UNITED STATES INTERNATIONAL TRADE COMMISSION

Rolling Stock: Locomotives and Rail Cars

Industry & Trade Summary

Office of Industries
Publication ITS-08
March 2011
Control No. 2011001

UNITED STATES INTERNATIONAL TRADE COMMISSION

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Preface

The United States International Trade Commission (USITC) has initiated its current Industry and Trade Summary series of reports to provide information on the rapidly evolving trade and competitive situation of the thousands of products imported into and exported from the United States. Over the past 20 years, U.S. international trade in goods and services has risen by almost 350 percent, compared to an increase of 180 percent in the U.S. gross domestic product (GDP), before falling sharply in late 2008 and 2009 due to the economic downturn. During the same two decades, international supply chains have become more global and competition has increased.

Each Industry and Trade Summary addresses a different commodity or industry and contains information on trends in consumption, production, and trade, as well as an analysis of factors affecting industry trends and competitiveness in domestic and foreign markets. This report on the railway rolling stock industry primarily covers the period from 2004 to 2009, and includes data for 2010 where available.

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Acronyms

DBA	Doing business as.
DMU	Diesel multiple unit: A diesel-powered rail car designed for operation in conjunction with other similar cars. Used where railway has not been electrified.
EMU	Electrical multiple unit: an electrically-powered rail car designed for operation in conjunction with other similar cars, powered from an external source of electricity. Examples include subway and Metro cars.
EPA	The United States Environmental Protection Agency
FRA	Federal Railroad Administration, U.S. Department of Transportation
NESOI	not elsewhere specified or indicated
OEM	original equipment manufacturer
SASAC	State-owned Assets Supervision and Administration Commission
STB	Surface Transportation Board, U.S. Department of Transportation

Key Points

This report addresses trade and industry conditions for railway rolling stock primarily for the period 2004 through 2009, and includes data for 2010 where available.

- The railway rolling stock industry consists principally of manufacturers producing locomotives, rail cars, electric multiple units, parts for these vehicles, and multimodal shipping containers.

- There are seven principal locomotive manufacturers and five major rail car ("car") manufacturers in the United States. While the locomotive manufacturers focus on market niches, car manufacturers typically supply a range of cars.

- During 2004–09, the primary market for locomotives was freight railroads, while the primary markets for cars were individual rail car lessors, shipping companies that moved their goods by rail, and freight railroads. The primary market for parts were original equipment manufacturers and enterprises that routinely rebuild railway rolling stock.

- U.S. railroads moved 1.7 billion tons of freight over 169,082 miles of track in the United States during 2009.

- U.S. demand to move freight by rail increased during 2004–08, driving up the demand for railway rolling stock. In particular, freight from Asia landing on the U.S. West Coast grew significantly, spurring the demand for both road and rail transportation.

- The U.S. locomotive fleet grew during the period, from 20,774 to 24,443 diesel-electric locomotives in service in 2009, while the freight car fleet remained relatively static at 1.4 million cars in service. In 2009, shipments of U.S. railway rolling stock totaled $11.0 billion, with $8.9 billion (80.9 percent) sold to the domestic market. During this period, imports as a share of U.S. consumption declined, from 19.1 percent to 12.4 percent. The top three nations supplying U.S. imports were Canada, China, and Japan in 2009, while the top three markets for U.S. exports of all railway rolling stock products were Canada, China, and Australia.

- The United States has had a trade surplus in railway rolling stock since 2004. The surplus peaked at $1.1 billion in 2008, an increase of $764 million (207.6 percent) over 2004, fell to $888 million in 2009, and then improved to $1 billion in 2010.

- U.S. producers of railway rolling stock compete in foreign markets principally on the basis of technology. Asian and eastern European companies are increasingly interested in partnering with certain U.S. manufacturers. U.S. firms face competitive obstacles in countries with state-run manufacturers.

- During 2004–08, global exports of diesel-electric locomotives more than doubled, before falling to pre-2001 levels in 2009. Principal exporting nations were the United States ($403.8 million), Canada ($182.1 million), Spain ($133.4 million), Ukraine

($51.1 million), and China ($42.4 million).[1] Of this group, only Spain's exports grew in 2008–09.

