

# Air Cargo Ton-Miles—A Statistic of Growing Importance

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This paper is designed to show the manner in which cargo ton-miles are reported by the airline industry and the growth of cargo traffic during recent years. It covers procedures used by the air carriers to report periodically to the Civil Aeronautics Board and the Air Transport Association of America. CAB and ATA reports on air cargo traffic are also discussed. The significant increase in cargo ton-miles is pointed out by charts showing the growth in airline freight traffic from 1939 to 1963 and comparing this traffic with that of other modes of transportation.

■AIR TRANSPORTATION had its beginning in the cargo transportation field. In 1911, the first U.S. airmail experiments began with a flight on Long Island, New York, of a total distance of 10 miles. From this early start, the airlines became familiar with the ton-mile statistic, and today it is a highly significant and much used figure in the aviation industry.

## GROWTH OF THE INDUSTRY

During the early growth of air transportation, air freight played a secondary role to the carrying of passengers. In 1948, less than 300 million revenue ton-miles of cargo—freight, mail and express—moved by air. Since 1948 significant increases have been made in air cargo traffic, including international and domestic service, by the U.S. scheduled airlines (Fig. 1). In 1963, approximately 1.3 billion cargo ton-miles were flown in domestic service by the scheduled and supplemental air carriers (Table 1).

The certificated route air carriers transported 644,552,000 ton-miles of freight in scheduled domestic service in 1963, about 90 percent more than was carried in 1958 (Tables 2 and 3). According to the Civil Aeronautics Board, freight accounted for 16 percent of all revenue ton-miles flown, both cargo and passenger, and of this amount 43 percent was in all-cargo service. Based on estimated figures, the certificated route carriers accounted for 821,414,000 freight ton-miles in scheduled service in 1964, an increase of about 27 percent over the 1963 period.

In 1963, the scheduled airlines offered the public more than 10,000 flights a day, all of which carried some kind of cargo: mail, express, or freight. The eleven U.S. trunk and three all-cargo airlines flew 864 million ton-miles of cargo in scheduled domestic operations, a 10.5 percent increase over the 782 million ton-miles carried in 1962. Airfreight ton-miles in 1963 totaled 631 million, a 13.5 percent increase. Express ton-miles totaled 65.7 million, up 0.6 percent; mail volume climbed 4.7 percent to a total of 168.1 million ton-miles. The results for 1964 will show even more significant increases. Air cargo is expected to total 1.06 billion ton-miles for the trunks and all-cargo airlines.

The sharp growth rate and expectations by the airlines in regard to cargo potentials are reflected in the increase in the number of large turbo-fan jets and turboprop cargo aircraft being acquired. During 1963, cargo capacity of the airlines greatly increased

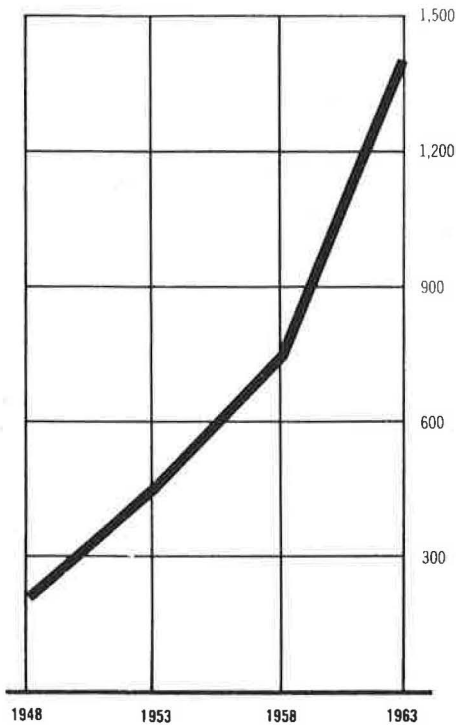


Figure 1. Revenue cargo ton-miles in millions per year carried by U.S. scheduled airlines.

TABLE 2  
REVENUE FREIGHT TON-MILES FLOWN BY  
CERTIFICATED ROUTE AIR CARRIERS IN  
SCHEDULED DOMESTIC SERVICE,  
1950-1963<sup>a</sup>

Year	Ton-Miles (thousands)
1950	173,102
1951	175,516
1952	202,472
1953	210,098
1954	206,598
1955	267,680
1956	298,495
1957	350,011
1958	337,898
1959	393,606
1960	417,550
1961	472,625
1962	567,720
1963	644,552

