# Statistics on Waterborne Commerce Compiled by the Corps of Engineers, U. S. Army

W. A. C. CONNELLY
Chief, Statistical and Service Division, Board of Engineers for Rivers and Harbors

Information on the use of waterways and harbors by vessels, freight, and passengers has been collected and compiled by the Engineers for over 100 years. Compilation of data was begun on each waterway or harbor at the time navigation improvements were undertaken. Summarizations of the data on a national basis were started in 1920. Currently, vessel operators report all domestic freight and passenger vessel movements and tons of cargo and number of passengers carried between origins and destinations in the several traffics: coast, lake, internal, intraport, and local. Since 1920, ton-miles have been computed for all improved waterways and summarized for geographic areas and for the nation.

For 1961, ton-miles were also compiled on the basis of the regulatory status of the carriers under the terms of the Interstate Commerce Act: regulated and unregulated. Beginning with data for 1962, ton-miles will be compiled on the basis of the regulatory status of the carriage, i.e., regulated by the Interstate Commerce Commission; unregulated, for hire; and private.

•THE PURPOSE of this article is to describe and discuss statistical data on waterborne traffic collected, compiled, and published by the U. S. Army Corps of Engineers as a part of the Federal program for statistics on shipping.

Information on the use of the waterways by vessels, freight, and passengers is required by the Corps in connection with its responsibilities for the improvement, operation, and maintenance of the navigable waterways and harbors of the nation. The first River and Harbor Act of Congress assigning this type of work to the Corps was approved in 1824. Prior to 1920, each District Engineer in charge of the work collected whatever information he considered necessary to enable him to recommend improvements required by the developing waterborne traffic. Commodities were counted in customary units: tons, barrels, bushels, heads, and feet.

For calendar year 1920, the Chief of Engineers instituted a "new, uniform method" for collecting and compiling the data on the vessels, passengers, and freight using the improved waterways. The method encompassed domestic and foreign traffic and included standard forms for collection of the data, vessel and commodity nomenclature and classification, definitions for the types of traffic, and specified that quantities of freight be stated in tons of 2,000 pounds. It also provided for the compilation of ton-miles for each waterway. Collection and compilation of the data continued as a function of the District Engineers. This method remained in effect through calendar year 1946, after which the Federal program was put into operation.

In brief, the Federal Program for Statistics on Shipping was instituted in 1947 by the Office of Statistical Standards, Bureau of the Budget, under the terms of the Federal Reports Act of 1942. The purposes of the program are to reduce to the minimum

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the reporting burden on the public, to eliminate duplication of effort in the government, to standardize terms and methodology, to improve the timeliness of the data, and to be responsive to the needs of the increasing number and variety of users. The Bureau of the Budget assigned the work to the several agencies on the basis of prime responsibilities of the agencies. Data on domestic waterborne traffic were assigned to the U. S. Army, Corps of Engineers; on foreign trade to the Bureau of the Census, Department of Commerce; on deep-draft shipping, domestic and foreign, to the Maritime Administration, Department of Commerce; and on passengers in the foreign trades, to the Immigration and Naturalization Service, Department of Justice. Data on domestic carriage subject to economic regulation by the Interstate Commerce Commission are collected by the Commission.

Subject to the terms of the Federal Reports Act, the compiling agency furnishes data to other Federal government agencies. The Army Engineers regularly supply data on domestic coastwise and lakewise traffic to Maritime Administration, and, on specific requests, on regulated carriers to the Interstate Commerce Commission. The Corps obtains data on foreign traffic from the Bureau of the Census and on passengers to and from foreign ports from Immigration and Naturalization Service.

For collection of data on domestic traffic, the Corps of Engineers uses one basic form. The vessel operator reports volume and description of commodities carried, ports and docks of origin and destination, name and draft of the vessel, dates of departure and arrival, and type of service in which the freight was moved: regulated by the ICC; unregulated, for hire; or private. Codes for vessel operators identify those operators who hold either certificates or permits to engage in common or contract carriage. The operator makes one report to one designated District Engineer's office, regardless of the area of operation.