- The United States was in the top five nations exporting rail cars during 2004–07. In 2008, China, not a historically major supplier of rail cars, surged past the United States into the ranks of the top five exporting countries, as its rail car exports grew by 196.5 percent (or by $176.8 million) over 2007. China maintained its lead over the United States in rail car exports in 2009.

- Current trends in the U.S. railway rolling stock industry include research into kinetic energy regeneration as well as development of freight cars capable of carrying larger loads and diesel-electric locomotives that produce fewer air pollutants.

[1] Note: Schedule B does not differentiate between new and used locomotives.

Introduction

The U.S. railway rolling stock manufacturing industry is the principal equipment supplier to U.S. freight railroads.[2] It produces over-the-road and yard (switching) locomotives, freight and passenger rail cars, subway and metro cars, parts for these vehicles, and multimodal shipping containers. This report focuses on freight locomotives and rail cars, two of the largest segments of the U.S. railway rolling stock industry, and briefly discusses commuter rail and metro cars. It analyzes railway rolling stock manufacturing during 2004–09, including industry trends and demand factors, as well as trade patterns in both traditional and emerging foreign markets. The industry does not include railroads. This report does not discuss two significant industry components—multimodal shipping container and parts manufacturers—in depth because of data limitations.

The U.S. industry consists of three over-the-road locomotive producers, several yard locomotive producers, five major rail car producers, and hundreds of parts suppliers. It has made significant investments in research and development (R&D) since 2000; as a result, today's new locomotives are more fuel-efficient and create fewer pollutants than those produced a decade ago.

The industry is capital-intensive, with high financial barriers to entry. It is also concentrated, with only a few major companies making rolling stock for each product niche, which limits market choices for their customers.[3] In 2009, shipments of U.S. railway rolling stock totaled $11.0 billion, with $8.9 billion (80.9 percent) sold to the domestic market.[4]

The U.S. trade surplus in railway rolling stock goods grew each year, peaking at $1.1 billion in 2008 (an increase of $764 million, or 207.6 percent) before declining in 2009 to $888 million (table A.1). In 2010, the U.S. trade surplus rebounded to $1.0 billion. In 2010, the largest total U.S. railway rolling stock trading partners (U.S. imports plus exports) were Canada, China, and Mexico. The United States had a $638 million trade surplus with Canada, a $62 million deficit with China, and a $204 million surplus with Mexico.

This report analyzes railway rolling stock manufacturing and trade during 2004–09, including industry trends and demand factors, and trade patterns in both traditional and emerging foreign markets. It includes 2010 data where available.

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[2] AskOxford.com defines railway rolling stock as "locomotives, carriages, or other vehicles used on a railway." As presented in this report, railway rolling stock data also cover railway or tramway track fixtures and fittings. Over-the-road locomotives are those used outside of switching yards for point-to-point service. Yard locomotives, also known as "switcher" or "shunter" locomotives, work primarily in rail yards, moving cars around to make up a train for over-the-road locomotives to deliver. The term "rail cars" refers to both freight and passenger rail cars. The corresponding NAICS code, 336510, captures railroad railway rolling stock manufacturing, while two more NAICS codes, 331511 and 331513, capture the casting of iron and steel wheel blanks, respectively. After wheels are cast, the blanks are forged—found under NAICS code 332111, iron and steel forging. Other NAICS numbers that pertain to this industry include 332312, for steel railroad car racks manufacturing, as a part of fabricated structural metal manufacturing; 333613, for railroad car journal bearings, plain, as a part of mechanical power transmission equipment manufacturing; and 336321, locomotive and railroad car light fixtures manufacturing, as a part of vehicular lighting equipment manufacturing.

[3] DataMonitor, *Road and Rail in the United States*, December 2008, 13.

[4] The figure for U.S. domestic market sales value is estimated by subtracting exports from shipments.