<sup>a</sup>Source: Civil Aeronautics Board

TABLE 1  
DOMESTIC INTERCITY FREIGHT BY MODES<sup>a</sup>

Year	Tons-Miles (billions)						Total
	Air <sup>b</sup>	Rail	Truck	Oil Pipeline	Great Lakes	Rivers and Canals	
1939	0.01	339	53	56	76	20	544
1940	0.02	379	62	59	96	22	618
1941	0.02	482	81	68	114	27	772
1942	0.04	645	80	75	122	26	928
1943	0.05	735	57	98	115	26	1,031
1944	0.07	747	58	133	119	31	1,088
1945	0.09	691	67	127	113	30	1,028
1946	0.08	602	82	96	96	28	904
1947	0.11	665	102	105	112	35	1,019
1948	0.15	647	116	120	119	43	1,045
1949	0.20	535	127	115	98	42	917
1950	0.30	597	173	129	112	52	1,063
1951	0.34	655	188	152	120	62	1,177
1952	0.34	623	195	158	105	64	1,145
1953	0.37	614	217	170	127	75	1,203
1954	0.38	557	213	179	91	83	1,123
1955	0.49	631	223	203	119	98	1,274
1956	0.58	656	249	230	111	109	1,356
1957	0.68	626	254	223	117	115	1,336
1958	0.70	559	256	211	80	109	1,216
1959	0.80	582	289	227	80	117	1,296
1960	0.89	579	299	229	100	123	1,331
1961	1.0	570	313	233	87	124	1,328
1962	1.3	600	331	238	90	133	1,393
1963	1.3	620	348	243	97	143	1,461

<sup>a</sup>Includes mail and express but not intercoastal and coastwise ton-miles; based on data from the Transportation Association of America, Interstate Commerce Commission, and Civil Aeronautics Board.

<sup>b</sup>Includes domestic scheduled and charter service of the U.S. scheduled airline industry, both passenger/cargo and all-cargo carriers, and the supplemental airlines.

as the first all-cargo jets were placed into U.S. scheduled airline service. At the beginning of 1964 about a dozen of these jets were being operated by U.S. carriers. Each jet freighter is capable of hauling a load of more than 40 tons nonstop from coast to coast.

Despite the gains made during recent years, however, the gross amount of domestic intercity cargo hauled by air is presently less than 1 percent of the total handled by all transport modes (Table 4). Although this amount is small in comparison to total freight haulage, it is still very important to the airlines.

TABLE 3  
REVENUE CARGO TON-MILES FLOWN BY  
CERTIFICATED ROUTE AIR CARRIERS IN  
SCHEDULED DOMESTIC SERVICE, 1963<sup>a</sup>

Traffic Category	Ton-Miles (thousands)
Freight	644,552
Express	70,017
Priority U.S. mail	145,929
Non-priority U.S. mail	29,518
Excess baggage	25,001
Total	915,017

<sup>a</sup>Source: Civil Aeronautics Board

TABLE 4

PERCENTAGE OF INTERCITY FREIGHT BY MODES<sup>a</sup>

Year	Air <sup>b</sup>	Rail	Truck	Oil Pipeline	Great Lakes	Rivers and Canals
1939	-	62.3	9.7	10.3	14.0	3.7
1940	-	61.3	10.0	9.5	15.5	3.6
1941	-	62.4	10.5	8.8	14.8	3.5
1942	-	69.5	6.5	8.1	13.1	2.8
1943	-	71.3	5.5	9.5	11.2	2.5
1944	0.01	68.7	5.3	12.2	10.9	2.8
1945	0.01	67.2	6.5	12.4	11.0	2.9
1946	0.01	66.6	9.1	10.6	10.6	3.1
1947	0.01	65.3	10.0	10.3	11.0	3.4
1948	0.01	61.9	11.1	11.5	11.4	4.1
1949	0.02	58.3	13.8	12.5	10.7	4.6
1950	0.03	56.2	16.3	12.1	10.5	4.9
1951	0.03	55.6	16.0	12.9	10.2	5.3
1952	0.03	54.4	17.0	13.8	9.2	5.6
1953	0.03	51.0	18.0	14.1	10.6	6.2
1954	0.03	49.6	19.0	15.9	8.1	7.4
1955	0.04	49.5	17.5	15.9	9.3	7.7
1956	0.04	48.4	18.4	17.0	8.2	8.0
1957	0.05	46.9	19.0	16.7	8.8	8.6
1958	0.06	46.0	21.1	17.4	6.6	9.0
1959	0.06	44.9	22.3	17.5	6.2	9.0
1960	0.07	43.5	22.5	17.2	7.5	9.2
1961	0.08	42.9	23.6	17.5	6.6	9.3
1962	0.09	43.1	23.8	17.1	6.5	9.5
1963	0.09	43.1	23.8	16.6	6.6	9.8

<sup>a</sup>Includes mail and express but not intercoastal and coastal ton-miles; based on data from Transportation Association of America, Interstate Commerce Commission, and Civil Aeronautics Board.