The data are transferred to punch cards, with one punch card carrying generally one line of the vessel report, representing a commodity moved between two ports during one trip, one month, one quarter, or one year, depending on the period mutually agreed upon by the collecting office of the Corps of Engineers and the operator. Date of arrival of the commodity determines the year for which the data are reported. Data prior to 1961 are on a calendar year basis; beginning with data for 1961, a cut-off date of 28 February 1962 was established for the processing of reports of terminations in 1961. Reports received after that date were carried into the following year. This cut-off date will continue to be used as a means for expediting availability of published data. Foreign traffic data are obtained from the Bureau of the Census, Department of Commerce.

Enumerations are based on two items of the operator's report: commodities and vessels. Commodities are enumerated in tons (2,000 lb) and in ton-miles (statute mile); vessels are counted in trips and net register tons.

Commodities are classified in accordance with the Commodity Classification for Shipping Statistics, approved by the Bureau of the Budget. For ports and harbors, tonnages of commodities are summarized by types of traffic, foreign and domestic. Foreign traffic is divided into imports and exports, each of which is further divided in the Great Lakes Area into traffic with Canadian Ports and with overseas ports. Domestic traffic is separated into receipts and shipments for the following types: coastwise, lakewise, internal, intraport, local, and intraterritory.

For waterways, tons of commodities are summarized by traffics for the foreign and coastwise trades by inbound and outbound movements. For the inland traffic movements, the commodity tons are arrayed to portray the movement and direction in detail for each waterway or stretch of waterway: upbound; inbound, upbound; outbound, upbound; and through, upbound; and the reverse of these. These terms reveal the character of the waterway's traffic, whether it is principally a receiving waterway, or shipping, or both, or a "through" waterway for the kinds and tons of commodities carried.

Numbers of vessel trips are tabulated in feet of draft—the stub, and by direction and by type of vessel—the headings. Totals for net register tons are given for each of the types of vessels using the harbor and waterway.

A commodity table and vessel trip-and-draft table are prepared for each harbor

and waterway which has been improved by the Federal Government. For the long waterways, tables are prepared for segments, which are determined by the Congressional authorizations or by the characteristics of the traffic.

Harbors and segments of harbors are treated in the same manner as waterways. Large harbors may have many channels, each of which is a separate project, and on which a separate report or table is prepared. The terms "port" and "harbor" as used here are not synonymous: the harbor is the water area of a port; the latter also contains all the landward area, wharves, sheds, warehouses, roadways, railways and yards, and cargo handling facilities. Thus a port such as New York contains many harbors; and a harbor such as San Francisco Bay contains several ports.

In accordance with practice of long standing, the Corps of Engineers compiles and publishes in the public interest data on port and area complexes when requested by the port authorities. Such requests are made, of course, by those authorities whose port areas are not coterminous with project harbor limits. District Engineers also disseminate information of area interest, such as data on a single waterway and on vessels passing locks. Other data compiled and published in the public interest are areas of origin and destination of principal commodities (by tonnage), water carrier ton-miles, and water carriage ton-miles.

The compiled data are published annually in a five-part series of seven volumes titled Waterborne Commerce of the United States.

From punched cards furnished by the Corps of Engineers, the Maritime Administration periodically publishes annual data on the areas of origin and destination of commodities moving in deep-draft shipping. Only tonnages of those commodities moving in self-propelled vessels of 1,000 gross tons and more are included. Tonnages of commodities are presented separately for dry cargo ships and for tankers. The title of this report is Domestic Oceanborne and Great Lakes Commerce of the United States.

The total annual waterborne tonnage of the United States has exceeded one billion tons for the past eight years. The 1962 total of 1,129 million tons is almost double the 1939 total of 569 million tons. However, it is believed that the waterways' share of the total tons carried by all modes declined during the same period from 26 percent to 21 percent. The highways' share in 1961 is almost four and one-half times that of 1939. The Bureau of Public Roads' planned program for collection of data on tons and ton-miles of carriage by highways will remove the present uncertainty regarding highways' contribution to the nation's transportation volume. It is certain that the contribution is large; the question is "how large?"