U.S. Industry

Trends

Industry trends during the report period were driven both by market demand for greater efficiency and by the U.S. government's new emission standards for new locomotive engines.[5] Shipping companies sought to reduce their shipping costs, and car manufacturers responded with improved designs with larger capacities, allowing more goods to be transported per car. By the end of the period, new freight rail cars transported more tonnage per carload than those offered a decade earlier.[6] This increased capacity allowed owners to ship more weight or volume per carload than before, lowering costs per ton of freight transported. It also may be one reason railroad companies purchased higher-horsepower locomotives than those used previously.

U.S. railroads continued to find it less beneficial to own rail cars than provide the service of moving them; hence, their share of car ownership continued to decline. U.S. railroads owned less than one-half of all freight rail cars in the United States during the period, with shippers and leasing companies owning the majority. In 2009, U.S. railroads owned 69,529 (11.3 percent) fewer cars than in 2004.[7] At the same time, freight rail car ownership by suppliers and shippers increased from 634,500 to 839,020 (a 32.2 percent increase). Railroads typically will charge a shipper lower fees if the shipper provides its own freight cars, which has been an incentive for shipping companies to purchase rail cars.[8]

Locomotive manufacturers are continuing to invest in cleaner, more efficient ways to generate energy. One avenue being developed is kinetic energy recovery systems, a technology that collects the energy created when a locomotive applies its brakes while pushing or pulling rail cars and stores it for motive use when the engineer demands it. This system will allow locomotives to transport more weight through mountainous regions without requiring significant increases in engine horsepower.

In addition to more horsepower, new locomotive engines produce less pollution, the result of re-engineering several key systems.[9] New air-to-air heat exchangers reduce engine oil operating temperatures, which lowers emissions. Air-cooled inverters no longer need chemical coolants, eliminating a potential source of toxic spills, and advances in fuel injection technologies meter fuel more precisely to lower consumption

[5] Locomotive engines are subject to the Environmental Protection Agency (EPA) schedule for exhaust emissions reduction. Tier 3 standards were phased in during 2009, while the more restrictive Tier 4 standards will be phased in during 2015. EPA, "New Clean Diesel Rule Major Step," May 11, 2004, and, "EPA Finalizes More Stringent Emission Standards," March 2008.

[6] AAR, *Railroad Fact Book 2010,* 53.

[7] Ibid., 51.

[8] Industry official, interview by USITC staff, March 2010.

[9] EPA, "New Clean Diesel Rule Major Step," and "EPA Finalizes More Stringent Emission Standards." The move to newly designed engines was driven in large part by the EPA's issuance of standards found in the Clean Air Nonroad Diesel Rule for the sulphur content in diesel fuel in 2004 and air pollutant standards in 2008. The EPA mandated a stepped approach to the reduction of air pollutants, culminating in its Tier 4 regulations, which are projected to reduce diesel particulate levels by 90 percent and nitrous oxide emissions by 80 percent over Tier 2 levels.

and therefore pollution.[10] Locomotive manufacturers also use diesel particulate filters and electronic engine controls to allow for more efficient combustion and emissions reduction.[11]

Industry Structure

The U.S. railway rolling stock manufacturing industry is comprised of three principal segments: locomotives, rail cars, and parts manufacturers. In the United States, locomotives (figure 1) and rail cars (figure 2) primarily transport freight and raw materials and, to a much lesser extent, provide passenger rail service. The U.S. industry primarily manufactures locomotives and rail cars built to withstand the rigors of transporting heavy freight loads and raw materials over hundreds of miles.[12] Passenger rail vehicles—locomotives, rail cars, and both diesel and electrical multiple units (DMUs/EMUs)—are built to withstand lighter usage and loads, but typically travel at higher speeds.[13] Locomotives (nearly all of which are diesel-electric in the United States) pull or push rail cars over rails between distant points, locally in switching yards, or in urban/suburban service.[14] DMUs, which use an onboard diesel engine for power, and EMUs, which use electricity from an external source to power one or more on-board electric motors, are typically employed in city transit systems (e.g., subways, metros). A train is constituted by attaching a locomotive/motive force to several rail cars or EMUs. Although there is only one U.S.-owned manufacturer of passenger rail cars, several foreign companies have production facilities in the United States.

FIGURE 1 A typically configured diesel-electric locomotive

Source: Image courtesy of Bruce Jacobs, Anaheim, CA, and BNSF Railway Co., Fort Worth, TX.

