

FREIGHT FACTS AND FIGURES

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U.S. Department of Transportation
Federal Highway Administration

QUALITY ASSURANCE STATEMENT

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Freight Facts and Figures 2005 is a snapshot of the volume and value of freight flows in the United States, the physical network over which freight moves, the economic conditions that generate freight movements, the industry that carries freight, and the safety, energy, and environmental consequences of freight transportation. This snapshot helps planners, decisionmakers, and the public understand the magnitude and importance of freight transportation in the global economy. An electronic version of this publication is also available on www.ops.fhwa.dot.gov/freight.



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I. THE NATION SERVED BY FREIGHT



Freight transportation has grown dramatically with the growth and spread of population and economic activity within the United States and with the increasing interdependence of economies across the globe. The U.S. population grew by 28 percent between 1980 and 2003, while the economy, measured by Gross Domestic Product (GDP), doubled in real terms. Other indicators of economic growth such as employment and household income have also risen, by 39 and 16 percent respectively. Foreign trade has grown faster than the overall economy, quadrupling in real value between 1980 and 2003, reflecting unprecedented global interconnectivity.

Table 1-1. Economic and Social Characteristics of the United States

	1980	1990	2000	2003	Percent change, 1980 to 2003
Resident population (thousands)	227,225	249,623	282,178	290,810	28.0
Households (thousands)	80,776	93,347	104,705	111,278	37.8
Median household income (\$2000)	35,057	38,257	41,990	40,553	15.7
Civilian labor force (thousands)	106,940	125,840	142,583	146,510	37.0
Employed ¹ (thousands)	99,303	118,793	136,891	137,736	38.7
Agriculture, forestry, fishing, and hunting (percent)	NA	1.9	1.8	1.7	NA
Mining	NA	0.5	0.3	0.4	NA
Construction	NA	6.9	7.3	7.4	NA
Manufacturing	NA	16.8	14.4	12.3	NA
Wholesale and retail trade	NA	14.7	14.6	15.0	NA
Transportation and utilities	NA	5.1	5.4	5.0	NA
Information	NA	2.9	3.0	2.7	NA
Financial activities	NA	7.1	6.8	7.1	NA
Professional and business services	NA	9.4	10.0	10.1	NA
Education and health services	NA	17.5	19.1	20.5	NA
Leisure and hospitality	NA	8.0	8.2	8.4	NA
Other services	NA	4.3	4.7	4.9	NA
Public administration	NA	4.7	4.5	4.5	NA
Business establishments (thousands)	NA	6,176	7,070	NA	NA
Governments	³ 81,831	⁴ 85,006	NA	NA	NA
Gross domestic product (\$2000 millions)	5,161,700	7,112,500	9,817,000	10,381,300	101.1
Foreign trade ² (\$2000 millions)	631,335	1,168,168	2,572,000	2,582,221	309.0
Goods (percent)	74.0	71.6	78.8	78.6	378.1
Services (percent)	26.0	28.4	21.2	21.4	261.0

Key: NA = not available.

¹Based on the 2002 Census Industry Classification system. Data for 1990 do not appear in the source document; they are estimated using the Bureau of Labor Statistics crosswalk from the 1990 Census Industry Classification system to the 2002 Census Industry Classification system.

²These data are revised from those published last year due to a change in the inflation-adjustment methodology.

³1982. ⁴1992.

TABLE 1-1. ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES

Sources: Unless otherwise stated all data from: U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2004-2005* (Washington, 2005), available at

<http://www.census.gov/statab/www/> as of July 26, 2005.

Median household income: U.S. Department of Commerce, U.S. Census Bureau, Historical Income Tables, table H-6, available at www.census.gov/hhes/income/histinc/h06ar.html as of June 27, 2005.

Business establishments: U.S. Census Bureau, County Business Patterns, available at <http://www.census.gov/epcd/cbp/view/cbpview.html> as of July 26, 2005.

Gross domestic product: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Gross Domestic Product, available at www.bea.doc.gov as of July 26, 2005.

Foreign trade: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, U.S. International Transactions, available at www.bea.doc.gov as of June 27, 2005.

Economic activity and the demand for freight transportation are no longer concentrated almost exclusively in the Northeast manufacturing belt of the United States, with raw

Table 1-2. Population and Gross State Product (GSP) by Region

	1980	1990	2000	2003	2004	Percent change, 1980 to 2004
Resident Population (thousands)	226,549	248,789	281,423	290,810	293,655	30
Northeast	49,136	50,828	(R) 53,595	54,398	54,571	11
Midwest	58,868	59,670	(R) 64,395	65,406	65,730	12
South	75,372	85,454	(R) 100,234	104,538	105,945	41
West	43,173	52,837	(R) 63,199	66,466	67,409	56
GSP (\$ 2000 millions)	5,054,549	6,994,329	(R) 9,749,103	10,289,258	10,720,847	112
Northeast	1,107,283	1,604,121	(R) 2,073,076	2,176,628	2,271,720	105
Midwest	1,262,917	1,566,939	(R) 2,176,746	2,243,163	2,313,685	83
South	1,608,531	2,220,755	(R) 3,210,017	3,437,836	3,582,160	123
West	1,075,817	1,602,514	(R) 2,289,264	2,431,631	2,553,282	137
GSP per capita (\$ 2000)	22,311	28,113	(R) 34,642	35,381	36,508	64
Northeast	22,535	31,560	(R) 38,680	40,013	41,629	85
Midwest	21,453	26,260	(R) 33,803	34,296	35,200	64
South	21,341	25,988	(R) 32,025	32,886	33,812	58
West	24,919	30,329	(R) 36,223	36,585	37,877	52

Key: R = revised.

materials flowing from the South and West. Population, employment, and income figures show a spread of economic activity throughout the United States.

Demand for

freight transportation grows with increases in population and economic activity. Over the next ten years the U.S. economy is projected to increase by 38 percent and the U.S. population by 9 percent. Transportation and warehousing employment is expected to increase by 22 percent over this period, faster than employment as a whole at 15 percent.

Figure 1-1. Economic and Population Projections: 2002 to 2012 (Index, 2002 = 100)

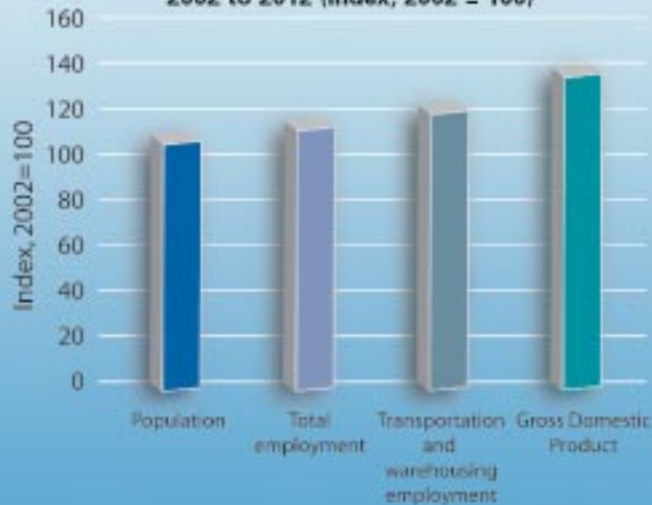


TABLE 1-2. POPULATION AND GROSS STATE PRODUCT (GSP) BY REGION

Sources: Population: 1980-2003 — U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2004-2005* (Washington: 2005); 2004 — *Ibid.*, Population Division, Annual Population Estimates, table 1, available at <http://www.census.gov/popest/states/NST-ann-est.html> as of June 29, 2006; Gross State Product: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at <http://www.bea.doc.gov/region/gsp/> as of June 23, 2006.

FIGURE 1-1. ECONOMIC AND POPULATION PROJECTIONS, 2002 TO 2012 (INDEX, 2002 = 100)

Sources: Population: U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2003* (Washington, DC: 2003), available at <http://www.census.gov/statab/www> as of June 10, 2004; Employment: U.S. Department of Labor, Bureau of Labor Statistics, BLS Releases 2002-12 Employment Projection, press release, February 11, 2004, table 1, available at www.bls.gov as of June 23, 2004; GDP: Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2003-2012* (Washington, DC: 2002), available at <http://www.cbo.gov> as of June 24, 2004.

II. FREIGHT FLOWS

In terms of tons transported, domestic freight transportation by the truck, rail, water, and air modes grew by about 20 percent from 1993 to 2002 and is expected to increase another 65 percent to 70 percent by 2020.

International shipments are expected to increase even faster over this period (by about 85 percent). In 1998, excluding commodities transported by pipeline, trucks moved 71 percent of total tonnage and 80 percent of the total value of U.S. shipments.

By 2020, trucks are expected to haul about three quarters of total tonnage, followed by rail (14 percent), water (7 percent), and air (less than 1 percent).

A more complete estimate of freight shipments is presented in Table 2-2. This 2002 estimate is from an expanded and improved version of the Freight Analysis Framework (FAF), based on the 2002 Commodity Flow Survey and other public data sources. The data in Table 2-2 are not comparable to those in Table 2-1 because estimation methods have been improved and coverage is more complete. Future editions of this publication will include estimates for 1997 and forecasts through 2035.

Table 2-1. Selected Freight Shipments by Weight and Value

Mode	Tons (millions)			Value (\$ billions)		
	1998	2010	2020	1998	2010	2020
Total	15,271	21,376	25,848	9,312	18,339	29,954
Domestic	13,484	18,820	22,537	7,876	15,152	24,075
Air	9	18	26	545	1,308	2,246
Highway	10,439	14,930	18,130	6,656	12,746	20,241
Rail	1,954	2,528	2,894	530	848	1,230
Water	1,082	1,345	1,487	146	250	358
International	1,787	2,556	3,311	1,436	3,187	5,879
Air	9	16	24	530	1,182	2,259
Highway	419	733	1,069	772	1,724	3,131
Rail	358	518	699	116	248	432
Water	136	199	260	17	34	57
Other ¹	864	1,090	1,259	NA	NA	NA

Key: NA = Not available.

¹Other includes international shipments that moved via pipeline or by an unspecified mode.

Notes: Domestic shipments by pipeline are excluded. Modal numbers may not add to totals due to rounding.

Table 2-2. Total Freight Shipments: 2002

Mode	Tons (millions)	Value (\$ billions)	Ton-Miles (billions)
All modes, total	19,487	13,052	4,409
Truck	11,712	9,075	1,515
Rail	1,979	392	1,372
Water	1,668	673	485
Air (including truck and air)	6	563	13
Pipeline	3,529	896	688
Parcel, U.S. Postal Service, or courier	27	1,022	21
Other multiple and unknown modes	567	430	315

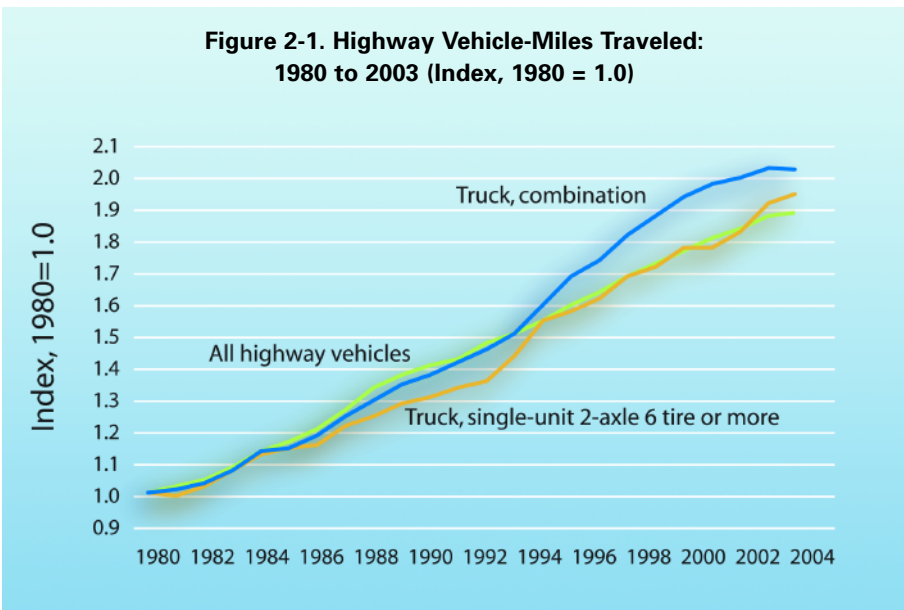
Note: Mode definitions are based on the U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, 2002 Commodity Flow Survey, December 2004. Modal numbers may not add to totals due to rounding.

TABLE 2-1. FREIGHT SHIPMENTS BY WEIGHT AND VALUE

Source: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, 2002.

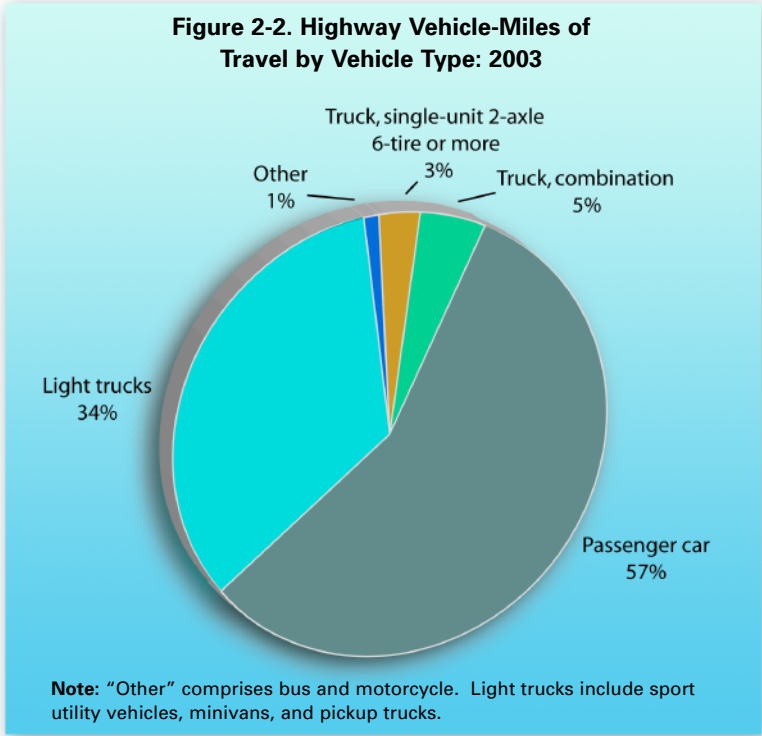
TABLE 2-2. TOTAL FREIGHT SHIPMENTS: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, 2005.



As the demand for goods and services grows, so does the amount of truck traffic on the nation's highways. Commercial truck travel has doubled over the past two decades, about the same as highway travel as a whole. Consequently, truck vehicle-miles traveled (VMT) as a share of all VMT has remained relatively stable.

Over this period, travel by combination trucks grew slightly faster than by single unit trucks.



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2003, commercial trucks accounted for about 7 percent of highway VMT. Truck VMT is comprised of 64 percent combination truck and 36 percent single-unit truck.

Truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Most of these routes will experience increases in truck traffic over the next twenty years, that, in

combination with increases in passenger travel, will add to existing congestion.

FIGURE 2-1. HIGHWAY VEHICLE-MILES TRAVELED: 1980-2003 (INDEX, 1980 = 1.0)
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual Issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm as of June 23, 2005.

FIGURE 2-2. HIGHWAY VEHICLE-MILES OF TRAVEL BY VEHICLE TYPE: 2003
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm of June 23, 2005.



