was created by the U.S. Congress to raise awareness about quality management practices. For the 3 consecutive years between 1997 and 1999, Graniterock Co. was named by Fortune Magazine one of the 100 best companies to work for (Rock Products 2000e).

In June, CSR America of West Palm Beach, FL, announced the acquisition of American Limestone Co. and of Florida Crushed Stone Co. These two acquisitions increased CSR America's production capacity by about 50%, as well as its aggregates reserves (Rock Products, 2000d).

In July, Martin Marietta Materials, Inc., announced that it acquired from A.B. Long Quarries a limestone quarry located near Knoxville, TN, and also signed a long-term contract to process aggregates and assume all responsibility for an operation at Chemical Lime Co.'s New Braunfels, TX, facility. The company also announced that it purchased the Texarkana Asphalt operation, which has a rail-served aggregates distribution yard in Texarkana, TX, and a rail-distribution yard near Wilmington, NC (Rock Products, 2000i). Lafarge Corp. of Herndon, VA, announced the purchase from Presque Isle Corp. of a limestone quarry located in Presque Isle, MI, about 20 miles (about 34 kilometers) north of Alpena on the shore of Lake Huron, where Lafarge already operates a large quarry and a cement manufacturing plant (Rock Products, 2000f).

In August, Titan Cement S.A. agreed to purchase Tarmac America, Inc., and subsequently sold all Tarmac America's non-Florida aggregates operations to Vulcan Materials. These operations included four quarries in South Carolina, the Hanover Quarry in Pennsylvania, three quarries and three sand and gravel pits in Virginia, and distribution and marine operations in Maryland and Virginia (Rock Products, 2000k).

U.S. Aggregates announced that it expanded the distribution of aggregates products with a startup of a major sales yard in Memphis, TN, three new yards in Mississippi, and two new yards in the Florida panhandle (Rock Products, 2000l).

In September, Martin Marietta Materials, Inc., announced that under the terms of the October 1998 investment agreement between the two companies, it would buy the remaining part of Meridian Aggregates Co. that it did not already own (Pit & Quarry, 2000b).

In October, CEMEX S.A. de C.V. and Southdown announced that the two companies entered into a definitive merger agreement under which CEMEX would acquire all of the outstanding stock of Southdown. Later that month, it was announced that the merger was completed successfully (Pit & Quarry, 2000a). Global Stone Corp. of Roswell, GA, a wholly owned subsidiary of Oglebay Norton Co., has acquired the assets of the J.M. Huber Corp. limestone processing facility located near Portage, IN. The facility will be known as Global Stone Portage LLC and will use high-quality limestone from their Michigan limestone quarries (Pit & Quarry, 2000c).

After receiving approval votes from most of their member companies, effective September 30, 2000, the National Aggregates Association and the National Stone Association merged to form the National Stone, Sand & Gravel Association. The new association will be the sole organization representing the crushed stone and sand and gravel producing companies at the national level.

Limestone.—The 2000 output of crushed limestone, including some dolomite, increased by 2.6% to 998 Mt valued at \$5.0 billion compared with the revised 1999 totals (table 2).

Limestone was produced by 767 companies at 1,965 operations with 1,955 quarries in 47 States. In addition, 38 companies with 50 operations and 52 quarries reported producing limestone and dolomite from the same quarries. Their production of 35.4 Mt is included with the limestone listed in table 2. The limestone totals listed in this chapter, therefore, include an undetermined amount of dolomite in addition to the dolomite reported separately.

The leading producing States, in descending order of tonnage, were Texas, Florida, Missouri, Ohio, and Pennsylvania; these five States accounted for 40% of the total U.S. output (table 8). The leading producers of limestone, in descending order of tonnage, were Martin Marietta Aggregates, Inc.; Vulcan Materials Co.; Hanson Building Materials America; Lafarge Corp.; and CSR America.

Dolomite.—Production of dolomite decreased by 1.9% to 101 Mt valued at \$533 million compared with the revised 1999 totals (table 2). Crushed dolomite was reportedly produced by 96 companies at 174 operations with 191 quarries in 29 States. An additional undetermined amount of dolomite is included in the total crushed limestone, as explained above.

The leading producing States, in descending order of tonnage, were Illinois, Pennsylvania, Indiana, Ohio, and New York; these five States accounted for 57.1% of the total U.S. output (table 8). The leading producers, in descending order of tonnage, were Oldcastle, Inc./Materials Group; General Dynamics Group; S.E. Johnson Companies, Inc.; Vulcan Materials Co.; and Hanson Building Materials America.