[10] GE Transportation, "The Evolution Series Locomotives," 6, 9, 10.
[11] MotivePowerWABTEC, "Locomotive Emissions Reduction," accessed March 2009.
[12] AAR, *Railroad Facts, 2009 Edition*, 2009, 36.
[13] Industry official, interview by USITC staff, March 2009.
[14] In a diesel-electric locomotive, the diesel engine drives an electric generator, which in turn powers traction motors geared directly to the locomotive's axles. This hybrid system has been in use since the end of World War II and is the foundational type of motive power of all U.S. locomotives. A major advantage over the steam engines in use during World War II is the ability for several diesel-electric locomotives to be linked together and controlled by one engineer. This modular approach to motive power resulted in lower cost to the railroads, as fewer employees could now move more passengers and freight by using the correct amount of power for a given train. Lawless, "Diesel-electric Locomotive Engines & How They Work," 2002.

Locomotives

There are three over-the-road locomotive manufacturers headquartered in the United States. Electro-Motive Diesel, Inc. (EMD) and the Rail Products Division of General Electric, Inc. (GE) both produce locomotives chiefly for use in freight applications, whereas MotivePower-WABTEC principally builds passenger and yard locomotives.[15] These locomotives are used for long-distance work and built for constant speed rather than short runs to nearby stations. Four other companies—Brookville Equipment Corp., National Railway Equipment Company, Progress Rail Services, and R.J. Corman/Railpower—primarily build yard or switching locomotives (table 1). Switching or yard locomotives move rail cars within the confines of rail yards. U.S. locomotive manufacturers are headquartered in Alabama, Idaho, Illinois, Kentucky, and Pennsylvania.

[15] On August 2, 2010, Progress Rail Service, a wholly-owned subsidiary of the Caterpillar, Inc., finalized its purchase of EMD, which will now become a subsidiary of Progress Rail Service.

TABLE 1 U.S. locomotive manufacturers

Manufacturer	Location	Locomotive type	Maximum horsepower or kW
Brookville Equipment Corporation	Headquarters and final assembly: Brookville, PA	New yard and mining locomotives	45–2,250
Electro-Motive Diesel, Inc. (EMD)	Headquarters: LaGrange, IL	New over-the-road freight and passenger locomotives	4,300
	Final assembly: London, Ontario, Canada	New international class - United Kingdom - China - Australia - India	 2.420 (kW) 6,000 4,300 4,000 4,500
General Electric, Inc. (GE), Rail Products Division	Headquarters and final assembly: Erie, PA	New and refurbished over-the-road locomotives	3,700–4,400
MotivePower-WABTEC	Headquarters: Boise, ID	New over-the-road freight & passenger locomotives	3,600–4,000
		Genset switcher locomotives [a]	2,000–2,100
National Railway Equipment Co. (NREC)	Headquarters and final assembly: Mt. Vernon, IL	New E Series freight locomotive	2,000–3,500
		New Genset locomotives	700–2,100
		Used locomotives	
Progress Rail Services	Headquarters: Albertville, AL	New Genset locomotives	Up to 2,235
	Final assembly: Raceland, KY		
R.J. Corman/Railpower	Headquarters: Nicholasville, KY	New Genset locomotives	1,400–3,000

Source: Company Web sites, February 2010.

[a]Genset locomotives incorporate multiple engine and generator sets rather than one large engine and generator. This allows the engineer to use the minimum power needed, thereby maximizing efficient movement of the locomotive and its load.

Freight Rail Cars

Freight rail cars are the most prevalent type of railway rolling stock manufactured in the United States. They are designed to transport goods and commodities throughout North America and are a vital part of the North American freight logistics infrastructure (figure 2).

Six primary types of freight rail cars as well as several specialty cars are used by U.S. railroads for transport of goods or commodities (table 2),.