<sup>b</sup>Includes domestic scheduled and charter service of the U.S. scheduled airline industry, both passenger/cargo and all-cargo carriers, and the supplemental airlines.

## TON-MILE REPORTS

For the industry to maintain an accurate accounting of the ton-miles of cargo carried, the airlines are required to compile and report to the government periodically the ton-miles of cargo being transported. The figures are used as an aid in analyzing the traffic and financial results of a particular carrier as well as those of the entire industry.

There are two groups primarily engaged in the collection and dissemination of airline statistical data: the Civil Aeronautics Board, which is charged with the regulation of commercial air transportation, and the Air Transport Association of America, which represents the vast majority of the carriers comprising the certificated airline industry. Both groups compile airline data on the financial and traffic status of the air carriers. The statistics compiled by ATA are consolidated industry figures and are not broken down by carriers, whereas the CAB reports the financial and traffic statistics of each of the U.S. certificated carriers, as well as overall industry statistics.

Each certificated air carrier is required to report its ton-miles of freight handled per month on the Monthly Statement of Summarized Traffic and Capacity Statistics, CAB Form 41. The report is compiled and submitted every month to the CAB in accordance with the Board's Uniform System of Accounts and Reports for Certificated Route Air Carriers.

In general, the cargo ton-mile figures entered by the carriers on Form 41 are determined by computation from flight records. Total revenue ton-miles are entered on the report along with non-revenue ton-miles under the heading, Traffic on Revenue Flights. In addition, for reporting purposes, revenue cargo ton-miles are divided into the following categories: (a) U.S. mail-priority, (b) U.S. mail-non-priority, (c) foreign mail, (d) express, (e) freight, and (f) excess baggage. There is no breakdown by type of commodities hauled since the air carriers are not required to furnish this information on a regular basis to the Board.

The Board's Research and Statistics Division compiles and publishes the monthly figures in its booklet, Air Carrier Traffic Statistics. Consolidated industry figures and statistics covering each certificated route operator are included. At the end of the year the annual data, along with other statistical material covering the entire annual period, are computed and released in the Handbook of Airline Statistics.

With the submission of the report of Form 41 to the Board, a copy is furnished to the Air Transport Association by each of its member carriers. From these, ATA computes the industry totals on a quarterly basis and publishes them in a booklet entitled Quarterly Review—Airline Traffic and Financial Data. This publication contains a breakdown of revenue ton-miles carried, by passengers, priority mail, non-priority mail, express, freight, charter, excess baggage and foreign mail for the various classes of air carriers as well as the consolidated industry figures. Other traffic and financial information is included. Calendar year-end figures covering the twelve-month period in comparison with previous years are reported in an annual publication, Air Transport Facts and Figures (Table 5).

Generally speaking, the statistical data released by ATA are more current and preliminary in nature than those of the CAB. ATA is primarily concerned with processing