Marble.—Production of crushed marble increased by 6.8% to 11 Mt valued at \$64.8 million, compared with the revised figure for 1999 (table 2). Crushed marble was produced by 14 companies with 23 operations and 28 quarries in 11 States (table 9). The leading producers of crushed marble, in descending order of tonnage, were Imerys Marble, Inc.; Florida Rock Industries, Inc.; Pluess Stauffer, Inc.; Georgia Marble Stone Corp.; and Vulcan Materials Co.

Calcareous Marl.—Output of marl increased by 3.9% to 3.7 Mt valued at \$16.6 million, compared with the 1999 totals (table 2). Marl was produced by seven companies with seven operations and seven quarries in five States (table 9). The leading producers, in descending order of tonnage, were Holderbank/Holman, Inc.; Capitol Aggregates LTD; and Giant Group Ltd.

Shell.—Shell is derived mainly from fossil reefs or oyster shell banks. The output of crushed shell decreased by 1.7% to 1.8 Mt valued at \$8.6 million compared with the revised 1999 totals (table 2). Crushed shell was produced by 11 companies with 11 operations in 7 States. The leading producers, in descending order of tonnage, were Caloosa Shell Corp.; Schroeder Manatee, Inc.; and F&W Mines, Inc.

Granite.—The output of crushed granite increased by only 0.8% to 246 Mt valued at \$1.6 billion, compared with the revised 1999 totals (table 2). Crushed granite was produced by 139 companies at 375 operations with 369 quarries and 6 sales

yards in 34 States.

The leading States, in descending order of tonnage, were Georgia, North Carolina, Virginia, South Carolina, and California; these five States accounted for 72.5% of the U.S. output (table 10). The leading producers, in descending order of tonnage, were Vulcan Materials Co., Martin Marietta Aggregates, Hanson Building Materials America, Meridian Aggregates Co., and Florida Rock Industries, Inc.

Traprock.—Production of crushed traprock increased by 1.8% to 114 Mt valued at \$724 million, compared with the revised 1999 total (table 2). Traprock was produced by 226 companies at 349 operations with 445 quarries in 24 States.

The leading producing States, in descending order of tonnage, were Oregon, New Jersey, Virginia, Washington, and California; these five States accounted for 61.1% of U.S. output (table 10). Leading producers, in descending order of tonnage, were Oldcastle, Inc./Materials Group; Vulcan Materials Co.; Luck Stone Corp.; Stavola, Inc.; and Eucon Co.

Sandstone and Quartzite.—The combined output of crushed sandstone and quartzite increased by 4.8% to 43.6 Mt, valued at \$255 million compared with the revised 1999 totals (table 2). Crushed sandstone was produced by 118 companies at 153 operations with 151 quarries in 24 States, and crushed quartzite was produced by 37 companies at 45 operations with 49 quarries in 17 States.

The leading producing States, in descending order of tonnage of sandstone and quartzite, were Pennsylvania, Arkansas, California, Oklahoma, and South Dakota; their combined production accounted for 56.6% of the U.S. output (table 10). The leading producers of sandstone, in descending order of tonnage, were Lafarge Corp.; Ashland Oil, Inc./APAC, Inc.; and Martin Marietta Aggregates. The leading producers of quartzite were Martin Marietta Aggregates; County Line Quarry, Inc.; and Salem Stone Corp.

Slate.—The output of crushed slate decreased by 18.3% to 2.8 Mt valued at \$19.1 million compared with the revised 1999 totals (table 2). Crushed slate was produced by 13 companies at 14 operations with 18 quarries in 10 States.

Most of the crushed slate was produced in North Carolina. The leading producers, in descending order of tonnage, were Martin Marietta Aggregates; McCartney Construction Co., Inc., and NAPA Development Corp., Inc.

Volcanic Cinder and Scoria.—Production of volcanic cinder and scoria decreased by 14.6% to 1.8 Mt valued at \$13.2 million compared with the 1999 totals (table 2). Volcanic cinder and scoria were produced by 22 companies from 38 operations with 39 quarries in 12 States.

The leading producing States, in descending order of tonnage, were California, Washington, and Texas (table 11). Leading producers, in descending order of tonnage, were Martin Marietta Aggregates; Peter Kiewit Sons', Inc.; and Bishop Red Rock, Inc.

Miscellaneous Stone.—Output of other kinds of crushed stone decreased by 0.6% to 32.5 Mt valued at \$191 million compared with the revised 1999 totals (table 2). Miscellaneous stone was produced by 124 companies at 250 operations with 265 quarries in 28 States.

The leading producing States, in descending order of tonnage, were Pennsylvania, California, and Texas; their combined production accounted for 41.1% of the total U.S. output. Leading producers, in descending order of tonnage, were the U.S. Department of Agriculture's Forest Service; the U.S. Department of the Interior's Bureau of Land Management; U.S. Silica Co.; Aggregates Industries, Inc.; and RMC Group.