Figure 2-3. Estimated Average Daily Truck Traffic: 1998

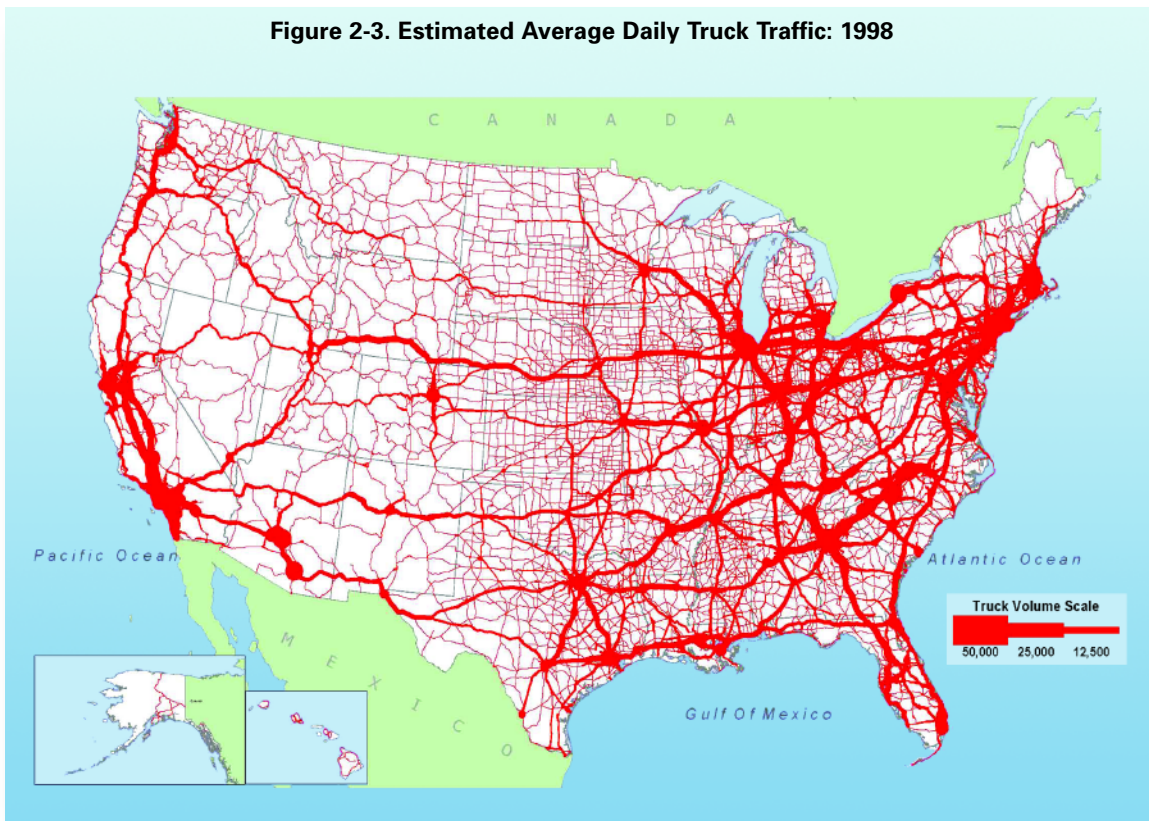


Figure 2-4. Estimated Average Daily Truck Traffic: 2020

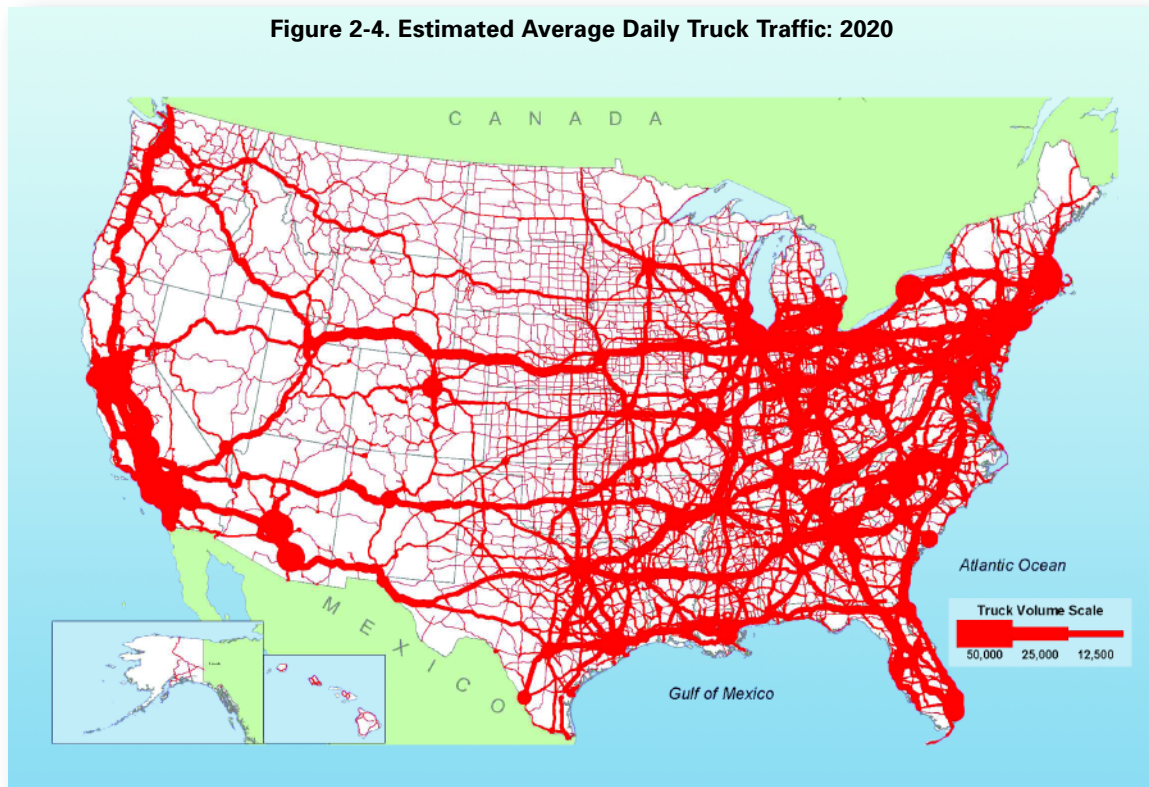
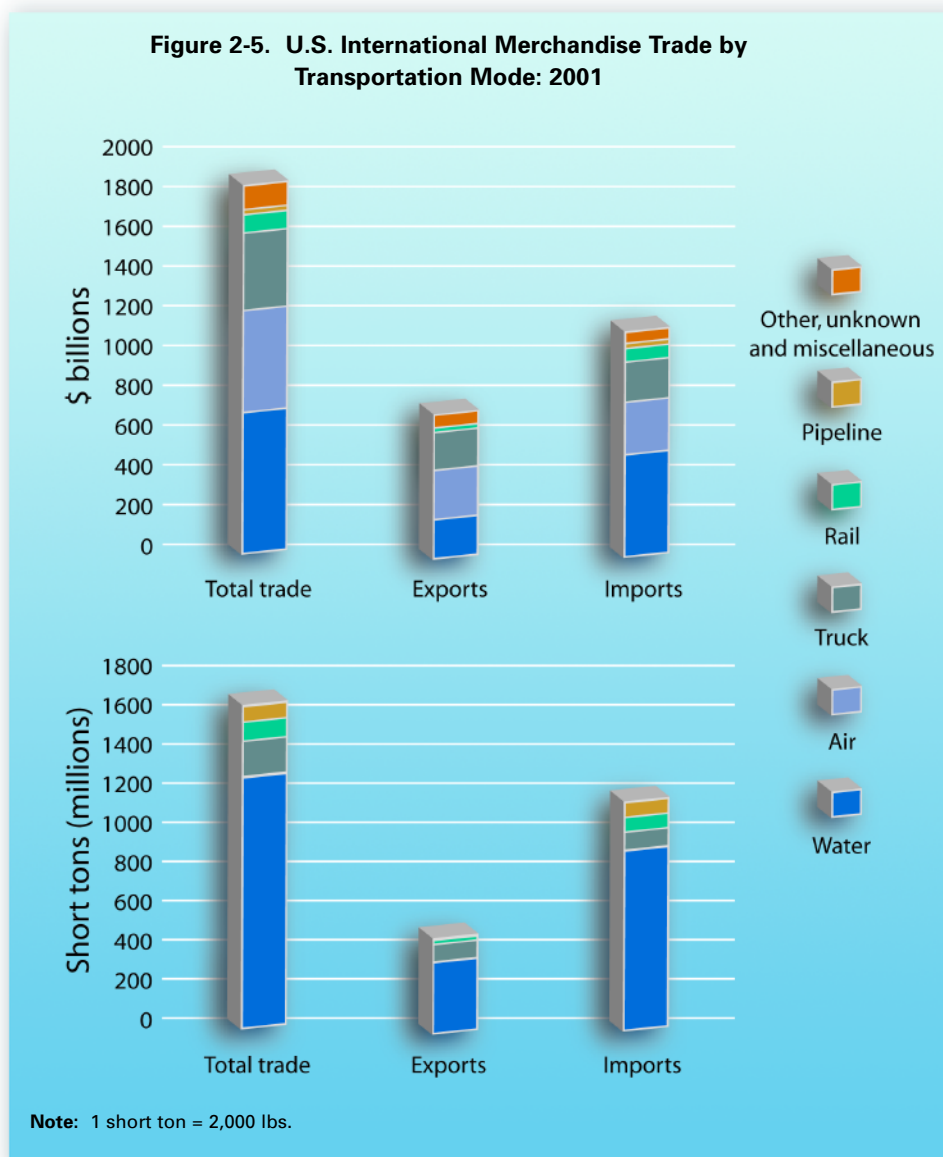


FIGURE 2-3. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 1998

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.

FIGURE 2-4. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 2020

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.



Some of the most severe congestion problems are found near ports, airports, and border crossings stemming from the rapid growth of international trade. Over the past two decades U.S. foreign trade in goods by value has quadrupled. Nearly 80 percent of freight tons in U.S. foreign trade are transported by ship. Although the vast majority of freight tonnage in U.S. foreign trade moves by water, air and truck transportation are nearly as important when freight value is

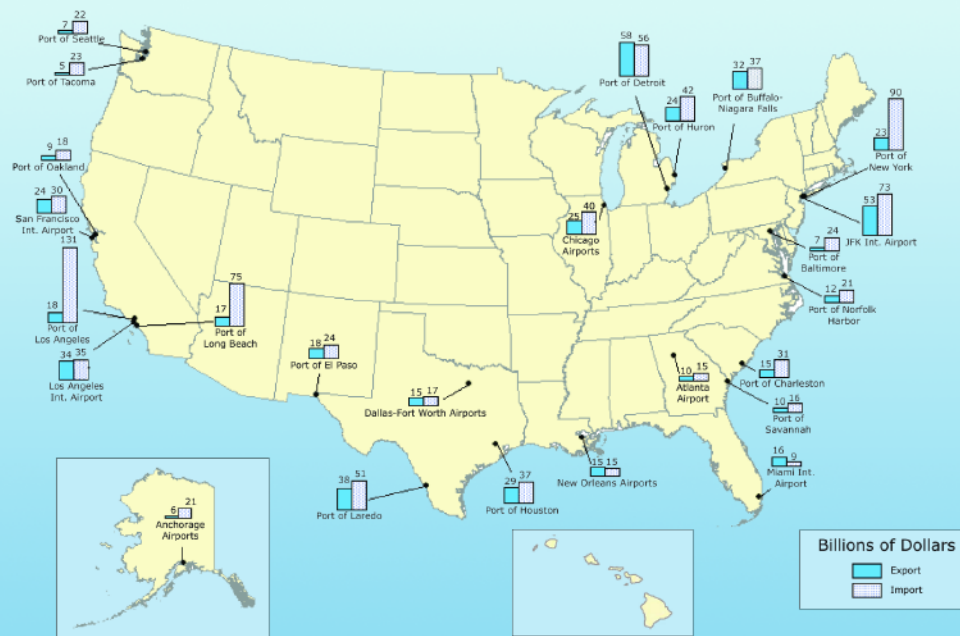
considered. By value, the water share drops to 40 percent, with 28 percent moving by air and 21 percent moving by truck.

The top 25 foreign trade gateways measured by value of shipments are comprised of 9 airports, 11 water ports, and 5 border crossings. At these 25 gateways, imports comprise 65 percent of the total. Ports with very large shares of imports relative to exports are mostly water ports (such as the ports of Los Angeles, CA, Long Beach, CA, and Tacoma, WA). Anchorage International Airport also has a very high proportion of imports relative to exports.

FIGURE 2-5. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2001

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *U.S. International Trade and Freight Transportation Trends* (Washington, DC: 2003), table 7, available at www.bts.gov as of July 12, 2004.

Figure 2-6. Top 25 U.S. Foreign Trade Freight Gateways by Value: 2004 (\$ billions)



Note: Data for all air gateways include a low level (generally less than 2%-3% of the total value) of small user-fee airports located in the same region. Air gateways not identified by airport name include major airport(s) in the geographic area in addition to small regional airports.

Measured in tons, the Port of South Louisiana handles the most freight of any water port in the United States. Water ports dominated by domestic trade include St. Louis, MO-IL; Pittsburgh, PA; Huntington, WV-KY-OH; and Valdez, AK. Water ports dominated by foreign trade include Portland, ME; Los Angeles, CA; Freeport, TX; and Beaumont, TX. The top 25 water ports handle about two-thirds of all foreign and domestic goods moved by water.

FIGURE 2-6. TOP 25 U.S. FOREIGN TRADE FREIGHT GATEWAYS BY VALUE: 2004 (\$ BILLIONS)

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, (Washington, DC: 2005), available at <http://www.sts.gov> as of October 21, 2005.

**Figure 2-7. Top 25 Water Ports by Weight: 2003
(Million Short Tons)**

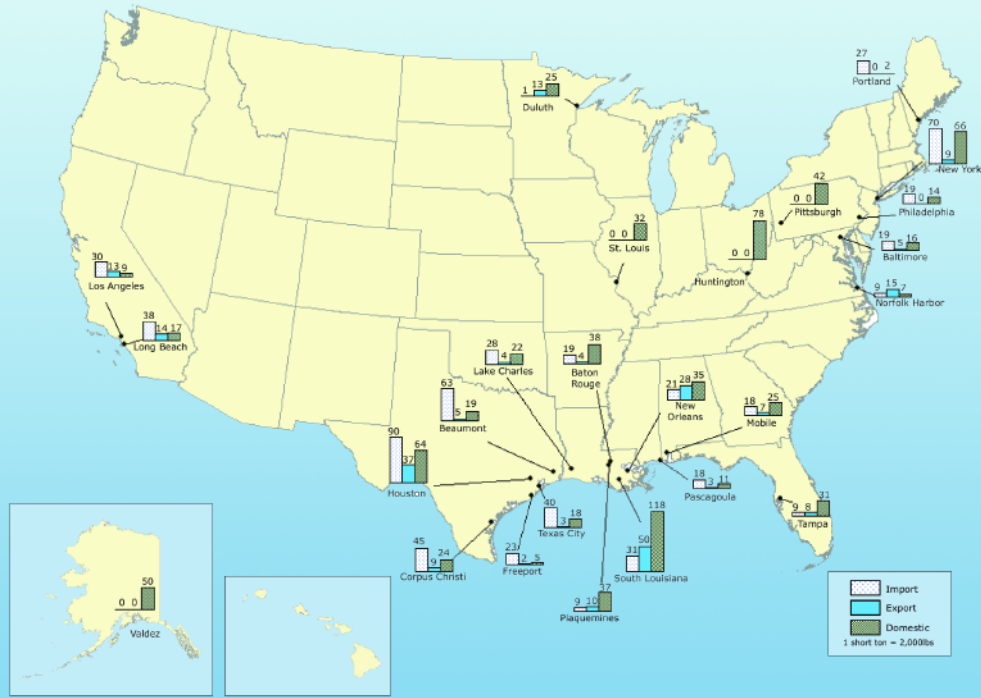


Figure 2-8. Top 25 U.S. Container Ports by Containerized Cargo: 2004



FIGURE 2-7. TOP 25 WATER PORTS BY WEIGHT: 2003

Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Calendar Year 2003, Part 5, National Summaries* (New Orleans, LA: 2005), available at <http://www.iwr.usace.army.mil/nac> as of October 21, 2005.

FIGURE 2-8. TOP 25 U.S. CONTAINER PORTS BY CONTAINERIZED CARGO: 2004

Source: U.S. Department of Transportation, Maritime Administration, *Top 30 U.S. Container Ports by Direction, CY2004*, based on data provided by Port Import/Export Reporting Service, 2005.



Containerized cargo has grown rapidly over the past few years and is concentrated at a few large water ports. The Port of Los Angeles handles about one-fifth of all the container traffic at water ports in the United States. Together with the Port of Long Beach, this share increases to more than one-third. Container trade at the Ports of Los Angeles and Long Beach nearly doubled between 1994 and 2004, about the same as containerized cargo overall.

Trade with Canada and Mexico has skyrocketed since the signing of the North American Free Trade Agreement (NAFTA) in 1994. Trucks carry almost two-thirds of the value of goods traded with these countries. The value of goods carried by truck increased by about 40 percent between 1997 and 2004. By weight, the water and truck modes carry the largest share of goods traded.