Considering the diversity of water transportation, it is difficult to think of it as a single mode. When hovercraft and hydrofoils begin to operate on the waterways, they will further increase the diversity. A small tugboat towing logs or a small fishboat bringing in her catch and a modern freighter in the foreign trades are apparently a world apart, but they are in competition. The freighter brings in frozen fish, logs, lumber, and articles made of wood. The ships in the coastwise (deep-sea domestic) trade compete with the barges on the intracoastal waterway. The ships in the Great Lakes overseas trades are competing for grain cargoes with the barges on the Mississippi River. Competition is not restricted to that among the various water traffics; it also exists within each type of traffic, as coastwise ships compete with coastwise ships, barges with barges.

The Corps of Engineers also collects data on the number, horsepower, and capacity of the vessels engaged in transportation in the three main areas of the country: the seacoasts, the Mississippi River System and the Gulf Intracoastal Waterway, and the Great Lakes. Although the data for some years back are comparable figure for figure, they are not comparing comparable vessels. The same is true for the vehicles of all modes: to say that there are so many trucks today as against so many trucks in 1939 is, in fact, misleading. The trend in trucks, rail cars, and vessels is toward more and more specialization. The vehicle is tailored to the freight, and has a capability over and above any gains in size and speed of movement. Vessels are increasing in size and horsepower; full forms, rudders, propellers, shipboard machinery and controls, and navigation equipment are also vastly increasing the capacities of the various trades.

The improved inland waterway mileage is about 23,000. This amount includes the connecting channels of the Great Lakes and the deep channels in major rivers flowing into the sea. It does not include the open waters of the Great Lakes, of bays and sounds, and, of course, the ocean tracks of the coastwise trades. Inland channels for deep-draft shipping range from about 27 ft to about 45 ft in depth. Those for shallow draft are mainly 9 to 12 ft deep.

Probably every transportable commodity moves by water, with the greatest variety in the foreign trade and also in the coastwise trade in truck vans and in rail cars moving by ship. However, about 90 percent of the waterborne tonnage consists of commodities moving in bulk and in very large lots. In 1961, tonnages of 10 commodity groups made up 88.3 percent of the total waterborne traffic:

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| Petroleum and products | 41.8% |
| Coal and coke | 15.4 |
| Iron ore and iron and steel | 10.8 |
| Sand, gravel, and stone | 8.3 |
| Grains | 4.2 |
| Logs and lumber | 3.1 |
| Chemicals | 2.8 |
| Seashells | 1.9 |
| Total | 88.3% |

The principal recent innovation in the Corps of Engineers' statistics on waterborne commerce is the compilation of ton-miles based on the vessel's itinerary. Since the legal conditions of carriage by water are comparable to those by road, and since the Bureau of Public Roads is launching a program for compilation of ton-miles by road, a description of the Engineers' ton-mile data may be of interest. Both modes have carriage (a) subject to economic regulation by the Interstate Commerce Commission, (b) for-hire carriage not regulated by the Commission, and (c) private carriage.

Ton-miles of freight carried on improved waterways of the United States have been compiled annually by the Corps of Engineers since about 1910. From that date until 1920, the compilations were made on an individual waterway basis for about half the waterways improved by the Corps at the direction of the Congress. Beginning with the data for 1920, ton-miles were compiled for virtually all the improved waterways for each year through 1924. The Introduction to the Annual Report of the Chief of Engineers, U. S. Army, Part 2 for 1925, has the statement: "A table has been incorporated in this report showing for the first time the total ton-miles of freight carried on the inland waterways of the United States." This total, however, included data for improved waterways only. Data for waterways used in their natural state have been added progressively in 1951, 1953, and 1954, and completed in 1959 with inclusion of Alaskan waters.

Further identification of ton-miles on a national basis was not made for the years prior to 1961. However, ton-miles by types of traffic--foreign, coastwise, lakewise, internal, intraport, and local--have been compiled for a number of years for the Great Lakes and the Mississippi River and these two systems. As mentioned above, the only basis for collection and compilation of ton-miles for the years through 1960 was the waterway, or right-of-way. The compilation of the ton-mile data on the basis of the vessel was begun in 1961 in response to a request of the Office of Statistical Standards, Bureau of the Budget. Since this larger total includes carriage on the open sea, these compilations produce a total more than double that based on the inland waterway.