TABLE 5  
REVENUE TON-MILES OF TRAFFIC CARRIED BY U. S. SCHEDULED AIRLINE INDUSTRY<sup>a</sup>

Carrier	Ton-Miles (thousands)							
	Passenger	Priority U.S. Mail	Non-Priority U.S. Mail	Express	Freight	Excess Baggage	Charter Flights	Total
Domestic trunk airlines:								
1959	2,672,087	98,487	17,929	53,107	282,472	29,419	13,271	3,166,772
1960	2,777,148	108,061	22,845	55,440	320,950	29,071	18,968	3,332,483
1961	2,806,469	117,929	26,762	56,745	384,161	26,881	16,270	3,435,218
1962	3,023,888	131,711	28,501	64,879	473,955	25,430	22,665	3,771,029
1963	3,456,932	138,661	28,402	64,915	520,631	23,797	24,227	4,257,565
Local service airlines:								
1959	97,516	1,693	503	2,211	3,125	711	3,061	108,820
1960	108,652	2,110	587	2,419	3,845	799	2,744	121,155
1961	127,602	2,771	584	3,019	5,492	875	2,084	142,428
1962	152,662	3,288	545	3,772	7,218	990	1,837	170,312
1963	177,555	3,766	587	4,312	9,026	1,004	2,096	198,346
Intra-Hawaiian airlines:								
1959	8,879	76	-	-	1,625	30	2,058	12,668
1960	10,156	82	5	-	1,806	31	5,605	17,685
1961	10,047	82	14	-	1,846	31	494	12,515
1962	10,308	90	19	-	2,100	51	10	12,578
1963	11,519	93	21	-	2,151	40	285	14,109
Helicopter airlines:								
1959	710	87	-	41	7	4	7	856
1960	901	91	-	40	7	5	10	1,053
1961	818	94	-	40	7	5	6	969
1962	779	65	-	44	6	3	10	907
1963	1,188	74	-	44	6	4	16	1,332
Intra-Alaskan airlines:								
1959	3,872	1,501	-	-	2,140	116	3,869	11,498
1960	4,434	1,796	-	-	2,422	127	1,844	10,625
1961	4,741	2,209	-	-	2,829	135	1,929	11,843
1962	4,874	2,576	-	-	2,620	147	3,211	13,428
1963	4,796	2,832	-	-	2,640	155	6,027	16,450
All-cargo airlines (domestic):								
1959	-	582	161	1,250	104,237	-	168,049	274,279
1960	-	674	233	1,050	88,516	-	159,224	249,697
1961	-	407	261	754	78,286	-	215,352	295,060
1962	-	175	146	417	81,816	-	389,536	472,090
1963	-	504	505	748	110,096	-	231,410	343,263
International and territorial airlines:								
1959	706,696	73,697	21	481	158,868	12,897	139,878	1,100,817
1960	831,066	82,626	12,233	520	191,065	13,922	78,350	1,218,245
1961	877,022	93,220	42,492	609	216,561	13,191	110,247	1,362,428
1962	1,017,184	108,987	52,760	798	263,931	15,125	150,848	1,619,903
1963	1,187,055	115,811	54,477	794	295,610	16,821	174,431	1,855,967
All-cargo airlines (international):								
1959	-	5,547	-	-	36,579	-	16,178	58,383
1960	-	6,567	2,658	-	34,853	-	28,796	73,091
1961	-	6,425	5,968	4	43,764	-	76,823	133,094
1962	-	4,441	6,602	14	66,537	-	99,759	177,497
1963	-	4,663	6,205	21	82,917	-	72,111	166,165
Consolidated industry:								
1959	3,489,760	181,670	18,614	57,090	589,053	43,177	346,371	4,734,093
1960	3,732,533	202,007	38,565	59,469	643,468	43,955	295,606	5,024,283
1961	3,827,038	223,139	76,087	61,167	732,951	41,118	423,231	5,393,933
1962	4,209,926	251,333	88,578	69,925	898,187	41,748	668,136	6,238,246
1963	4,839,045	266,404	90,197	70,834	1,023,077	41,821	510,603	6,880,845

<sup>a</sup>In some instances individual figures may not add to totals because of rounding; foreign mail ton-miles carried by international and territorial airlines and by all-cargo airlines in international operations are included only in the total ton-mile column.

and disseminating statistics of major importance to aviation interests as quickly and as rapidly as is feasibly possible.

The Bureau of the Census, since January 1962, has been publishing monthly reports by weight and value of commodities being transported by air in the U.S. foreign trade. Ton-miles, however, are not computed. The reports, which are compiled from export documents, contain a breakdown of some 60 commodities imported by air and 100 commodities exported by air. Items listed include auto, truck and bus parts, electronic computers, contracting and excavating machinery, and eggs.

The reports can be helpful to marketing specialists. For example, one recent report showed that 3,900 tons of machinery and vehicles were transported to the United Kingdom by air in 1963 along with 413 tons of man-made fibers and manufactures, 379 tons of photographic and projection equipment and 333 tons of electrical measuring and testing equipment.

Four reports are issued monthly and are followed by an annual summary. Two concern U.S. airborne exports of domestic merchandise, one with the commodities listed by the countries of destination and the other with the countries of destination by commodities. The other two pertain to imports involving origin countries.

### TERMINOLOGY

The statistical data on air cargo have been somewhat misleading. The terminology used does not always indicate exactly what is meant by terms such as airfreight and air cargo. The broader definition of air cargo may include airmail, non-priority surface mail moving by air, parcel post, excess baggage, cargo tendered by the Railway Express Agency as air express, cargo tendered by the airfreight forwarders, and cargo tendered as airfreight under published airfreight tariffs. Writers using the terms air cargo or airfreight might have one or any possible combination of these items in mind. The industry provides passenger ton-mile data which may be included in certain overall ton-mile figures. Such total ton-mile figures can be misinterpreted. Also, in the interpretation of ton-miles there is some confusion as to what segment of the industry is included in a given stated figure.