Table 2-3. U.S. Merchandise Trade with Canada and Mexico by Transportation Mode

Mode	1997		2000		2001 ¹		2004	
	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions of short tons)
Truck	323	NA	429	NA	395	180	453	NA
Rail	70	NA	94	NA	93	97	108	NA
Air	28	<1	45	<1	37	<1	32	<1
Water	22	190	33	213	29	214	46	244
Pipeline	14	NA	24	NA	26	79	39	NA
Other	19	NA	29	NA	31	1	34	NA
Total	475	527	653	578	612	572	712	NA

Key: NA = not available.

¹2001 data are from the U.S. Department of Transportation, Bureau of Transportation Statistics, *International Trade and Freight Transportation Trends* (Washington, DC: 2003), tables 22 and C-11, available at www.bts.gov as of July 12, 2004.

²Other includes "flyaway aircraft" (i.e., aircraft moving from the manufacturer to a customer and not carrying any freight), vessels moving under their own power, pedestrians carrying freight, and miscellaneous.

Notes: Individual modal totals may not sum to exact totals due to rounding. 1 short ton = 2,000 lbs. For value, "Other" is the difference between the total and the sum of the individual modes.

TABLE 2-3. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics; U.S. Department of

Commerce, Census Bureau; Statistics Canada; Transport Canada; Instituto Mexicano del Transporte; Instituto Nacional de Estadística, Geografía e Informática; Secretaría de Comunicaciones y Transportes; North American Trade Statistics Database, tables 6-1c and 6-2c, available at <http://nats.sct.gob.mx> as of November 2, 2005.

Table 2-4. U.S. Land Exports to and Imports from Canada and Mexico by Transportation Mode (\$ millions)

	1996	2000	2003	2004
Exports to Canada, total	139,109.7	154,847.4	154,870.8	170,295.4
Truck	102,743.0	129,825.3	124,235.0	135,897.5
Rail	15,678.7	12,946.5	14,776.5	16,596.6
Pipeline	162.2	161.6	759.6	1,584.2
Other ¹	20,467.5	11,913.4	15,099.2	17,776.7
Mail	58.3	0.6	0.4	23.1
Exports to Mexico, total	51,753.4	97,158.9	85,614.8	97,303.7
Truck	44,091.8	82,389.2	70,550.8	79,349.2
Rail	5,119.2	10,495.8	11,264.9	13,632.9
Pipeline	2.3	301.8	155.3	87.2
Other ¹	2,540.1	3,972.0	3,643.3	4,216.4
Mail	-	-	0.4	18.1
Imports from Canada, total	156,206.6	210,270.5	207,448.4	236,734.9
Truck	98,400.8	127,816.3	116,714.1	132,762.1
Rail	39,811.0	49,699.2	49,980.9	57,947.2
Pipeline	12,796.2	23,117.1	31,451.3	36,828.3
Other ¹	4,968.4	9,571.0	9,236.6	8,994.4
Mail	6.9	4.1	0.3	0.2
FTZ ²	223.4	62.8	65.3	202.6
Imports from Mexico, total	63,312.2	113,436.5	114,842.8	127,646.3
Truck	48,350.0	88,668.7	92,535.0	104,943.8
Rail	12,297.7	21,056.1	19,701.7	20,183.4
Pipeline	8.1	11.5	0.2	0.3
Other ¹	639.2	1,573.9	1,600.1	1,838.7
Mail	1.5	0.6	0.0	0.0
FTZ ²	2,015.6	2,125.7	1,005.4	679.8

Key: - = value too small to report.

¹"Other" includes "flyaway aircraft" or aircraft moving under their own power (i.e., aircraft moving from the manufacturer to a customer and not carrying any freight), powerhouse (electricity), vessels moving under their own power, pedestrians carrying freight, and unknown and miscellaneous.

²Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are treated as a mode of transportation in the Transborder Surface Freight Data, the actual mode for a specific shipment into or out of an FTZ is unknown because U.S. Customs does not collect this information.

Note: Numbers may not add to totals due to rounding.

Trade with Canada by land modes is significantly higher than trade with Mexico. However, trade across the Mexican border has grown much more quickly than trade on the Canadian border over the past few years. Imports and exports to Mexico measured by value grew by 102 percent and 88 percent respectively between 1996 and 2004. Imports and exports to Canada, by contrast, grew by 52 percent and 22 percent respectively.

TABLE 2-4. U.S. LAND EXPORTS TO AND IMPORTS FROM CANADA AND MEXICO BY TRANSPORTATION MODE (\$ MILLIONS)

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, available at www.bts.gov/transborder as of July 13, 2005.

Most trucks enter the United States through only four states: Texas, Michigan, New York, and California. Three border crossings — Detroit, MI, Buffalo-Niagara, NY, and Port Huron, MI — account for most trucks entering the United States from Canada. Three border crossings — Laredo, TX; Otay Mesa/San Ysidro, CA; and El Paso, TX — account for nearly two-thirds of trucks coming into the United States from Mexico.

Table 2-5. Incoming Truck Container Crossings by State, U.S.- Canadian Border

State	1998	2000	2004
Alaska	11,139	9,710	9,771
Idaho	44,683	53,102	48,266
Maine	391,480	394,067	509,951
Michigan	2,255,485	2,471,416	2,661,624
Minnesota	107,667	131,004	102,963
Montana	168,805	198,745	165,167
New York	NA	1,910,176	1,978,035
North Dakota	NA	340,301	351,968
Vermont	NA	226,109	281,538
Washington	715,663	497,405	666,046
Total U.S. - Canada border	NA	6,232,035	6,775,329

Key: NA = Not available.

Note: Full or empty truck containers entering the United States. The data include containers moving as in-bond shipments.

Table 2-6. Incoming Truck Container Crossings by State, U.S.-Mexican Border

State	1998	2000	2004
Arizona	318,185	322,160	319,872
California	860,684	947,311	1,135,850
New Mexico	31,699	35,507	32,348
Texas	2,502,358	2,895,703	3,024,830
Total U.S. - Mexico border	3,712,926	4,200,681	4,512,900

Note: Full or empty truck containers entering the United States. The data include containers moving as in-bond shipments.

TABLE 2-5. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2005, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-6. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2005, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.





**Table 2-7. Incoming Rail Container Crossings
by State, U.S.- Canadian Border**

State	1998	2000	2004
Alaska	N	N	N
Idaho	37,579	50,240	78,133
Maine	46,882	60,358	44,299
Michigan	587,317	679,747	751,600
Minnesota	215,899	250,943	333,657
Montana	23,729	25,255	39,996
New York	140,422	257,155	276,112
North Dakota	NA	154,698	225,284
Vermont	43,551	51,069	56,764
Washington	82,828	65,372	145,064
Total U.S. - Canada border	1,178,207	1,594,837	1,950,909

Key: N = not applicable; NA = not available.

Note: Full or empty rail containers entering the United States. The data include containers moving as in-bond shipments.

**Table 2-8. Incoming Rail Container Crossings
by State, U.S.- Mexican Border**

State	1998	2000	2004
Arizona	35,812	50,602	46,899
California	7,755	9,115	15,091
New Mexico	N	N	N
Texas	344,339	512,108	613,315
Total U.S. - Mexico border	387,906	571,825	675,305

Key: N = not applicable.

Note: Full or empty rail containers entering the United States. The data include containers moving as in-bond shipments.

Most freight trains enter the United States through five states: Michigan, Texas, Minnesota, New York, and North Dakota. Three border crossings — Port Huron, MI, Detroit, MI, and International Falls, MN — account for half of all containers coming in to the United States from Canada by rail. On the Mexican border, Laredo, TX by itself accounts for half of all containers coming into the United States by rail.

TABLE 2-7. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2005, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-8. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2005, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

Table 2-9. Top 25 Airports by Landed Weight of All-Cargo Operations¹

Airport	2003 Rank	Landed weight (thousands of short tons)			
		2000	2001	2002	2003
Anchorage, AK (Ted Stevens Anchorage International) ²	1	8,084	7,777	8,994	9,007
Memphis, TN (Memphis International)	2	6,318	6,865	8,826	8,760
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,026	4,202	4,172
Miami, FL (Miami International)	4	2,929	3,055	3,174	3,239
Los Angeles, CA (Los Angeles International)	5	2,892	2,929	3,038	3,120
New York, NY (John F. Kennedy International)	6	2,793	2,543	2,912	2,937
Chicago, IL (O'Hare International)	7	2,062	2,012	2,217	2,351
Indianapolis, IN (Indianapolis International)	8	2,884	3,154	2,338	2,277
Newark, NJ (Newark Liberty International)	9	1,961	1,795	1,758	1,835
Oakland, CA (Metropolitan Oakland International)	10	1,811	1,639	1,746	1,695
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,546	1,481	1,481
Philadelphia, PA (Philadelphia International)	12	1,454	1,452	1,466	1,365
Ontario, CA (Ontario International)	13	1,220	1,291	1,444	1,338
San Francisco, CA (San Francisco International)	14	1,267	1,012	1,035	1,200
Atlanta, GA (William B. Hartsfield International)	15	1,090	1,043	1,166	1,194
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	16	912	980	1,043	1,098
Honolulu, HI (Honolulu International)	17	692	789	970	1,017
Seattle, WA (Seattle-Tacoma International)	18	1,060	958	881	796
Dayton, OH (James M. Cox Dayton International)	19	2,233	1,444	897	784
Phoenix, AZ (Sky Harbor International)	20	920	838	867	779
Portland, OR (Portland International)	21	882	807	816	749
Denver, CO (Denver International)	22	900	803	783	747
Minneapolis, MN (Minneapolis-St Paul International/Wold Chamberlain)	23	622	586	621	687
Houston, TX (George Bush Intercontinental)	24	480	463	482	666
San Juan, PR (Luis Munoz Marin International)	25	485	417	537	652
Top 25 airports		(R) 51,627	(R) 50,224	(R) 53,693	53,947
United States, all airports³		(R) 74,754	(R) 71,426	(R) 73,290	73,072
Top 25 as % of U.S. total		69.1%	70.3%	73.3%	73.8%

Key: R = revised.

¹All-Cargo operations are operations dedicated to the exclusive transportation of cargo. This does not include aircraft carrying passengers that may also be carrying cargo. Aircraft landed weight is the certificated maximum gross landed weight of the aircraft as specified by the aircraft manufacturers.

²Anchorage includes a large proportion of all-cargo operations in-transit.

³Limited to airports with an aggregate landed weight in excess of 100 million pounds (50,000 short tons) annually.

Note: 1 short ton = 2,000 lbs.

The Federal Aviation Administration (FAA) reports that Anchorage International and Memphis International are this country's two most important airports that handle all-cargo aircraft. All-cargo aircraft are those dedicated to the exclusive transportation of cargo. They do not include aircraft carrying passengers as well as cargo. Of the top 25 airports that handle all-cargo operations, Memphis is also one of the fastest growing, up 39 percent since 2000, along with Honolulu (47 percent), Houston (39 percent), and San Juan (34 percent).

TABLE 2-9. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS

Source: U.S. Department of Transportation, Federal Aviation Administration, ACAIS Database Report F5, CY 2003 and CY 2001, available at <http://www2.faa.gov/arp/planning/stats> as of June 27, 2005

Trucks move more than one-half of all hazardous materials shipped from a location in the United States. However, truck ton-miles of hazardous shipments account for a much smaller share, about one-third of all ton-miles, because such shipments travel relatively short distances. By contrast, rail accounts for only 5 percent of shipments by weight but 22 percent by ton-miles.

Table 2-10. U.S. Hazardous Materials Shipments by Transportation Mode: 2002

Transportation mode	Value		Tons		Ton-miles		Average miles per shipment
	\$ Billion	Percent	Millions	Percent	Billions	Percent	
All modes, total	660.2	100.0	2,191.5	100.0	326.7	100.0	136
Single modes, total	644.5	97.6	2,158.5	98.5	311.9	95.5	105
Truck ¹	419.6	63.6	1,159.5	52.9	110.2	33.7	86
For-hire	189.8	28.8	449.5	20.5	65.1	19.9	285
Private ²	226.7	34.3	702.2	32.0	44.1	13.5	38
Rail	31.3	4.7	109.4	5.0	72.1	22.1	695
Water	46.9	7.1	228.2	10.4	70.6	21.6	S
Air	1.6	0.2	0.1	0.003	0.1	0.03	2,080
Pipeline ³	145.0	22.0	661.4	30.2	S	S	S
Multiple modes, total	9.6	1.5	18.7	0.9	12.5	3.8	849
Parcel, U.S. Postal Service or Courier	4.3	0.6	0.2	0.01	0.1	0.04	837
Other	5.4	0.8	18.5	0.8	12.4	3.8	1,371
Unknown and other modes, total	6.1	0.9	14.2	0.6	2.3	0.7	57

Key: S = data are not published because of high sampling variability or other reasons; Z = zero or less than 1 unit of measure.

¹Truck as a single mode includes shipments that went by private truck only, for-hire truck only, or a combination of both.

² Private truck refers to a truck operated by a temporary or permanent employee of an establishment or the buyer/receiver of the shipment.

³Excludes most shipments of crude oil.

Table 2-11. U.S. Hazardous Materials Shipments by Hazard Class: 2002

Hazard class	Description	Value		Tons		Ton-miles	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	7.9	1.2	5.0	0.2	1.6	0.5
Class 2	Gases	73.9	11.2	213.4	9.7	37.3	11.4
Class 3	Flammable liquids	490.2	74.3	1,789.0	81.6	218.6	66.9
Class 4	Flammable solids	6.6	1.0	11.3	0.5	4.4	1.3
Class 5	Oxidizers and organic peroxides	5.5	0.8	12.7	0.6	4.2	1.3
Class 6	Toxic (poison)	8.3	1.3	8.5	0.4	4.3	1.3
Class 7	Radioactive materials	5.9	0.9	0.1	0.003	0.04	0.01
Class 8	Corrosive materials	38.3	5.8	90.7	4.1	36.3	11.1
Class 9	Miscellaneous dangerous goods	23.6	3.6	61.0	2.8	20.2	6.2
Total		660.2	100.0	2,191.5	100.0	326.7	100.0

TABLE 2-10. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2002

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, U.S. Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a.

TABLE 2-11. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, U.S. Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a.



Flammable liquids, especially gasoline, are the predominant hazardous material transported in the United States. In terms of ton-miles, flammable liquids account for about 67 percent of total ton-miles of hazardous materials shipments. The next largest class of hazardous materials in terms of ton-miles is gases at about 11 percent.

Despite the enormous amount of freight being moved by truck in the United States, the United States moves a much smaller share of its goods domestically by truck and a much greater share of goods by rail than countries in western Europe and Japan.

Table 2-12. Percent Share of Total Domestic Freight Activity by Transportation Mode: 1996

Mode	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Air	0.14	0.08	0.01	0.11	0.09	0.01	0.29
Water	9.2	5.2	17.6	13.0	58.0	23.6	20.5
Oil pipeline	23.9	9.0	4.1	4.7	NA	5.5	16.6
Rail	50.5	20.7	19.6	8.7	3.1	6.3	36.3
Road	16.3	65.0	58.6	73.5	38.1	64.7	26.4

Key: NA = not available.

TABLE 2-12. PERCENT SHARE OF TOTAL DOMESTIC FREIGHT ACTIVITY BY MODE: 1996

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *G-7 Countries: Transportation Highlights*, BTS99-01 (Washington, DC: 1999), available at www.bts.gov as of August 26, 2004.

III. THE FREIGHT TRANSPORTATION SYSTEM

Freight is carried via an extensive network of roads, railroad, waterways, and pipelines. Road infrastructure increased slowly over the past two decades despite a large increase in the volume of traffic. Between 1980 and 2003, route miles of public roads increased by 3 percent compared with an 89 percent increase in vehicle miles traveled (vmt). Over the same period, miles of railroad dropped by more than 20 percent, while rail shipments (measured in ton-miles) increased by 69 percent.