Consumption

Crushed stone production reported to the USGS is actually material that was either sold or used by producers. Production that was stockpiled is not included in the reported quantities. The "sold or used" tonnage, therefore, represents the amount of production released for domestic consumption or export in a given year. Because some of the crushed stone producers did not report a breakdown by end use, their total production is included in "Unspecified, reported" use. The estimated production of nonrespondents is included in the "Unspecified, estimated" use.

In 2000, U.S. consumption of crushed stone was 1.56 Gt, a 2.0% increase compared with the revised consumption of 1999. This total is slightly different from the "apparent consumption" of crushed stone that is defined as "U.S. production plus imports minus exports." Of the 1.56 Gt of crushed stone consumed, 691 Mt, or 44.3% of the total, was "Unspecified, reported and estimated" uses. Of the remaining 869 Mt, reported by uses, about 82.3% was used as construction aggregates, mostly for highway and road construction and maintenance; 14.6%, for chemical and metallurgical uses, including cement and lime manufacture; 1.5%, for agricultural uses; and 0.7%, for special uses and products (table 13). To provide a more accurate estimation of the consumption patterns for crushed stone, the "Unspecified" uses are not included in the above percentages. In any use pattern study or marketing analysis, the quantities included in the "Unspecified" uses should be distributed among the reported uses by applying the above percentages to the total of the "Unspecified" uses.

Limestone.—Of the 998 Mt of crushed limestone consumed, 445 Mt, or 44.6%, was in "Unspecified, reported and estimated" uses. Of the remaining 553 Mt of crushed limestone, reported by uses, 75.8% was used as construction aggregates; 21.5%, for chemical and metallurgical applications including cement and lime manufacturing; 2%, for agricultural uses; and 0.8%, for special uses and products (table 14).

Dolomite.—Of the 101 Mt of crushed dolomite consumed, 45.1 Mt, or 44.7%, was in "Unspecified, reported and estimated" uses. Of the remaining 55.9 Mt of crushed dolomite, reported by uses, 91.2% was used as construction aggregates; 3.9%, for chemical and metallurgical applications; and 3.8%, for agricultural uses. An additional undefined amount of dolomite consumed in a variety of uses, mostly construction aggregates, is reported with the limestone (table 14).

Marble.—Of the 11 Mt of crushed marble consumed, 9.2 Mt, or 83.7%, was reported as "Unspecified, reported and estimated" uses. The remaining 1.8 Mt of crushed marble, reported by uses, was used as construction aggregates and for special and miscellaneous uses, including fillers and extenders (table 16).

Calcareous Marl.—Of the 3.7 Mt of crushed calcareous marl consumed, 3.6 Mt, or 97.3%, was used for cement manufacturing.

Shell.—Of the 1.8 Mt of crushed shell consumed, 199,000 metric tons (t), or 11%, was reported as "Unspecified, reported and estimated" uses. Most of the remaining 1.78 Mt was used as construction aggregates.

Granite.—Of the 246 Mt of crushed granite consumed, 99 Mt, or 40.2%, was reported as "Unspecified, reported and estimated" uses. Of the remaining 147 Mt, most was used as construction aggregates (table 17).

Traprock.—Of the 114 Mt of crushed traprock consumed, 55.1 Mt, or 48.3%, was reported as "Unspecified, reported and

estimated” uses. Of the remaining 58.9 Mt, most was used as construction aggregates (table 17).

Sandstone and Quartzite.—Of the 33 Mt of crushed sandstone consumed, 16 Mt, or 48.5%, was reported as “Unspecified, reported and estimated” uses. Of the remaining 17 Mt of crushed sandstone reported by uses, 15.4 Mt, or 90.6%, was used as construction aggregates (table 18).

Of the 10.6 Mt of crushed quartzite consumed, 3.7 Mt, or 34.9%, was reported as “Unspecified, reported and estimated” uses. Of the remaining 6.9 Mt of crushed quartzite, reported by uses, 5.7 Mt, or 83.3%, was used as construction aggregates (table 18).

Volcanic Cinder and Scoria.—Of the 1.8 Mt of volcanic cinder and scoria consumed, 677,000 t, or 38.5%, was reported as “Unspecified, reported and estimated” uses. Most of the remaining 1.1 Mt of crushed volcanic cinder and scoria was used as construction aggregates (table 19).

Miscellaneous Stone.—Of the 35.3 Mt of miscellaneous crushed stone consumed, 22.2 Mt, or 62.9%, was reported as “Unspecified, reported and estimated” uses. Of the remaining 13.1 Mt reported by uses, 12 Mt, or 91.9%, was used as construction aggregates.