For 1961, the ton-mile data on domestic carriage were distributed by type of traffic; regulatory status of the carrier: (a) carriers subject to economic regulation by the Interstate Commerce Commission, and (b) carriers not so regulated; and by commodity in terms of the Commodity Classification for Shipping Statistics. Ton-miles of carriage in foreign traffic were included only for that part of the carriage on inland waters and without commodity detail.

For 1962, ton-miles were compiled to reflect the regulatory status of the carriage, rather than of the carrier. Ton-miles by commodity and traffic are grouped into three categories of carriage: (a) regulated by the Commission, (b) unregulated, for hire, and (c) private. It is planned to continue annual compilations on the basis of carriage.

Thus, ton-miles by water are now compiled on two separate bases primarily to serve different purposes: (a) the inland waterway, to obtain--with data on numbers and types of vessels and tons of commodities and ton-miles--information on the use of harbors and waterways by traffic and (b) the vessel, to obtain broader economic information related to transportation, trade, and Federal regulation of carriage.

Since ton-miles by type of carrier are on a different basis from that by type of carriage, two views of the regulatory status of commodity ton-miles are provided. Those by carrier give the amount of participation by regulated and by unregulated carriers in the total traffic. The ton-miles by carriage give a somewhat closer view of the legal status of the carriage: regulated, unregulated for-hire, and private. Although technically correct, neither view gives the exact picture, since common and contract carriers may perform carriage not subject to economic regulation by the Intestate Commerce Commission. Consequently, the volume of regulated carrier ton-miles (1961 data) is larger than that of the regulated carriage (1962 data).

Ton-miles for foreign traffic are computed using the mileages for length of haul on inland waters only; no breakdown by commodity is made.

Tables 1 and 2 of Water Carrier Ton-Miles, Supplement 2 to Part 5, National Summaries of Waterborne Commerce of the United States, indicate the magnitude of the domestic water carrier industry's production and some of the intra- and inter-modal aspects of competition in both the domestic and the foreign trades. The total of 37.1 billion is many billions of ton-miles under the actual ton-miles of carriage produced by the carriers in the foreign trades. Thus a sector of the industry remains unmeasured. This "gap" also exists for air, rail, and highway carriers moving freight between the United States and foreign countries. Viewed from the broader (than transportation alone) standpoint of production and distribution, ton-miles of foreign carriage (and goods) are competing with domestic ton-miles (and goods). For example, barbed wire (and its ton-miles of carriage) from Belgium to the United States is competing with domestic barbed wire (and its ton-miles of carriage) moving by rail, highway, and water; and a recently exploited deposit of sulphur in Canada will affect the ton-miles of long-haul domestic sulphur.

Viewed from the narrower standpoint of intra- and inter-modal competion for the same tons of goods, the foreign-trade ship is competing with domestic carriers for every mile of the ship's haul in inland waters; the farther the haul, the greater the competion with the domestic carriers. The Saint Lawrence Seaway is an example of this type of competition.

The addition of the coastwise ton-mile data to those for inland filled the last remaining gap in ton-mile information on domestic waterborne traffic. The coastwise traffic, amounting in 1961 to 312 billion ton-miles, contributed more than 60 percent of the 1961 total of waterborne ton-miles, and carried about 20 percent of the total tons moved by water.

The coastwise ton-mile data, as in the case of the foreign traffic tonnage data, reflect some of the aspects of intra- and inter-modal competition. These ton-miles compete with the inland waterway ton-miles as well as those by pipeline, highway, and rail. The commodity details provide some insight into the prevailing distribution patterns and the competition of geographic areas of origin in the markets of the receiving areas.

Transportation, however, is but one part of the marketing complex, and cannot sensibly be viewed in terms of transportation only. Commodities appear in the several modes, disappear, perhaps reappear, or are replaced by entirely different commodities serving the same customer needs, for reasons not related to transportation services, yet with great effect on those services. For example, electricity and gas are directly competitive with other energy sources and their transportation, and as yet there are no published data in ton-mile equivalents for these commodities. This example illustrates the need to analyze the commodity markets in depth to obtain even a glimmer of

the forces affecting the current trends and future prospects of the various forms of transportation.