Table 3-1. Miles of Infrastructure by Transportation Mode

	1980	1990	2000	2003	Percent change, 1980-2003
Public roads, route miles	3,859,837	3,866,926	3,951,101	3,989,847	3.4
National Highway System (NHS)	N	N	161,189	161,801	N
Interstates	41,120	45,074	46,673	46,769	13.7
Other NHS	N	N	114,516	115,032	N
Freight Intermodal connectors ¹	N	N	N	1,853	N
Other	N	N	3,789,912	3,828,047	N
Strategic Highway Corridor Network (STRAHNET)	N	N	62,066	62,576	N
Interstate	N	N	46,675	46,773	N
Non-Interstate	N	N	15,389	15,803	N
Railroad	² 183,077	175,909	170,512	140,939	-23.0
Class I	NA	133,189	120,597	98,944	NA
Regional	NA	18,375	20,978	15,648	NA
Local	NA	24,337	28,937	26,347	NA
Inland waterways					
Navigable channels	11,000	11,000	11,000	11,000	0.0
Great Lakes-St. Lawrence Seaway	2,342	2,342	2,342	2,342	0.0
Pipelines					
Oil	218,393	208,752	176,996	160,868	-26.3
Gas	1,051,774	(R) 1,189,200	(R) 1,369,300	1,424,200	35.4

Key: N = not applicable; NA = not available; R = revised.

¹Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.

²Excludes Class III railroads.

TABLE 3-1. MILES OF INFRASTRUCTURE BY MODE

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table HM-16.

Freight Intermodal connectors: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, National Highway System Intermodal Connectors, available at <http://www.fhwa.dot.gov/hap10/nhs/intermodalconnectors/index.html> as of July 5, 2005.

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).

Navigable channels: U.S. Army Corps of Engineers.

Great Lakes-St. Lawrence Seaway: Great Lakes-St. Lawrence Seaway System, "Seaway Facts," available at <http://www.greatlakes-seaway.com/en/aboutus/seawayfacts.html> as of July 6, 2005.

Oil pipelines: 1980-2000: ENO Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002).

2003: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, *Pipeline Statistics*, internet site <http://ops.dot.gov/stats/lpo.htm> as of July 5, 2005.

Gas pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).

Table 3-2. Number of U.S. Vehicles, Vessels, and Other Conveyances

	1980	1990	2000	2003
Highway	161,490,159	193,057,376	225,821,241	236,760,033
Truck, single-unit 2-axle 6-tire or more	4,373,784	4,486,981	5,926,030	5,666,933
Truck, combination	1,416,869	1,708,895	2,096,619	2,245,085
Truck, total	5,790,653	6,195,876	8,022,649	7,912,018
Trucks as percent of all highway vehicles	3.6	3.2	3.6	3.3
Rail				
Class I, locomotive	28,094	18,835	20,028	20,774
Class I, freight cars ¹	1,168,114	658,902	560,154	467,063
Nonclass I freight cars ¹	102,161	103,527	132,448	124,580
Car companies and shippers freight cars ¹	440,552	44	2 9,83	688,194
Water	38,788	39,445	41,354	39,983
Nonsel-propelled vessels ²	31,662	31,209	33,152	31,335
Self-propelled vessels ³	7,126	8,236	8,202	8,648
Oceangoing steam and motor ships ⁴	864	636	454	412
US Flag fleet as percent of world fleet ⁴	3.5	2.7	1.6	1.4

¹Beginning with 2003 data, Canadian-owned U.S. railroads are excluded. This accounts for about 47,000 cars in 2000.

²Nonsel-propelled vessels include dry-cargo barges, tank barges, and railroad-car floats.

³Self-propelled vessels include dry cargo, passenger, off-shore support, tankers, and towboats.

⁴1,000 gross tons and over.

A vast number of vehicles and vessels move goods over the transportation network. The number of commercial trucks climbed 37 percent between 1980 and 2003, but their share of the total highway vehicle fleet remained constant. The character of the commercial truck fleet has changed, however, as the number of combination trucks grew twice as fast as the number of single-unit trucks over this period, 59 percent versus 30 percent. In comparison, the number of rail freight cars declined since 1980 as newer cars typically have greater capacity than older ones.

TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES

Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

Rail: Association of American Railroads, *Railroad Facts 2004* (Washington, DC: 2004).

Water: Nonself-propelled vessels and self-propelled vessels: U.S. Army, Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 1, National Summaries* (New Orleans, LA: Annual issues).

Oceangoing steam motor ships: U.S. Department of Transportation, Maritime Administration, *Merchant Fleets of the World* (Washington, DC: Annual issues).

Most heavy truck miles are made in the carriage of commodities. Nevertheless, about 20 percent of truck miles are made with no product on board.

The weight profile of heavy trucks on the road (those over 10,000 pounds) changed between 1987 and 2002 with greater use of trucks at both the lighter and heavier ends of the spectrum.

Between 1987 and 2002, the number of light-heavy trucks (between 10,000 and 19,500 pounds) and heavy-heavy trucks (over 26,000 pounds) increased 86 percent and 42 percent respectively. Over the same period, the number of medium-heavy trucks (between 19,501 and 26,000 pounds) grew by only 19 percent. Trucks between 60,000 and 80,000 pounds average weight form the largest category in both number of trucks and vmt because in most cases 80,000 pounds is the maximum allowed on the highway system.

Table 3-3. Truck Miles by Products Carried: 2002¹

Products carried	Millions of miles
Total²	145,172
Animals and fish, live	735
Animal feed and products of animal origin	2,088
Grains, cereal	1,368
All other agricultural products	2,661
Basic chemicals	876
Fertilizers and fertilizer materials	1,666
Pharmaceutical products	305
All other chemical products and preparations	1,351
Alcoholic beverages	1,124
Bakery and milled grain products	3,553
Meat, seafood, and their preparations	3,056
Tobacco products	445
All other products foodstuff	7,428
Logs and other wood in the rough	1,149
Paper or paperboard articles	3,140
Printed products	765
Pulp, newsprint, paper, paperboard	1,936
Wood products	3,561
Articles of base metal	3,294
Base metal in primary or semifinished forms	2,881
Nometallic mineral products	3,049
Tools, nonpowered	7,759
Tools, powered	6,478
Electronic and other electrical equipment	3,024
Furniture, mattresses, lamps, etc.	2,043
Machinery	3,225
Miscellaneous manufactured products	4,008
Precision instruments and apparatus	734
Textile, leather, and related articles	1,538
Vehicles, including parts	3,844
All other transportation equipment	636
Coal	301
Crude petroleum	132
Gravel or crushed stone	2,790
Metallic ores and concentrates	45
Monumental or building stone	462
Natural sands	1,089
All other nonmetallic minerals	499
Fuel oils	1,232
Gasoline and aviation turbine fuel	849
Plastic and rubber	2,393
All other coal and refined petroleum products	1,172
Hazardous waste (EPA manifest)	190
All other waste and scrape (non-EPA manifest)	2,647
Recyclable products	922
Mail and courier parcels	4,760
Empty shipping containers	794
Passengers	274
Mixed freight	14,659
Products, equipment, or materials not elsewhere classified	265
Products not specified	6,358
Not applicable ³	150
No product carried	28,977

¹Excludes pickups, panels, minivans, sport utilities, and station wagons.

²Detail lines may not add to total because multiple products/hazardous materials may be carried at the same time.

³Vehicles not in use. When the respondent had partial-year ownership of the vehicle, annual miles were adjusted to reflect miles traveled when not owned by the respondent.

TABLE 3-3. TRUCK MILES BY PRODUCTS CARRIED: 2002
Source: U.S. Department of Commerce, Census Bureau, *Vehicle Inventory and Use Survey 2002: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 6, 2005.

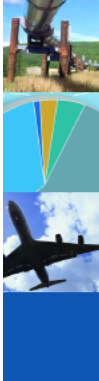




Table 3-4. Number and Vehicle-Miles Traveled (VMT) of Trucks by Average Weight (Including Vehicle and Load)¹

Average weight (pounds)	1987		1992		1997		2002		Percent change, 1987-2002	
	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number	VMT
Total	3,624	89,972	4,008	104,987	4,701	147,876	5,415	145,624	49	62
Light-heavy	1,030	10,768	1,259	14,012	1,436	19,815	1,914	26,256	86	144
10,001 to 14,000	525	5,440	694	8,000	819	11,502	1,142	15,186	118	179
14,001 to 16,000	242	2,738	282	2,977	316	3,951	396	5,908	64	116
16,001 to 19,500	263	2,590	282	3,035	301	4,362	376	5,161	43	99
Medium-heavy	766	7,581	732	8,143	729	10,129	910	11,766	19	55
19,501 to 26,000	766	7,581	732	8,143	729	10,129	910	11,766	19	55
Heavy-heavy	1,829	71,623	2,017	82,832	2,536	117,931	2,591	107,602	42	50
26,001 to 33,000	377	5,411	387	5,694	428	7,093	437	5,845	16	8
33,001 to 40,000	209	4,113	233	5,285	257	6,594	229	3,770	10	-8
40,001 to 50,000	292	7,625	339	9,622	400	13,078	318	6,698	9	-12
50,001 to 60,000	188	7,157	227	8,699	311	12,653	327	8,950	74	25
60,001 to 80,000	723	45,439	781	51,044	1,070	74,724	1,179	77,489	63	71
80,001 to 100,000	28	1,254	33	1,529	46	2,427	69	2,950	144	135
100,001 to 130,000	8	440	12	734	18	1,051	26	1,571	238	257
130,001 or more	4	185	5	227	6	312	6	329	43	78

¹Excludes trucks with an average weight of 10,000 pounds or less.

Note: Weight includes the empty weight of the vehicle plus the average weight of the load carried.

Federal and state governments are very concerned about truck weight because of the damage that heavy trucks can do to roads and bridges. To monitor truck weight, approximately 200 million weighs are made each year, about half are weigh-in-motion and half static. Less than 1 percent of weighs discover violations.

Table 3-5. Commercial Vehicle Weight Enforcement Activities

	2000	2001	2002	2003
All weighs	192,991,221	198,459,894	208,429,680	177,369,377
Weigh-in-motion	92,908,114	98,177,442	106,662,180	95,078,759
Static weighs ¹	100,103,107	100,282,452	101,861,470	82,290,618
Semiportable scales	NA	902,380	592,604	522,758
Fixed scales	NA	98,751,448	99,710,078	81,276,662
Portable scales	NA	628,624	1,558,788	491,198
Violations ²	653,720	663,706	657,308	515,587
Axle weight violations	NA	281,681	271,308	254,910
Gross weight violations	NA	141,707	144,518	132,258
Bridge weight violations	NA	240,318	241,482	128,419
Permits ³	3,483,746	3,402,522	3,566,236	3,554,449
Non-divisible trip permits	NA	2,685,971	2,603,257	2,629,392
Non-divisible annual permits	NA	197,328	251,245	234,607
Divisible trip permits	NA	226,100	240,782	258,206
Divisible annual permits	NA	289,400	422,522	377,482
Divisible overwidth permits	NA	3,723	48,430	44,762

Key: NA = not available.

¹Static weighs include the total vehicles weighed from semiportable, portable, and fixed scales.

²Violations include those from axle, gross, and bridge formula weight limits.

³Permits issued are for divisible and non-divisible loads on a trip or annual basis, as well as the overwidth movement of a divisible load.

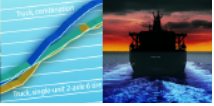
TABLE 3-4. NUMBER AND VEHICLE-MILES TRAVELED (VMT) OF TRUCKS BY AVERAGE WEIGHT

Sources: U.S. Department of Commerce, Census Bureau, 2002 *Vehicle Inventory and Use Survey: United States* (Washington, DC: 2004), available at <http://www.census.gov/ved/www/02vehinv.html> as of July 1, 2005;

U.S. Department of Commerce, Census Bureau, 1992 *Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at <http://www.census.gov/ved/www/92vehinv.html> as of July 1, 2005.

TABLE 3-5. COMMERCIAL VEHICLE WEIGHT ENFORCEMENT ACTIVITIES

Source: U.S. Department of Transportation, Federal Highway Administration, Annual State Certifications of Size and Weight Enforcement on Federal-aid Highways, as prescribed under CFR Part 657.



In addition to weight, state and federal governments are also interested in the length and other characteristics of commercial trucks using the road system. Twenty nine states have semitrailer length limitations on the National Truck Network other than the 48-foot limit set by Federal law for a semitrailer operating in a truck tractor-semi-trailer combination.

Table 3-6. Semitrailer Length Limitations On National Truck Network by State (48 Feet Unless Otherwise Specified)

State	Length limitation (feet and inches)
Alabama	53-6
Arizona	57-6
Arkansas	53-6
California ¹	48-0
Colorado	57-4
Delaware	53-0
Illinois	53-0
Indiana ²	48-6
Iowa	53-0
Kansas	57-6
Kentucky	53-0
Louisiana	59-6
Mississippi	53-0
Missouri	53-0
Montana	53-0
Nebraska	53-0
Nevada	53-0
New Mexico	57-6
North Dakota	53-0
Ohio	53-0
Oklahoma	59-6
Oregon	53-0
Pennsylvania	53-0
Rhode Island	48-6
South Dakota	53-0
Tennessee	50-0
Texas	59-0
Wisconsin ³	48-0
Wyoming	57-4

¹Semitrailers up to 53 feet may also operate without a permit by conforming to a kingpin-to-rear-most axle distance of 38 feet.

²Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most axle distance of 40 feet and 6 inches. Semitrailers that are consistent with 23 CFR 23 658.13(h) may operate without a permit provided the distance from the kingpin to the center of the rear axle is 46 feet or less.

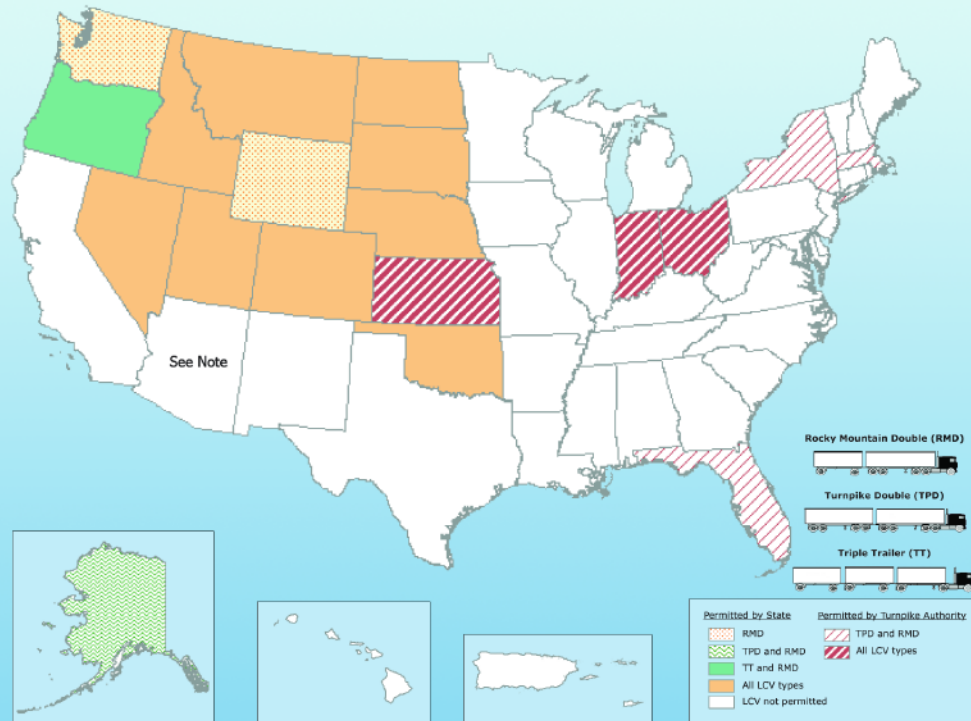
³Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most axle distance of 41 feet, measured to the center of the rear tandem assembly. Semitrailers that are consistent with 23 CFR 658.13(h) may operate without a permit provided the distance from the kingpin to the center of the rear axle is 46 feet or less.

Note: The National Truck Network is the composite of the individual network of highways from each state on which vehicles authorized by the Surface Transportation Assistance Act of 1982 are allowed to operate.

TABLE 3-6. SEMITRAILER LENGTH LIMITATIONS ON NATIONAL TRUCK NETWORK BY STATE (48 FEET UNLESS OTHERWISE SPECIFIED)

Source: U.S. Department of Transportation, Federal Highway Administration, Truck Size and Weight, Route Designations - Length, Width and Weight Limitations, Code of Federal Regulations, Title 23, Part 658.

Figure 3-1. Permitted Longer Combination Vehicles (LCVs) by State and Truck Configuration



Note: LCVs (of all types) are only permitted on I-15 that traverses the northwest corner of the states.