Additional information regarding production and consumption of crushed stone by type of rock and major uses in each State and the State districts may be found in the USGS Minerals Yearbook, volume II, Area Reports: Domestic.

Recycling

As the recycling of most waste materials increases, aggregates producers are recycling more cement concrete and asphalt concrete materials recovered from construction projects to produce concrete aggregates and asphalt aggregates. The annual survey of crushed stone producers now collects information on recycling of cement and asphalt concretes produced by the crushed stone producers only. Information on recycling of these materials by construction or demolition companies is not collected by the USGS.

Asphalt Concrete.—A total of 1.3 Mt of asphalt concrete valued at \$7.3 million was recycled by 56 companies in 23 States. This volume represents a 12.4% decrease compared with that of 1999 (tables 20, 21). The leading recycling States, in descending order of tonnage, were California, Wisconsin, and Pennsylvania. The leading recycling companies, in descending order of tonnage produced, were Holmes Construction Co., Inc.; Raisch Products; and Stone Industries, Inc.

Cement Concrete.—A total of 2.3 Mt of cement concrete valued at \$13.9 million was recycled by 51 companies in 25 States. This tonnage represents a 34.1% increase compared with that of 1999 (tables 20-22). The leading recycling States, in descending order of tonnage, were Illinois, California, New Jersey, and Florida. The leading companies, in descending order of tonnage produced, were Vulcan Materials Co.; Stone Industries, Inc.; and Dolomite Products.

Prices

Prices in this chapter are average free on board (f.o.b.) plant, usually at the first point of sale or captive use, as reported by the companies. This value does not include transportation from the plant or yard to the consumer. It does, however, include all costs of mining, processing, inplant transportation, overhead costs, and profit.

The average unit price per ton of crushed stone increased

slightly by 0.6% to \$5.39 compared with that of 1999. The average unit prices, by kind of stone, increased between 0.7% for limestone and 18.8% for volcanic cinder and scoria and decreased by 0.4% for calcareous marl (table 2).

Transportation

For 722 Mt, or 46.3%, of the 1.56 Gt of crushed stone produced for consumption in 2000, no means of transportation was reported by the producers. Of the remaining 838 Mt of crushed stone, 639 Mt, or 76.3%, was reported as being transported by truck from the processing plant or quarry to the first point of sale or use; 56.7 Mt, or 6.8%, by rail; and 38.6 Mt, or 4.6%, by waterway. About 9% of the specified production was reported as not having been transported and, therefore, is assumed to have been used onsite. Information regarding means of transportation used by the producers to ship crushed stone in each geographic region is provided in table 23.

Foreign Trade

The widespread distribution of domestic deposits of stone suitable for mining as crushed stone and the high cost of transportation limits foreign trade to mostly local transactions across international boundaries. U.S. imports and exports are small, representing less than 1% of domestic consumption. Shipments of crushed stone by water from Canada and especially Mexico, however, continue to increase.

Exports.—Exports of crushed stone decreased by 2.4% to 4 Mt compared with those of 1999, and the value decreased by 3.6% to \$29.7 million. About 97% of the exported crushed stone was limestone for cement manufacturing. Canada was the major destination with 99.7% of the total crushed stone (table 25).

Imports.—Imports of crushed stone, including calcium carbonate fines, increased by 5.7% to 13 Mt compared with those of 1999, and the value decreased by 0.9% to \$105 million. About 88% of the imported crushed stone was limestone. Imports of natural calcium carbonate fines remained unchanged from the previous year at 1,000 t, while the value increased by 111% to \$698,000 (table 26).

Shipments of crushed stone from The Bahamas, Canada, and Mexico into the United States continued in 2000. The imported crushed stone was used mostly as construction aggregates or for cement manufacturing. This trend is expected to continue, and the volume of imports, especially from Mexico, is expected to increase.

Outlook

The demand for crushed stone in 2001 is expected to be about 1.6 Gt, a 2.5% increase compared with 2000. Gradual increases in demand for construction aggregates are anticipated after 2000 as well, based on the expected volume of work on the infrastructure that will be financed by the new Transportation Equity Act for the 21st Century, the Aviation Investment and Reform Act for the 21st Century, and the U.S. economy in general. The projected increases will be influenced by the construction activity in the public and private construction sectors, as well as by the new construction work related to security measures being implemented around the Nation. Crushed stone f.o.b. prices are not expected to increase significantly. The delivered prices of crushed stone, however, are expected to increase, especially in and near metropolitan

areas, mainly because more aggregates are transported from distant sources.

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