Seven classes of air carrier operators in the United States have certificates of convenience and necessity authorizing them to conduct regularly scheduled services. These classifications are used by the CAB in connection with the economic regulation of the industry and, under the Federal Aviation Act, are based largely on the scope of operations authorized or allowed by the Act. These classes are as follows:

1. Domestic trunk carriers.—This category includes carriers with permanent operating rights within the continental United States. There are currently eleven trunk lines operating primarily over high-density traffic routes between principal traffic centers. These carriers conduct both scheduled and nonscheduled, or charter, service. In 1963, records were set by these airlines in all categories of cargo traffic in scheduled operations. Freight ton-miles were 520,631,000, a gain of 9.8 percent over 1962; mail ton-miles were 167,063,000, a gain of 4.3 percent; express rose to 64,915,000 ton-miles. In 1964, according to estimates, freight will be up 24.7 percent, mail 7.6 percent, and express 8.7 percent over 1963 figures.

2. Domestic local service carriers.—There are presently 13 of these carriers operating routes of lesser traffic density between the smaller traffic centers and between these and principal centers. In 1963, they carried 25.0 percent more freight, 13.6 percent more mail, and 14.3 percent more express than in 1962. In 1964, it is estimated freight will increase 32.1 percent, mail 16.2 percent and express 19.9 percent over the 1963 period.

3. Helicopter carriers.—Helicopters operate between airports, central post offices, and the suburbs of New York, Chicago, Los Angeles and San Francisco. Cargo volume of the four carriers in 1963 amounted to 74,000 ton-miles of air mail, an increase of 13.8 percent over 1962; also carried were 44,000 ton-miles of express and 6,000 ton-miles of freight, both of which matched 1962 achievements.

4. Intra-Hawaiian carriers.—The two airlines comprising this class operate between the several islands of Hawaii; they carried 2,151,000 ton-miles of freight in 1963, a gain of 2.4 percent over 1962, and 114,000 ton-miles of mail, an increase of 4.6 percent. They made substantial gains in 1964.

5. Intra-Alaskan carriers. —In 1963, the eight carriers which provide service in the State of Alaska carried 2,832,000 ton-miles of airmail for an increase of 9.9 percent over 1962, and 2,640,000 ton-miles of freight, a 1.0 percent increase. Estimates for 1964 point to further increases in cargo traffic transported by this group of carriers.

6. International and territorial carriers. —This service includes all U.S. Flag air carriers operating between the United States and foreign countries other than Canada and over international waters. These 18 carriers moved 295,600,000 ton-miles of freight in 1963, an increase of 12.0 percent over 1962, 170,288,000 ton-miles of mail, an increase of 5.3 percent, and 794,000 ton-miles of express, down about 1.0 percent. It is estimated that during 1964 freight ton-miles for this group of carriers jumped about 30 percent over 1963.

7. All-cargo carriers. —Scheduled flights carry freight, express and mail between designated areas in the U.S. and in one case to the Caribbean and in another to Europe. These carriers in domestic scheduled service carried a record of 110,096,000 ton-miles of freight in 1963, representing a 34.6 percent increase over 1962. Mail volume was 1,009,000 ton-miles, an increase of 8.3 percent; express volume was 748,000 ton-miles, an increase of 79.6 percent. Charter freight operations declined, however, by about 41 percent to 204,581,000 ton-miles.

In addition, supplemental air carriers conduct passenger and cargo charter service, as well as scheduled operations on a limited temporary basis. There were 15 such companies as of February 1, 1964. The supplemental carriers transported 171,067,000 ton-miles of freight in domestic service in 1963 compared to 115,171,000 in 1962.

#### A LOOK AHEAD

Although the airlines account for less than 1 percent of the total intercity ton-miles, the cargo they carry is of high value. This cargo, especially since it includes mail and express, is being considered more and more an indicator of business activity and economic growth.

There have been various predictions on the growth rate of domestic airfreight. It is, of course, difficult to say just what the figure will be. Airfreight, however, can be expected to increase by 20 percent or more in 1965 over 1964. Some foresee an increase of 120 percent by 1970 and an increase of 250 percent by 1975, bringing the total to more than 2.8 billion ton-miles in domestic scheduled service.

With the increased availability of the economical cargo jets and the improvement of handling methods, the cost of shipping by air will undoubtedly decrease in the future. Cargo ton-miles should expand at a faster rate than passenger miles, and it appears the air carriers will capture a larger share of the total freight market.

When compared to other modes of transportation, the airfreight business is still in an embryonic stage, but we can look forward to definite growth. As airfreight increases, more detailed reporting procedures will be required and eventually tonnage and ton-mile figures by commodity groups will be developed as in the other transport modes.