Fourteen states and six state turnpike authorities allow at least one type of Longer Combination Vehicle (LCV) on at least some parts of the road network.

FIGURE 3-1. PERMITTED LONGER COMBINATION VEHICLES (LCVs) BY STATE AND TRUCK CONFIGURATION

Source: U.S. Department of Transportation, Federal Highway Administration, *Comprehensive Truck Size and Weight Study, Volume II* (Washington, DC: 2000).

The speed limit is another important variable for road users. Speed limits for trucks vary from state to state and often differ from limits set for passenger vehicles.

As highway traffic increases over the next twenty years, the conditions that truckers will encounter on the roads are expected to worsen considerably (figures 3-2 and 3-3 on page 30).

Table 3-7. Maximum Posted Speed Limits on Rural Interstates: 2005 (miles per hour)

State	Truck	Car
Alabama	70	70
Alaska	65	65
Arizona	75	75
Arkansas	65	70
California	55	70
Colorado	75	75
Connecticut	65	65
Delaware	65	65
District of Columbia ¹	55	55
Florida	70	70
Georgia	70	70
Hawaii	60	60
Idaho	65	75
Illinois	55	65
Indiana	² 65	² 70
Iowa	² 70	² 70
Kansas	70	70
Kentucky	65	65
Louisiana	70	70
Maine	65	65
Maryland	65	65
Massachusetts	65	65
Michigan	55	70
Minnesota	70	70
Mississippi	70	70
Missouri	70	70
Montana	65	75
Nebraska	75	75
Nevada	75	75
New Hampshire	65	65
New Jersey	65	65
New Mexico	75	75
New York	65	65
North Carolina	70	70
North Dakota	75	75
Ohio	55	65
Oklahoma	75	75
Oregon	55	65
Pennsylvania	65	65
Rhode Island	65	65
South Carolina	70	70
South Dakota	75	75
Tennessee	70	70
Texas	65	75
Utah	75	75
Vermont	65	65
Virginia	65	65
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

¹Urban Interstate.

²Indiana and Iowa increased speed limits for both cars and trucks by 5 miles per hour beginning July 1, 2005.

Note: 55 miles per hour (mph) = 89 kilometers per hour (kph); 60 mph = 97 kph; 65 mph = 105 kph; 70 mph = 113 kph.

TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2005

Source: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles as of May 2005, available at http://www.hwysafety.org/safety_facts/state_laws/speed_limit_laws.htm as of June 27, 2005.



Figure 3-2. National Highway System Estimated Peak Period Congestion: 1998



Figure 3-3. National Highway System Estimated Peak Period Congestion: 2020



FIGURE 3-2. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 1998

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.

FIGURE 3-3. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 2020

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.

IV. THE FREIGHT TRANSPORTATION INDUSTRY



The freight industry has many components, encompassing companies large and small. All told there were about 200,000 transportation and warehousing establishments in 2002, with more than half of those primarily engaged in trucking. Trucking revenue accounts for about 40 percent of the transportation and warehousing sector. Revenue generated by warehousing is a small percentage of the entire transportation and warehousing sector.

Table 4-1. Economic Characteristics of Transportation and Warehousing in Freight Dominated Modes North American Industry Classification System (NAICS) Basis

	Establishments		Revenue (\$ thousands)		Payroll (\$ thousands)		Paid Employees	
	1997	2002	1997	2002	1997	2002	1997	2002
Transportation and warehousing¹	178,025	(R) 200,421	318,245,044	394,456,801	82,346,182	(R) 118,251,681	2,920,777	(R) 3,757,426
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,921	(R) 1,924	24,019,168	(R) 23,124,300	2,834,114	(R) 3,031,880	72,857	(R) 65,326
Truck transportation ¹	103,798	(R) 112,698	141,225,398	(R) 165,561,328	38,471,272	(R) 47,833,733	1,293,790	(R) 1,437,259
Pipeline transportation	2,311	(R) 2,512	26,836,992	(R) 27,641,362	2,660,576	(R) 3,082,558	49,280	(R) 46,556
Support activities for transportation	30,675	(R) 34,223	39,758,245	(R) 62,315,569	12,592,441	(R) 16,558,036	411,640	(R) 478,166
Couriers and messengers	10,887	(R) 12,754	39,812,433	(R) 59,373,155	14,071,630	(R) 17,431,848	530,839	(R) 578,257
Warehousing and storage ¹	6,497	(R) 12,637	10,657,925	(R) 17,924,787	2,926,119	(R) 18,689,122	109,760	(R) 639,174

Key: NA = not available; R = revised.

¹Enterprise support establishments are included in 2002 but not 1997, thus the two years are not comparable.

Notes: Total includes air transportation, transit and ground passenger transportation, and scenic and sightseeing transportation. Data are for establishments in which transportation is the primary business. Data exclude transportation provided privately, such as trucking organized "in-house" by a grocery company. Data are not collected for rail transportation nor for governmental organizations even when their primary activity would be classified in industries covered by the census. For example, data are not collected for publicly-operated buses and subway systems. Data for 2002 are preliminary and subject to change.

Table 4-2. Economic Characteristics of Freight Railroads

	Class I		Non-Class I		Total	
	1997	2002	1997	2002	1997	2002
Number of railroads	9	7	541	545	550	552
Freight revenue (billions \$)	32.3	34.1	3.0	2.8	35.3	36.9
Operating revenue (billions \$)	33.1	35.3	NA	NA	NA	NA
Employees	177,981	157,372	22,736	19,688	200,717	177,060

Key: NA = not available.

TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING IN FREIGHT DOMINATED MODES, NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) BASIS

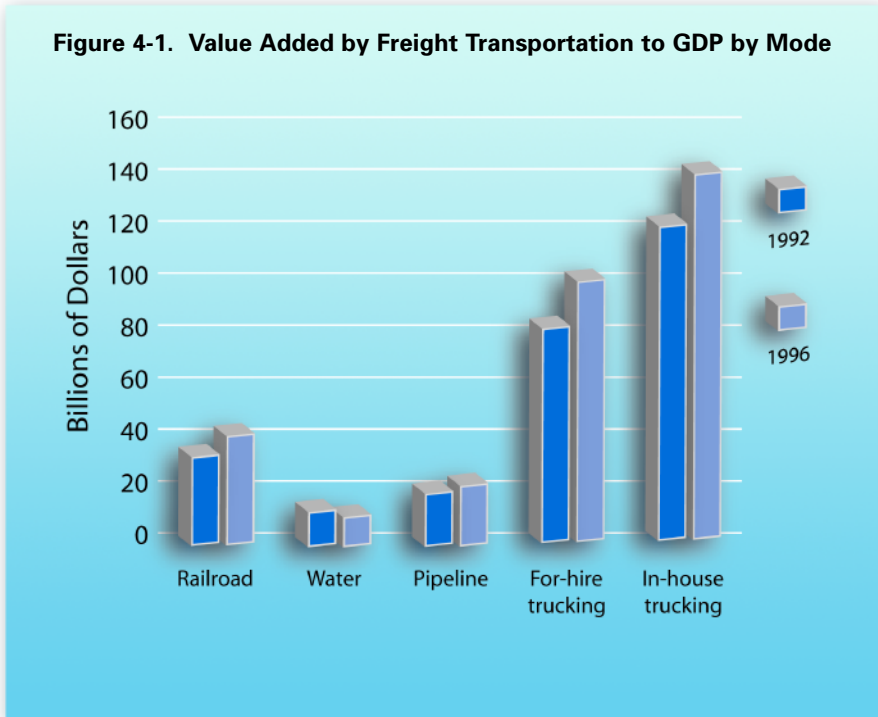
Source: U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation and Warehousing, United States*, available at http://www.census.gov/econ/census02/data/us/US000_48.HTM as of September 14, 2005; U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation and Warehousing, United States*, available at http://www.census.gov/epcd/ec97/us/US000_48.HTM as of September 14, 2005.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS

Source: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).



Figure 4-1. Value Added by Freight Transportation to GDP by Mode

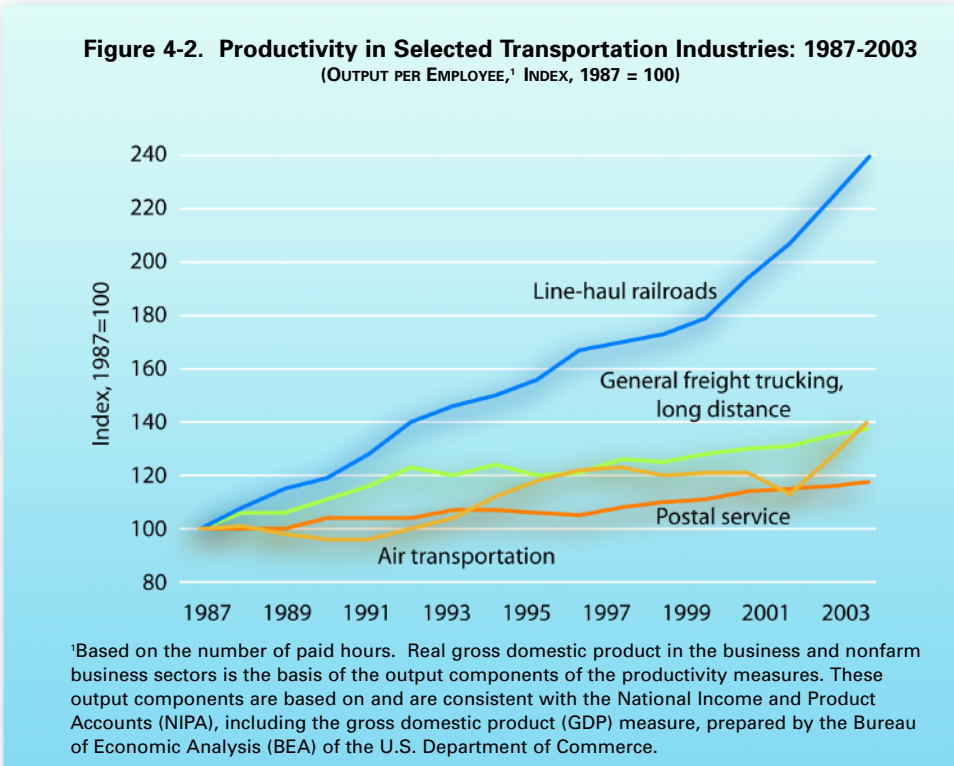


Freight transportation is a big part of the economy. The value generated by transportation services in moving goods and people on the transportation system is about 5 percent of Gross Domestic Product. In the transportation services sector about 60 percent of the value is generated by for-hire transportation services and the rest is generated by “in-house” transportation (transportation provided by businesses for their own

use). In-house trucking accounted for \$142 billion of GDP in 1996 (the latest year for which data are available) and for-hire trucking accounted for \$101 billion.

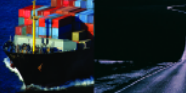
In general, moving goods is cheaper now than in the past. Productivity has improved in both long-distance railroading and long-distance trucking over the past decade, but

Figure 4-2. Productivity in Selected Transportation Industries: 1987-2003
(OUTPUT PER EMPLOYEE,¹ INDEX, 1987 = 100)



¹Based on the number of paid hours. Real gross domestic product in the business and nonfarm business sectors is the basis of the output components of the productivity measures. These output components are based on and are consistent with the National Income and Product Accounts (NIPA), including the gross domestic product (GDP) measure, prepared by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce.

much more quickly in rail than road transportation. Between 1987 and 2003, output per hour worked more than doubled in line-haul railroading but grew only 40 percent in long distance, general freight trucking. Line-haul railroads primarily engage in operating railroads for the transport of passengers



and/or cargo over a long distance within a rail network. These establishments do not include switching and terminal operations or short distance (or local) railroads. Long distance, general freight trucking establishments are operations other than those primarily engaged in local trucking and specialized trucking. Specialized trucking establishments are engaged in the transportation of freight that, because of size, weight, shape, or other inherent characteristics, requires specialized equipment, such as flatbeds, tankers, or refrigerated trailers.

Table 4-3. Employment in For-Hire Transportation Primarily Serving Freight¹ (Thousands)

	1980	1990	2000	2004
Total U.S. labor force²	90,528	109,487	131,785	131,480
Transportation and warehousing	2,961	3,476	4,410	4,250
Rail transportation	518	272	232	224
Water transportation	NA	57	56	57
Truck transportation	NA	1,122	1,406	1,351
Pipeline transportation	NA	60	46	39
Support activities for transportation	NA	364	537	536
Postal service	673	825	880	784
Couriers and messengers	NA	375	605	561
Warehousing and storage	NA	407	514	556

Key: NA = not available.

¹Annual averages.

²Excludes farm employment.

Note: These data include workers employed in transportation industries but not necessarily in a transportation occupation, such as a lawyer working for a trucking company. Moreover, these data exclude workers in transportation occupations employed by non-transportation industries, such as a truck driver employed by a retail company.

Employment in many transportation industries has remained steady or has grown over the past two decades, but it has plummeted in rail transportation as productivity has soared. Between 1980 and 2004, rail employment declined nearly 60 percent. Consequently, in 2004 rail transportation employed only 5 percent of those working in the transportation and warehousing industry compared with 18 percent in 1980. By comparison, employment in trucking in 2004 accounted for about one-third of employment in transportation and warehousing.

FIGURE 4-1. VALUE ADDED BY FREIGHT TRANSPORTATION TO GDP BY MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, September 2000.

FIGURE 4-2. PRODUCTIVITY IN SELECTED TRANSPORTATION INDUSTRIES: 1987-2003

Source: U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at <http://www.bls.gov/> as of September 12, 2005.

TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION PRIMARILY SERVING FREIGHT (THOUSANDS)

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov as of July 1, 2005.



Freight transportation is a major employer, with truck driving by far the largest freight transportation occupation in the United States. There were approximately 2.9 million truck drivers in 2004; about 54 percent of these professionals drive heavy/tractor trailer trucks, 32 percent drive light/delivery service trucks, and about 14 percent are driver/sales workers.

Table 4-4. Employment in Selected Freight Transportation and Freight Transportation-Related Occupations

Occupation (SOC code)	1999	2000	2004
Vehicle operators, pipeline operators, and primary support			
Driver/sales worker (53-3031)	385,210	373,660	406,910
Truck drivers, heavy and tractor-trailer (53-3032)	1,558,400	1,577,070	1,553,370
Truck drivers, light or delivery services (53-3033)	1,085,050	1,033,220	938,730
Locomotive engineers (53-4011)	19,940	29,390	31,180
Rail yard engineers, dinky operators, and hostlers (53-4013)	5,070	4,020	6,170
Railroad brake, signal, and switch operators (53-4021)	14,500	16,830	16,410
Railroad conductors and yardmasters (53-4031)	36,680	40,380	35,720
Sailors and marine oilers (53-5011)	27,200	30,090	27,570
Captains, mates, and pilots of water vessels (53-5021)	20,660	21,080	25,200
Ship engineers (53-5031)	6,800	7,370	10,330
Bridge and lock tenders (53-6011)	6,970	4,790	3,500
Gas compressor and gas pumping station operators (53-7071)	6,940	6,510	4,680
Pump operators, except wellhead pumpers (53-7072)	13,480	13,730	9,810
Transportation equipment manufacturing and maintenance occupations			
Bus and truck mechanics and diesel engine specialists (49-3031)	273,320	258,800	251,430
Rail car repairers (49-3043)	7,230	10,620	18,140
Transportation Infrastructure construction and maintenance occupations			
Rail-track laying and maintenance equipment operators (47-4061)	8,620	9,940	10,430
Signal and track switch repairers (49-9097)	3,720	5,540	7,780
Dredge operators (53-7031)	1,910	3,100	1,730
Secondary support service occupations			
Dispatchers, except police, fire, and ambulance (43-5032)	171,560	167,180	165,910
Postal service mail carriers (43-5052)	352,550	354,980	344,050
Shipping, receiving, and traffic clerks (43-5071)	886,230	864,530	747,270
Transportation inspectors (53-6051)	22,440	26,520	24,140
Tank car, truck, and ship loaders (53-7121)	20,830	17,480	16,530

Key: SOC = Standard Occupational Classification.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Employment and Wages, 2004* (Washington, DC: May 2004), available at <http://www.bls.gov/oes> as of July 5, 2005.

V. SAFETY, ENERGY, AND ENVIRONMENTAL CONSEQUENCES OF FREIGHT TRANSPORTATION

Growing demand for freight transportation heightens concerns about its safety, energy, and environmental consequences. Most of our current knowledge is in safety, with some in energy consumption. More information is needed to understand and fix freight-related environmental issues.

Table 5-1. Transportation Fatalities by Freight Transportation Mode

	1980	1990	2000	2003	2004 ⁵
Total transportation fatalities (passenger and freight)	NA	47,347	(R) 44,384	45,132	NA
Highway (passenger and freight)	51,091	44,599	41,945	(R) 42,884	42,636
Large truck occupants ¹	1,262	705	754	(R) 726	761
Others killed in crashes involving large trucks	4,709	4,567	4,528	(R) 4,310	4,429
Large truck occupants ¹ (percent)	2.5	1.6	1.8	(R) 1.7	1.8
Others killed in crashes involving large trucks (percent)	9.2	10.2	10.8	(R) 10.1	10.4
Railroad (passenger and freight)	1,417	1,297	937	(R) 865	899
Highway-rail crossing ²	833	698	425	(R) 332	368
Railroad ^{2,3}	584	599	512	(R) 533	531
Waterborne (passenger and freight)	487	186	(R) 187	(R) 127	93
Vessel-related ⁴	206	85	(R) 53	(R) 53	36
Freight ship	8	0	0	3	2
Tank ship	4	5	0	0	3
Tug / towboat	14	13	(R) 2	(R) 0	1
Offshore supply	NA	2	(R) 3	0	0
Fishing vessel	60	47	(R) 30	(R) 18	14
Mobile offshore drilling units	NA	0	0	(R) 2	0
Platform	NA	1	0	0	0
Freight barge	NA	0	0	0	1
Tank barge	NA	0	0	(R) 2	0
Miscellaneous	56	11	(R) 6	(R) 5	6
Not vessel-related ⁴	281	101	(R) 134	(R) 74	57
Pipeline	19	9	38	12	24
Hazardous liquid pipeline	4	3	1	0	5
Gas pipeline	15	6	37	12	19

Key: NA = not available; R = revised.

¹Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

²Includes Amtrak.

³Includes train accidents and other incidents. Most fatalities involve trespassers who are included under other incidents (482 in 2004).

⁴Vessel-related casualties include those involving damage to vessels such as collisions or groundings. Fatalities not related to vessel casualties include deaths from falling overboard or from accidents involving onboard equipment.

⁵Railroad fatalities are preliminary.

Note: Caution must be exercised in comparing fatalities across modes because significantly different definitions are used.

Nearly 5,200 people died in crashes involving large trucks in 2004, although only 761 of those were large-truck occupants. Fatalities involving large trucks are about 12 percent of all highway fatalities, while trucks account for about 7 percent of highway vehicle miles traveled (vmt). Despite a doubling of large truck travel between 1980 and 2004, the number of fatalities involving large trucks declined 13 percent over this period.

TABLE 5-1. TRANSPORTATION FATALITIES BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, available at <http://www.bts.gov/> as of September 28, 2005.

Table 5-2. Injured Persons by Freight Transportation Mode

	1980	1990	2000	2003	2004 ⁵
TOTAL injured persons (passenger and freight)	NA	NA	(R) 3,259,673	2,918,405	NA
Highway (passenger and freight)	NA	3,231,000	3,189,000	2,889,000	2,788,000
Large truck occupants ¹	NA	42,000	31,000	27,000	27,000
Others injured in crashes involving large trucks	NA	108,000	109,000	95,000	89,000
Large truck occupants ¹ (percent)	NA	1.3	1.0	0.9	1.0
Others injured in crashes involving large trucks (percent)	NA	3.3	3.4	3.3	3.2
Railroad (passenger and freight)	62,246	25,143	11,643	(R) 9,157	8,751
Highway-rail grade crossing ²	3,890	2,407	1,219	(R) 1,028	1,071
Railroad ^{2,3}	58,356	22,736	10,424	(R) 8,129	7,680
Waterborne (passenger and freight)	NA	NA	(R) 757	(R) 778	703
Vessel-related ⁴	180	175	(R) 150	(R) 227	198
Freight ship	8	10	(R) 5	(R) 8	4
Tank ship	9	13	3	(R) 1	7
Tug / towboat	27	19	10	(R) 9	22
Offshore supply	NA	9	5	(R) 5	5
Fishing vessel	28	31	(R) 23	(R) 22	36
Mobile offshore drilling units	NA	13	0	(R) 15	0
Platform	NA	9	(R) 0	0	0
Freight barge	NA	3	2	0	5
Tank barge	NA	3	0	(R) 1	1
Miscellaneous	98	12	(R) 8	(R) 29	25
Not related to vessel casualties ⁴	NA	NA	(R) 607	(R) 551	505
Pipeline	192	76	81	71	55
Hazardous liquid pipeline	15	7	4	5	13
Gas pipeline	177	69	77	66	42

Key: NA = not available; R = revised.

¹Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

²Includes Amtrak.

³Includes train accidents and other incidents. Most injuries (5,975 in 2004) involve workers on duty.

⁴Vessel-related injuries include those involving damage to vessels, such as collisions or groundings. Injuries not related to vessel casualties include those from falls overboard or from accidents involving onboard equipment.

⁵Railroad injuries are preliminary.

Note: Numbers may not add to totals due to some injuries being counted in more than one mode.

About 125,000 people are injured each year in freight transportation. Like fatalities, most injuries involve trucks. Yet, these injuries account for less than 5 percent of the total number of people injured on the highway each year. Approximately, 10 percent of injuries are the result of non-highway related incidents, mostly railroading. Since 1980, railroading has become much safer with a drop in injuries of more than 80 percent.

TABLE 5-2. INJURED PERSONS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, available at <http://www.bts.gov/> as of September 28, 2005.

Large trucks were involved in about 7 percent of all highway crashes in 2004. The estimated number of crashes in 2004 is up by about 12 percent since 1990, a good deal less than the roughly 50 percent increase in truck miles driven over the same period.

Table 5-3. Transportation Accidents by Freight Transportation Mode

	1980	1990	2000	2003	2004 ⁵
Highway (passenger and freight)	NA	6,471,000	6,394,000	6,328,000	6,181,000
Large truck ¹	NA	372,000	438,000	(R) 436,000	416,000
Large truck ¹ (percent of total)	NA	5.7	6.9	(R) 6.9	6.7
Rail (passenger and freight)					
Highway-rail grade crossing ^{2,3}	10,796	5,715	3,502	(R) 2,966	3,050
Railroad ^{2,4}	8,205	2,879	2,983	(R) 2,991	3,179
Waterborne (passenger and freight)					
Vessel-related	4,624	3,613	(R) 5,403	(R) 5,163	4,962
Pipeline					
Hazardous liquid pipeline	246	180	(R) 146	(R) 129	140
Gas pipeline	1,524	198	234	(R) 244	292

Key: NA = not available; R = revised.

¹Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

²Includes Amtrak.

³Includes both accidents and incidents. Most highway-rail grade crossing accidents are also counted under highway.

⁴Train accidents only.

⁵Railroad data are preliminary.

TABLE 5-3. TRANSPORTATION ACCIDENTS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, available at <http://www.bts.gov/> as of September 28, 2005.





Table 5-4. Hazardous Materials Transportation Incidents

	1980	1990	2000	2003	2004
Total	15,719	8,879	(R) 17,557	(R) 15,162	14,740
Accident-related	486	297	390	(R) 341	281
Air	223	297	1,419	(R) 751	995
Accident-related	0	0	1	0	0
Highway	14,161	7,296	(R) 15,063	(R) 13,599	12,977
Accident-related	347	249	327	299	233
Rail	1,271	1,279	1,058	(R) 802	753
Accident-related	134	48	62	42	48
Water¹	34	7	17	10	15
Accident-related	2	0	0	0	0
Other²	30	0	0	0	0
Accident-related	3	0	0	0	0

Key: R = revised.

¹Water category only includes packaged (nonbulk) marine. Non-packaged (bulk) marine hazardous materials incidents are reported to the U.S. Coast Guard and are not included.

²Other category includes freight forwarders and modes not otherwise specified.

Notes: Hazardous materials transportation incidents required to be reported are defined in the Code of Federal Regulations (CFR), 49 CFR 171.15, 171.16 (Form F 5800.1). Hazardous materials deaths and injuries are caused by the hazardous material in commerce. Accident related means vehicular accident or derailment. Each modal total also includes fatalities caused by human error, package failure, and causes not elsewhere classified.

Because most hazardous materials are transported by truck, most incidents related to hazardous materials transportation are on the highways. In 2003, 88 percent of all incidents were highway-related. Moreover, 54 percent of injuries and 77 percent of fatalities in hazardous materials transportation occurred in highway transportation during 2004.

A very small share of hazardous material transportation incidents are the result of a vehicular crash or

derailment (referred to as “accident-related”). In 2004, only 2 percent of incidents were accident-related. Most incidents occur because of human error or package failure, particularly during loading and unloading. While only 2 percent of incidents were accident-related in 2004, they accounted for 70 percent of all property damage.

Table 5-5. Commercial Motor Carrier Compliance Review Activity by Safety Rating

Safety rating	1999		2003		2004	
	Number	Percent	Number	Percent	Number	Percent
Satisfactory	3,485	47.9	(R) 5,002	59.9	4,396	57.7
Conditional	2,543	34.9	(R) 2,345	28.1	2,308	30.3
Unsatisfactory	1,122	15.4	(R) 754	9.0	698	9.2
Not rated	128	1.8	(R) 243	2.9	221	2.9
Total	7,278	100.0	(R) 8,344	100.0	7,623	100.0

Key: R = revised.

Note: A compliance review is an on-site examination of a motor carrier’s records and operations to determine whether the carrier meets the Federal Motor Carrier Safety Administration’s safety fitness standard. This entails having adequate safety management controls in place to ensure acceptable compliance with applicable safety requirements to reduce the risk associated with: alcohol and controlled substance testing violations; commercial driver’s license standard violations; inadequate levels of financial responsibility; the use of unqualified drivers; improper use and driving of motor vehicles; unsafe vehicles operating on the highways; failure to maintain crash registers and copies of crash reports; the use of fatigued drivers; inadequate inspection, repair, and maintenance of vehicles; transportation of hazardous materials; driving and parking rule violations; violation of hazardous materials regulations; motor vehicle crashes and hazardous materials incidents.

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS

Source: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Hazardous Materials Safety, Hazardous Materials Information System Database, available at <http://hazmat.dot.gov> as of July 19, 2005.

TABLE 5-5. COMMERCIAL MOTOR CARRIER COMPLIANCE REVIEW ACTIVITY BY SAFETY RATING

Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), March 25, 2005 data snapshot, available at <http://www.fmcsa.dot.gov/> as of July 22, 2005.



The safety fitness of motor carriers has improved markedly over the past few years. In 2004, the share of motor carriers rated satisfactory was 58 percent, up from 48 percent in 1999.

Almost a quarter of roadside inspections of commercial vehicles result in the vehicle being taken out-of-service (OOS) for a serious violation. A much lower percentage of driver and hazardous materials inspections result in OOS orders. In 2004, only 7 percent of driver inspections and 6 percent of hazardous materials inspections resulted in an OOS order.

Table 5-6. Roadside Safety Inspection Activity Summary By Inspection Type

	2002		2003		2004	
	Number	Percent	Number	Percent	Number	Percent
All inspections						
Number of inspections	(R) 3,013,652	100.0	(R) 3,012,402	100.0	3,014,907	100.0
With no violations	(R) 830,762	27.6	(R) 812,516	27.0	810,406	26.9
With violations	(R) 2,182,890	72.4	(R) 2,199,886	73.0	2,204,501	73.1
Driver inspections						
Number of inspections	(R) 2,956,676	100.0	(R) 2,956,214	100.0	2,957,827	100.0
With no violations	(R) 1,869,030	63.2	(R) 1,881,894	63.7	1,891,067	63.9
With violations	(R) 1,087,646	36.8	(R) 1,074,320	36.3	1,066,760	36.1
With OOS violations	(R) 212,633	7.2	(R) 199,837	6.8	194,276	6.6
Vehicle inspections						
Number of inspections	(R) 2,172,904	100.0	(R) 2,163,025	100.0	2,249,338	100.0
With no violations	(R) 663,956	30.6	(R) 674,793	31.2	697,558	31.0
With violations	(R) 1,508,948	69.4	(R) 1,488,232	68.8	1,551,780	69.0
With OOS violations	(R) 497,613	22.9	(R) 493,937	(R) 22.8	524,464	23.3
Hazardous materials inspections						
Number of inspections	(R) 173,090	100.0	(R) 181,691	100.0	178,951	100.0
With no violations	(R) 138,939	80.3	(R) 148,486	81.7	145,527	81.3
With violations	(R) 34,151	19.7	(R) 33,205	18.3	33,424	18.7
With OOS violations	(R) 9,938	5.7	(R) 9,571	5.3	9,957	5.6

Key: OOS = out of service; R = revised.

Notes: A roadside inspection is an examination of individual commercial motor vehicles and drivers to determine if they are in compliance with the Federal Motor Carrier Safety Regulations and/or Hazardous Materials Regulations. Serious violations result in the issuance of driver or vehicle out of service (OOS) orders. These violations must be corrected before the driver or vehicle can return to service. Moving violations also may be recorded in conjunction with a roadside inspection.

TABLE 5-6. ROADSIDE SAFETY INSPECTION ACTIVITY SUMMARY BY INSPECTION TYPE

Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier

Management Information System (MCMIS), March 25, 2005 data snapshot, available at www.fmcsa.dot.gov as of September 14, 2005.

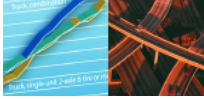


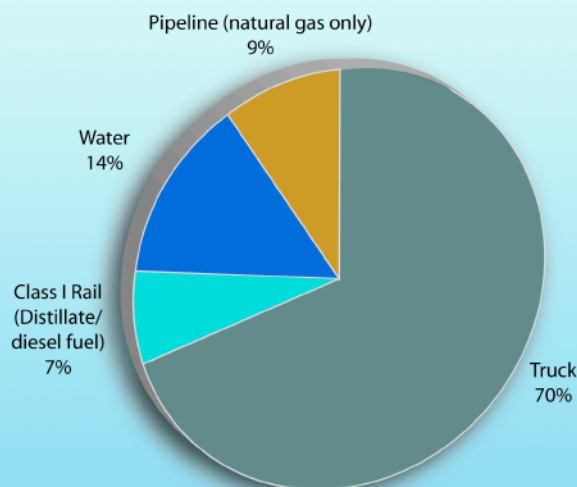
Table 5-7. Fuel Consumption by Transportation Mode

	1980	1990	2000	2003
Highway				
Gasoline, diesel and other fuels (million gallons)	114,960	130,755	162,555	169,624
Truck, total	19,960	24,490	35,229	37,585
Single-unit 2-axle 6-tire or more truck	6,923	8,357	9,563	10,690
Combination truck	13,037	16,133	25,666	26,895
Truck (percent of total)	17.4	18.7	21.7	22.2
Rail, Class I (in freight service)				
Distillate / diesel fuel (million gallons)	3,904	3,115	3,700	3,826
Water				
Residual fuel oil (million gallons)	8,952	6,326	6,410	3,874
Distillate / diesel fuel oil (million gallons)	1,478	2,065	2,261	2,217
Gasoline (million gallons)	1,052	1,300	1,124	1,107
Pipeline				
Natural gas (million cubic feet)	634,622	659,816	642,210	664,973

The number of gallons of fuel burned by commercial trucks nearly doubled over the past twenty years, while fuel use in several other modes declined. Between 1980 and 2003, the fuel consumed in highway freight transportation increased from 20 billion to 38 billion gallons annually. This is due to a substantial increase in the number of trucks on the road, an increase in the average number of miles traveled per truck, and a doubling of truck vmt. Over the same period, fuel use in Class I freight rail declined from 3.9 to 3.8 billion gallons.

In 2003, trucking accounted for 70 percent of freight transportation energy consumption. Water transportation accounted for 14 percent, natural gas pipelines 9 percent, and Class I rail only 7 percent.

Figure 5-1. Energy Consumption by Freight Transportation Mode: 2003



Note: Data do not include energy consumed by oil pipelines (crude petroleum and petroleum products) nor coal slurry/water slurry pipelines.

TABLE 5-7. FUEL CONSUMPTION BY TRANSPORTATION MODE
Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and similar tables in earlier editions. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: October 2004), p. 40. **Water:** U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2, 4, and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2003*, DOE/EIA-0131(02) (Washington, DC: January 2005), table 15 and similar tables in earlier editions.

FIGURE 5-1. ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2003
Sources: **Truck:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: 2004), p. 40. **Water:** U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2 and 4; U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2003*, DOE/EIA-0131(03) (Washington, DC: November 2004), table 15.

Over the past two decades, miles traveled per gallon by single-unit trucks increased by nearly 30 percent. Between 1980 and 2003, the fuel consumed increased 54 percent whereas miles traveled increased by 95 percent. As a result, over these years, miles per gallon increased from 5.8 to 7.3.

Table 5-8. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

	1980	1990	2000	2003
Number registered (thousands)	4,374	4,487	5,926	5,667
Vehicle-miles (millions)	39,813	51,901	70,500	77,562
Fuel consumed (million gallons)	6,923	8,357	9,563	10,690
Average miles traveled per vehicle	9,103	11,567	11,897	13,687
Average miles traveled per gallon	5.8	6.2	7.4	7.3
Average fuel consumed per vehicle (gallons)	1,583	1,862	1,614	1,886

In contrast to single-unit trucks, miles traveled per gallon by combination trucks changed very little over the past twenty years. Consequently, the gallons of fuel consumed doubled between 1980 and 2003 along with the number of miles traveled.

Table 5-9. Combination Truck Fuel Consumption and Travel

	1980	1990	2000	2003
Number registered (thousands)	1,417	1,709	2,097	2,245
Vehicle-miles traveled (millions)	68,678	94,341	135,020	138,322
Fuel consumed (million gallons)	13,037	16,133	25,666	26,895
Average miles traveled per vehicle	48,472	55,206	64,399	61,611
Average miles traveled per gallon	5.3	5.8	5.3	5.1
Average fuel consumed per vehicle (gallons)	9,201	9,441	12,241	11,980

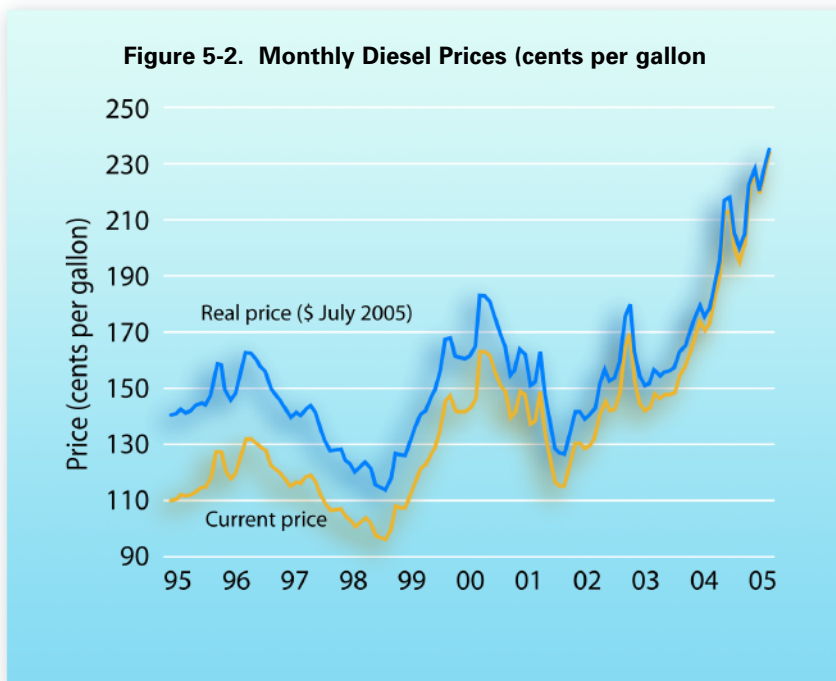
Diesel prices were about 62 percent higher in July 2005 than 10 years earlier (in inflation-adjusted terms). Over that period prices bottomed out in February 1999 at just under \$1.14 a gallon (in \$ July 2005).

TABLE 5-8. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

Table 5-9. Combination Truck Fuel Consumption and Travel

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).



Energy intensity is the amount of energy used in producing a given level of output or activity, in this case transportation. Since 1980 the energy intensity of both trucking and freight rail have improved. However, over the same period, domestic freight water transportation, measured by Btu per ton-mile, has become more energy intense.

Air quality is affected by emissions from freight vehicles. Compared with gasoline fueled cars and trucks, diesel fueled heavy trucks emit small amounts of carbon monoxide (CO) but large amounts of nitrogen oxides (NO_x).

Table 5-10: Energy Intensities of Domestic Freight Modes

	1980	1990	2000	2001	2002
Highway (Btu per vehicle-mile)	24,757	22,795	23,443	23,016	23,432
Railroad (Class I) (Btu per freight car-mile)	18,742	16,619	14,917	15,108	15,003
Railroad (Class I) (Btu per ton-mile)	597	420	352	346	345
Water (Btu per ton-mile)	358	387	473	460	471

Key: Btu = British thermal unit

Freight transportation is a major source of NO_x emissions accounting for 27 percent of all U.S. NO_x emissions and half of emissions from mobile sources. Freight transportation also accounts for about one-third of emissions of particulate matter 10 microns in diameter (PM-10) from mobile sources. Most PM-10, however, comes from agricultural fields, wildfires, and fugitive dust. Consequently, freight transportation is a minor factor when considering total PM-10 emissions.

FIGURE 5-2. MONTHLY DIESEL PRICES
Source: Diesel price: U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of September 12, 2005. Consumer price index: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index – All Urban Consumers, Monthly, available at www.bls.gov as of September 12, 2005.

TABLE 5-10: ENERGY INTENSITIES OF DOMESTIC FREIGHT MODES
Source: Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 24* (Oak Ridge, TN: 2004).

Table 5-11: Estimated National Average Vehicle Emissions Rates of Heavy-duty and Light-duty Vehicles (grams per mile)

	1990	2000	2001	2002	2003	2004
Gasoline (assuming zero RFG)						
Cars						
Exhaust HC	2.79	0.97	0.89	0.81	0.74	0.61
Nonexhaust HC	1.21	0.92	0.88	0.84	0.81	0.77
Total HC	3.99	1.89	1.77	1.65	1.54	1.37
Exhaust CO	42.89	18.53	18.03	17.58	17.13	13.79
Exhaust NO _x	2.70	1.29	1.25	1.20	1.14	1.00
Light trucks						
Exhaust HC	3.68	1.45	1.35	1.24	1.13	0.96
Nonexhaust HC	1.36	0.97	0.94	0.89	0.84	0.80
Total HC	5.04	2.42	2.29	2.13	1.98	1.76
Exhaust CO	56.23	26.81	25.61	24.32	22.30	18.76
Exhaust NO _x	2.62	1.54	1.53	1.50	1.45	1.32
Heavy trucks						
Exhaust HC	3.66	1.22	1.09	0.98	0.82	0.73
Nonexhaust HC	2.74	1.62	1.54	1.48	1.41	1.35
Total HC	6.40	2.84	2.63	2.46	2.24	2.08
Exhaust CO	85.61	31.08	27.59	24.73	20.60	18.46
Exhaust NO _x	7.19	5.26	5.13	5.01	4.91	4.62
Diesel						
Cars						
Exhaust HC	0.68	0.80	0.76	0.73	0.73	0.60
Exhaust CO	1.49	1.78	1.75	1.73	1.74	1.59
Exhaust NO _x	1.83	1.81	1.72	1.62	1.54	1.43
Light trucks						
Exhaust HC	1.59	1.02	0.88	0.96	0.97	0.98
Exhaust CO	2.67	1.77	1.54	1.66	1.68	1.68
Exhaust NO _x	2.71	1.76	1.64	1.67	1.66	1.59
Heavy trucks						
Exhaust HC	2.21	0.79	0.74	0.69	0.61	0.58
Exhaust CO	10.06	4.10	3.82	3.58	3.37	3.19
Exhaust NO _x	23.34	18.05	16.68	15.52	13.92	12.50

Key: CO = carbon monoxide; HC = hydrocarbon; NO_x = nitrogen oxides; RFG = reformulated gasoline.

Trucks are by far the largest contributor to freight emissions nationally, producing two-thirds of NO_x and PM-10 from the freight sector. New U.S. Environmental Protection Agency emissions standards for trucks are expected to significantly reduce emissions, however, even with large increases in truck traffic.



Table 5-12: Nitrogen Oxides (NO_x) and Particulate Matter (PM-10) Emissions by Freight Transportation Mode: 2002

Mode	NO _x Emissions					PM-10 Emissions				
	Tons	Percent	As percent of:			Tons	Percent	As percent of:		
			All mobile sources	All sources				All mobile sources	All sources	
Heavy-duty vehicles	3,782,000	66.8	33.0	17.9	120,000	64.7	23.3	0.5		
Freight railroads	857,200	15.1	7.5	4.1	21,300	11.5	4.1	0.1		
Marine vessels	1,011,000	17.9	8.8	4.8	44,000	23.7	8.5	0.2		
Air freight	8,200	0.1	0.1	0.0	300	0.2	0.1	0.0		
Total	5,658,400	100.0	49.4	26.8	185,600	100.0	36.0	0.8		

Table 5-13: Current and Future Nitrogen Oxides (NO_x) Emissions by Freight Transportation Mode

	Tons			Percent change, 2002-2010	Percent change, 2002-2020
	2002	2010	2020		
Heavy-duty trucks	3,782,000	2,186,900	662,600	-42	-82
Freight rail	857,200	563,200	486,400	-34	-43
Commercial marine	1,011,000	987,200	938,600	-2	-7
Air freight	8,200	10,000	12,400	22	51
Freight total	5,658,400	3,747,299	2,099,999	-34	-63

Table 5-14: Current and Future Particulate Matter (PM-10) Emissions by Freight Transportation Mode

	Tons			Percent change, 2002-2010	Percent change, 2002-2020
	2002	2010	2020		
Heavy-duty trucks	120,000	65,380	34,760	-46	-71
Freight rail	21,300	17,890	15,360	-16	-28
Commercial marine	44,000	45,330	46,960	3	7
Air freight	300	290	270	-3	-10
Freight total	185,600	128,889	97,349	-31	-48

TABLE 5-12: NITROGEN OXIDES (NO_x) AND PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

TABLE 5-13: CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

TABLE 5-14: CURRENT AND FUTURE PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

APPENDIX A. SELECTED METRIC TABLES



Table 2-1M. Freight Shipments by Weight and Value

Mode	Metric Tonnes (millions)			Value (\$ billions)		
	1998	2010	2020	1998	2010	2020
Total	13,854	19,392	23,449	9,312	18,339	29,954
Domestic	12,232	17,073	20,445	7,876	15,152	24,075
Air	8	16	24	545	1,308	2,246
Highway	9,470	13,544	16,447	6,656	12,746	20,241
Rail	1,773	2,293	2,625	530	848	1,230
Water	982	1,220	1,349	146	250	358
International	1,621	2,319	3,004	1,436	3,187	5,879
Air	8	15	22	530	1,182	2,259
Highway	380	665	970	772	1,724	3,131
Rail	325	470	634	116	248	432
Water	123	181	236	17	34	57
Other ¹	784	989	1,142	NA	NA	NA

Key: NA = Not available.

¹Other includes international shipments that moved via pipeline or by an unspecified mode.

Notes: Domestic shipments by pipeline are excluded. Modal numbers may not add to totals due to rounding.

1 ton = 0.91 metric tonne.

Table 2-3M. U.S. Merchandise Trade with Canada and Mexico by Transportation Mode

Mode	1997		2000		2001 ¹		2004	
	Value (\$ billions)	Weight (millions of metric tonnes)	Value (\$ billions)	Weight (millions of metric tonnes)	Value (\$ billions)	Weight (millions of metric tonnes)	Value (\$ billions)	Weight (millions of metric tonnes)
Truck	323	NA	429	NA	395	164	453	NA
Rail	70	NA	94	NA	93	88	108	NA
Air	28	<1	45	<1	37	<1	32	<1
Water	22	173	33	194	29	194	46	222
Pipeline	14	NA	24	NA	26	72	39	NA
Other	19	NA	29	NA	31	1	34	NA
Total	475	479	653	526	612	519	712	NA

Key: NA = not available.

¹2001 data are from the U.S. Department of Transportation, Bureau of Transportation Statistics, *International Trade and Freight Transportation Trends* (Washington, DC: 2003), tables 22 and C-11, available at www.bts.gov as of July 12, 2004. "Other" includes "flyaway aircraft" (i.e., aircraft moving from the manufacturer to a customer and not carrying any freight), vessels moving under their own power, pedestrians carrying freight, and miscellaneous.

Notes: Individual modal totals may not sum to exact totals due to rounding. 1 ton = 0.91 metric tonne. For value, "Other" includes the difference between the total value and the sum of the modes.

TABLE 2-1M. FREIGHT SHIPMENTS BY WEIGHT AND VALUE

Source: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, 2002.

TABLE 2-3M. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics; U.S. Department of Commerce, Census Bureau; Statistics Canada; Transport Canada; Instituto Mexicano del Transporte; Instituto Nacional de Estadística, Geografía e Informática; Secretaría de Comunicaciones y Transportes; North American Trade Statistics Database, tables 6-1c and 6-2c, available at <http://nats.sct.gov.mx> as of November 2, 2005.



Table 2-9M. Top 25 Airports by Landed Weight of All-Cargo Operations¹

Airport	2003 Rank	Landed weight (thousands of metric tonnes)			
		2000	2001	2002	2003
Anchorage, AK (Ted Stevens Anchorage International) ²	1	7,333	7,055	8,159	8,171
Memphis, TN (Memphis International)	2	5,732	6,228	8,007	7,947
Louisville, KY (Louisville International-Standiford Field)	3	3,617	3,653	3,812	3,785
Miami, FL (Miami International)	4	2,657	2,771	2,879	2,938
Los Angeles, CA (Los Angeles International)	5	2,624	2,657	2,756	2,830
New York, NY (John F. Kennedy International)	6	2,534	2,307	2,642	2,664
Chicago, IL (O'Hare International)	7	2,616	2,862	2,121	2,133
Indianapolis, IN (Indianapolis International)	8	1,870	1,825	2,011	2,065
Newark, NJ (Newark Liberty International)	9	1,779	1,628	1,595	1,664
Oakland, CA (Metropolitan Oakland International)	10	1,643	1,487	1,584	1,537
Fort Worth, TX (Dallas/Fort Worth International)	11	1,534	1,402	1,343	1,344
Philadelphia, PA (Philadelphia International)	12	1,319	1,318	1,330	1,238
Ontario, CA (Ontario International)	13	1,107	1,172	1,310	1,213
San Francisco, CA (San Francisco International)	14	989	946	1,058	1,089
Atlanta, GA (William B. Hartsfield International)	15	828	889	946	1,083
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	16	1,149	918	939	996
Honolulu, HI (Honolulu International)	17	628	716	880	923
Seattle, WA (Seattle-Tacoma International)	18	2,026	1,310	814	722
Dayton, OH (James M. Cox Dayton International)	19	961	869	799	712
Phoenix, AZ (Sky Harbor International)	20	835	760	787	707
Portland, OR (Portland International)	21	800	732	740	679
Denver, CO (Denver International)	22	817	729	710	678
Minneapolis, MN (Minneapolis-St Paul International/Wold Chamberlain)	23	564	532	564	624
Houston, TX (George Bush Intercontinental)	24	435	420	437	604
San Juan, PR (Luis Munoz Marin International)	25	440	379	487	591
Top 25 airports		(R) 46,835	(R) 45,563	(R) 48,709	48,940
United States, all airports³		(R) 67,815	(R) 64,796	(R) 66,488	66,290
Top 25 as % of U.S. total		69.1%	70.3%	73.3%	73.8%

Key: R = revised.

¹All-Cargo operations are operations dedicated to the exclusive transportation of cargo. This does not include aircraft carrying passengers that may also be carrying cargo. Aircraft landed weight is the certified maximum gross landed weight of the aircraft as specified by the aircraft manufacturer.

²Anchorage includes a large proportion of all-cargo operations in-transit.

³Limited to airports with an aggregate landed weight in excess of 45,380 metric tonnes (50,000 short tons) annually.

Note: 1 short ton = 0.91 metric tonne.



TABLE 2-9M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS

Source: U.S. Department of Transportation, Federal Aviation Administration, ACAIS Database Report F5, CY 2003 and CY 2001, available at <http://www.faa.gov/arp/planning/stats> as of June 27, 2005.

Table 2-10M. U.S. Hazardous Materials Shipments by Transportation Mode: 2002

Transportation mode	Value		Metric tonnes		Tonne-kilometers		Average kilometers per shipment
	\$ Billion	Percent	(Millions)	Percent	(Billions)	Percent	
TOTAL all modes	660.2	100.0	1,988.1	100.0	477.0	100.0	219
Single modes, total	644.5	97.6	1,958.2	98.5	455.4	95.5	169
Truck ¹	419.6	63.6	1,051.9	52.9	160.8	33.7	138
For-hire	189.8	28.8	407.8	20.5	95.1	19.9	459
Private ²	226.7	34.3	637.0	32.0	64.4	13.5	61
Rail	31.3	4.7	99.2	5.0	105.2	22.1	1,118
Water	46.9	7.1	207.0	10.4	103.1	21.6	S
Air	1.6	0.2	0.1	0.003	0.1	0.03	3,347
Pipeline ³	145.0	22.0	600.0	30.2	S	S	S
Multiple modes, total	9.6	1.5	17.0	0.9	18.2	3.8	1,366
Parcel, U.S. Postal Service or courier	4.3	0.6	0.2	0.01	0.2	0.04	1,347
Other	5.4	0.8	16.8	0.8	18.1	3.8	2,206
Unknown and other modes, total	6.1	0.9	12.9	0.6	3.4	0.7	92

Key: S = data are not published because of high sampling variability or other reasons.

¹Truck as a single mode includes shipments that went by private truck only, for-hire truck only, or a combination of both.

²Private truck refers to a truck operated by a temporary or permanent employee of an establishment or the buyer/receiver of the shipment.

³Excludes most shipments of crude oil.

Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

Table 2-11M. U.S. Hazardous Materials Shipments by Hazard Class: 2002

Hazard Class	Description	Value		Metric tonnes		Tonne-kilometers	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	7.9	1.2	4.5	0.2	2.3	0.5
Class 2	Gases	73.9	11.2	193.6	9.7	54.4	11.4
Class 3	Flammable liquids	490.2	74.3	1,622.9	81.6	319.1	66.9
Class 4	Flammable solids	6.6	1.0	10.3	0.5	6.4	1.3
Class 5	Oxidizers and organic peroxides	5.5	0.8	11.5	0.6	6.2	1.3
Class 6	Toxics	8.3	1.3	7.7	0.4	6.2	1.3
Class 7	Radioactive materials	5.9	0.9	0.1	0.003	0.1	0.01
Class 8	Corrosive materials	38.3	5.8	82.3	4.1	52.9	11.1
Class 9	Miscellaneous dangerous goods	23.6	3.6	55.4	2.8	29.4	6.2
Total		660.2	100.0	1,988.1	100.0	477.0	100.0

Key: Z = zero or less than 1 unit of measure.

Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

TABLE 2-10M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2002

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a.

TABLE 2-11M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a.

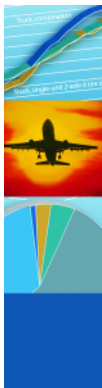
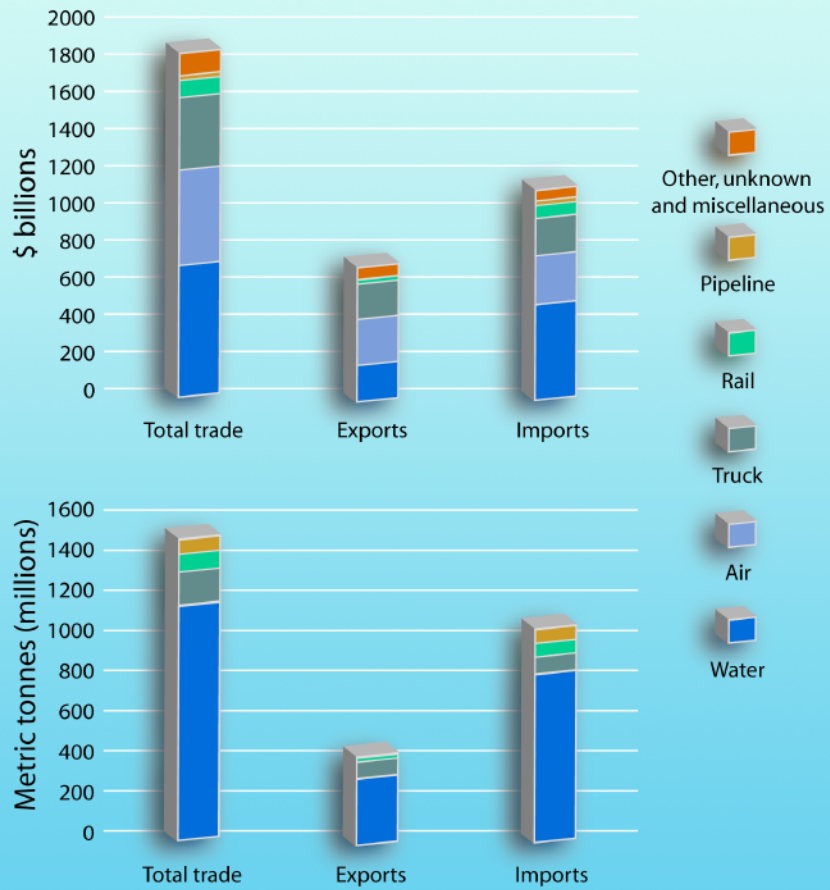


Figure 2-5M. U.S. International Merchandise Trade by Transportation Mode: 2001



Note: 1 short ton = 1 metric tonne.



FIGURE 2-5M. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2001

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *U.S. International Trade and Freight Transportation Trends* (Washington, DC: 2003), table 7, available at www.bts.gov as of July 12, 2004.

Table 3-1M. Kilometers of Infrastructure by Transportation Mode

	1980	1990	2000	2003	Percent change, 1980-2003
Public roads, route kilometers	6,211,806	6,223,214	6,358,681	6,421,036	3.4
National Highway System (NHS)	N	N	259,409	260,393	N
Interstates	66,176	72,540	75,113	75,267	13.7
Other NHS	N	N	184,296	185,126	N
Freight Intermodal connectors ¹	N	N	N	2,982	NA
Other	N	N	6,099,272	6,160,644	N
Strategic Highway Corridor Network (STRAHNET)	N	N	99,886	100,706	N
Interstate	N	N	75,116	75,274	N
Non-interstate	N	N	24,766	25,432	N
Railroad	294,634 ²	283,098	274,412	226,819	-23.0
Class I	NA	214,347	194,082	159,235	NA
Regional	NA	29,572	33,761	25,183	NA
Local	NA	39,167	46,570	42,401	NA
Inland waterways					
Navigable channels	17,703	17,703	17,703	17,703	0.0
Great Lakes-St. Lawrence Seaway	3,769	3,769	3,769	3,769	0.0
Pipelines					
Oil	351,469	335,954	284,847	258,892	-26.3
Gas	1,692,666	(R) 1,913,832	(R) 2,203,675	2,292,028	35.4

Key: N = not applicable; NA = not available; R = revised.

¹Excludes Class III railroads.

²Note: 1 mile = 1.61 kilometers.

TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

Freight intermodal connectors: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, National Highway System Intermodal Connectors, available at <http://www.fhwa.dot.gov/hap10/nhs/intermodalconnectors/index.html> as of July 5, 2005.

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: various issues).

Navigable channels: U.S. Army Corps of Engineers. Great Lakes-St. Lawrence Seaway: Great Lakes-St. Lawrence Seaway System, "Seaway Facts," available at <http://www.greatlakes-seaway.com/en/aboutus/seawayfacts.html> as of July 6, 2006.

Oil pipelines: 1980-2000: ENO Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002). 2003: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, *Pipelines Statistics*, Internet site <http://ops.dot.gov/stats/lpo.htm> as of July 5, 2005.

Gas Pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).



Table 3-3M. Truck Kilometers by Products Carried: 2002¹

Products carried	Millions of kilometers
Total²	233,632
Animals and fish, live	1,182
Animal feed and products of animal origin	3,360
Grains, cereal	2,202
All other agricultural products	4,283
Basic chemicals	1,410
Fertilizers and fertilizer materials	2,681
Pharmaceutical products	491
All other chemical products and preparations	2,174
Alcoholic beverages	1,808
Bakery and milled grain products	5,717
Meat, seafood, and their preparations	4,918
Tobacco products	717
All other products foodstuff	11,954
Logs and other wood in the rough	1,849
Paper or paperboard articles	5,053
Printed products	1,231
Pulp, newsprint, paper, paperboard	3,115
Wood products	5,731
Articles of base metal	5,301
Base metal in primary or semifinished forms	4,637
Nonmetallic mineral products	4,906
Tools, nonpowered	12,487
Tools, powered	10,425
Electronic and other electrical equipment	4,866
Furniture, mattresses, lamps, etc.	3,288
Machinery	5,190
Miscellaneous manufactured products	6,449
Precision instruments and apparatus	1,181
Textile, leather, and related articles	2,475
Vehicles, including parts	6,186
All other transportation equipment	1,024
Coal	484
Crude petroleum	212
Gravel or crushed stone	4,490
Metallic ores and concentrates	73
Monumental or building stone	744
Natural sands	1,753
All other nonmetallic minerals	802
Fuel oils	1,983
Gasoline and aviation turbine fuel	1,366
Plastic and rubber	3,851
All other coal and refined petroleum products	1,886
Hazardous waste (EPA manifest)	306
All other waste and scrape (non-EPA manifest)	4,261
Recyclable products	1,484
Mail and courier parcels	7,660
Empty shipping containers	1,278
Passengers	440
Mixed freight	23,591
Products, equipment, or materials not elsewhere classified	426
Products not specified	10,232
Not applicable ³	241
No product carried	46,634

¹Excludes pickups, panels, minivans, sport utilities, and station wagons.

²Detail lines may not add to total because multiple products/hazardous materials may be carried at the same time.

³Vehicles not in use. When the respondent had partial-year ownership of the vehicle, annual miles were adjusted to reflect miles traveled when not owned by the respondent.

Note: 1 mile = 1.61 kilometers.

**TABLE 3-3M. TRUCK
KILOMETERS BY PRODUCTS
CARRIED: 2002**

Source: U.S. Department of Commerce, Census Bureau, *Vehicle Inventory and Use Survey 2002: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 6, 2005.

Table 3-4M. Number and Vehicle-Kilometers Traveled (VKT) of Trucks by Average Weight (Including Vehicle and Load)¹

Average weight (kilograms)	1987		1992		1997		2002		Percent change, 1987-2002	
	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number	VKT
Total	3,624	144,796	4,008	168,960	4,701	237,983	5,415	234,359	49	62
Light-heavy	1,030	17,329	1,259	22,551	1,436	31,890	1,914	42,254	86	144
4,536 to 6,350	525	8,754	694	12,875	819	18,510	1,142	24,440	118	179
6,351 to 7,257	242	4,407	282	4,791	316	6,359	396	9,508	64	116
7,258 to 8,845	263	4,168	282	4,885	301	7,021	376	8,306	43	99
Medium-heavy	766	12,200	732	13,104	729	16,302	910	18,935	19	55
8,846 to 11,793	766	12,200	732	13,104	729	16,302	910	18,935	19	55
Heavy-heavy	1,829	115,266	2,017	133,305	2,536	189,791	2,591	173,169	42	50
11,794 to 14,969	377	8,708	387	9,163	428	11,414	437	9,407	16	8
14,969 to 18,144	209	6,619	233	8,505	257	10,612	229	6,067	10	-8
18,144 to 22,680	292	12,271	339	15,485	400	21,047	318	10,779	9	-12
22,680 to 27,216	188	11,518	227	13,999	311	20,362	327	14,404	74	25
27,216 to 36,287	723	73,127	781	82,147	1,070	120,256	1,179	124,707	63	71
36,288 to 45,359	28	2,018	33	2,460	46	3,906	69	4,747	144	135
45,360 to 58,967	8	708	12	1,181	18	1,691	26	2,528	238	257
58,967 or more	4	298	5	365	6	502	6	530	43	78

¹Excludes trucks with an average weight of 10,000 pounds or less.

Notes: Weight includes the empty weight of the vehicle plus the average weight of the load carried; 1 mile = 1.61 kilometers; 1 pound = 0.45 kilogram.

Table 5-7M. Fuel Consumption by Transportation Mode

	1980	1990	2000	2003
Highway				
Gasoline, diesel and other fuels (million litres)	435,171	494,962	615,338	642,099
Truck, total	75,557	92,705	133,356	142,276
Single-unit 2-axle 6-tire or more truck	26,206	31,635	36,200	40,467
Combination truck	49,350	61,070	97,156	101,809
Truck (percent of total)	17.4	18.7	21.7	22.2
Rail, Class I (in freight service)				
Distillate / diesel fuel (million litres)	14,778	11,792	14,006	14,483
Water				
Residual fuel oil (million litres)	33,887	23,947	24,264	14,665
Distillate / diesel fuel oil (million litres)	5,595	7,817	8,559	8,392
Gasoline (million litres)	3,982	4,921	4,255	4,192
Pipeline				
Natural gas (million cubic meters)	17,970	18,684	18,185	18,830

Notes: 1 gallon = 3.8 liters; 1 cubic foot = 0.03 cubic meters.

TABLE 3-4M. NUMBER AND VEHICLE-KILOMETERS TRAVELED (VKT) OF TRUCKS BY AVERAGE WEIGHT

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 1, 2005; U.S. Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at <http://www.census.gov/econ/www/viusmain.html> as of July 1, 2004.

TABLE 5-7M. FUEL CONSUMPTION BY TRANSPORTATION MODE

Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and similar tables in earlier editions.
Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: October 2004), p. 40.
Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2, 4, and similar tables in earlier editions.
Pipeline: U.S. Department of Energy, *Natural Gas Annual 2003*, DOE/EIA-0131(02) (Washington, DC: January 2005), table 15 and similar tables in earlier editions.

Table 5-8M. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

	1980	1990	2000	2003
Number registered (thousands)	4,374	4,487	5,926	5,667
Vehicle kilometers (millions)	64,073	83,527	113,459	124,824
Fuel consumed (million litres)	26,206	31,635	36,200	40,466
Average kilometers traveled per vehicle	14,649	18,615	19,146	22,027
Average kilometers traveled per litre	2.4	2.6	3.1	3.1
Average fuel consumed per vehicle (litres)	5,992	7,050	6,109	7,141

Notes: 1 mile = 1.61 kilometers; 1 gallon = 3.8 litres.

Table 5-9M. Combination Truck Fuel Consumption and Travel

	1980	1990	2000	2003
Number registered (thousands)	1,417	1,709	2,097	2,245
Vehicle kilometers traveled (millions)	110,527	151,827	217,294	222,608
Fuel consumed (million litres)	49,350	61,070	97,155	101,809
Average kilometers traveled per vehicle	78,008	88,845	103,640	99,153
Average kilometers traveled per gallon	2.2	2.5	2.2	2.2
Average fuel consumed per vehicle (litres)	34,831	35,737	46,339	45,347

Notes: 1 mile = 1.61 kilometers; 1 gallon = 3.8 litres.

**TABLE 5-8M. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL**

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues).

TABLE 5-9M. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

Technical Report Documentation Page

1. Report No. FHWA-HOP-05-071		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Freight Facts and Figures 2005				5. Report Date November 2005	
				6. Performing Organization Code	
7. Author(s) William Mallett, Battelle Rolf Schmitt and Joanne Sedor, FHWA				8. Performing Organization Report No.	
9. Performing Organization Name and Address Battelle 901 D Street, SW, Washington, DC 20024				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Highway Administration Office of Freight Management and Operations 400 7 th Street, SW Washington, DC 20590				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract This report provides a snapshot of freight transportation, focusing on the volume and value of freight shipments, the extent of the freight network, industry employment and productivity patterns, its safety record, energy use, and the environmental consequences of freight movements. Economic and social characteristics of the United States are also provided as background information. Metric data are available for several tables as well.					
17. Key Word Freight transportation, freight mobility, productivity, trade, economy, safety, energy use, emissions, employment				18. Distribution Statement	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 56	22. Price



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 Federal Highway Administration

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November 2005
 FHWA-HOP-05-071
 EDL 14157