TABLE 2 Types of freight rail cars, goods typically transported, and number and share (percentage) of the U.S. fleet, January 1, 2009

Car type	Principal commodities/goods transported	Number in fleet	Percent of total fleet[a]
Box	Commodities that must be protected from the elements, such as paper products, appliances, auto parts and building materials. Insulated boxcars transport food products, canned goods, beer, and wine	114,282	8.2
Gondola:		220,238	15.8
- uncovered	Coal, ores, and wood chips	(b)	(b)
- covered	Steel coils and flat steel	(b)	(b)
Hopper:			
- uncovered (usually smaller cars)	Heavy bulk commodities such as coal, coke, stone, sand, ores, gravel, and scrap metal	168,338	12.0
- covered	Light bulk material such as grain, fertilizer, flour, salt, sugar, clay, and lime	414,418	30.0
- covered small cube	Heavy commodities such as cement, ground limestone, and glass sand	(b)	(b)
Flat	Intermodal containers and road trailers, and bulk and finished goods such as lumber, pipes, plywood, drywall, and pulpwood	170,543	12.2
Refrigerated	Perishable foodstuffs	19,085	1.3
Tank	Liquids, including chemicals and petroleum	281,442	20.1
Other:		5,247	(c)
- center beam cars	Lumber and other building products		
- bi- and multilevel cars	Large vehicles (bi-level) and automobiles (multilevel)		
- intermodal cars	Trailers, multimodal shipping containers		
- coil cars	Steel coils		

Source: AAR, *Railroad Equipment Report, 2009*, 2009.

[a]Percentages do not add up to 100 because of rounding.
[b]Unknown.
[c]Less than 1.0 percent.

FIGURE 2 Common freight rail car varieties—*Continued*

Box car

Gondola car

Source: Images courtesy of Greenbrier Companies, Lake Oswego, OR.

FIGURE 2 Common freight rail car varieties—*Continued*

Uncovered gondola car used to transport coal

Mill gondola car

Source: Images courtesy of American Rail Car Industries, St. Charles, MO.

FIGURE 2 Common freight rail car varieties—*Continued*

Covered hopper car

Source: Image courtesy of the Greenbrier Companies, Lake Oswego, OR.

Covered hopper used to transport grain

Source: Image courtesy of American Rail Car Industries, St. Charles, MO.

FIGURE 2 Common freight rail car varieties—*Continued*

Flat car

Source: Image courtesy of The Greenbrier Companies, Lake Oswego, OR.

Tank car for transport of pressurized gases

Source: Image courtesy of American Rail Car Industries, St. Charles, MO.

FIGURE 2 Common freight rail car varieties—*Continued*

Tank car designed for the transportation of lubricating oil and similar fuel oil products.

Source: Image courtesy of The Greenbrier Companies, Lake Oswego, OR.

FIGURE 2 Common freight rail car varieties—*Continued*

Other types of cars:

Center partition car

Intermodal stack cars

Source: Images courtesy of The Greenbrier Companies, Lake Oswego, OR.

FIGURE 2 Common freight rail car varieties—*Continued*

Intermodal car used to transport containers

Source: Image courtesy of American Rail Car Industries, St. Charles, MO.

Five major companies and their subsidiaries produce freight rail cars in the United States (table 3). Some provide rail car leasing and management services as well. These firms were able to provide the rolling stock needed to meet the growing demand during 2004–09 for freight movement even as railroads divested themselves of car ownership over the period.

TABLE 3 Domestic operations of U.S. freight rail car manufacturers, 2010

Parent company	Subsidiary	Products	Location of production facilities and/or services	Rail car lessor
American Railcar Industries, Inc. Headquarters: St. Charles, MO		Special- and general-purpose covered hopper and tank rail cars Parts for other rail cars	Marmaduke, AR, and Paragould, AR	No
	Castings LLC	Rail car side frames, bolsters, couplers, and yokes	One-third interest in Ohio Castings Company, LLC. Ohio Castings leased a foundry in Cicero, IL, and acquired a foundry in Alliance, OH	No
Freightcar America, Inc. Headquarters: Chicago, IL		Rail cars manufactured: steel coil hopper gondola tank intermodal autos hybrid center beam	Danville, IL; Roanoke, VA	No
		Forged, cast, and fabricated rail car parts	Johnstown, PA	No
	JAIX Leasing	Full service and net leases for new and rebuilt freight cars and trade-ins of used freight cars	Chicago, IL	Yes
The Greenbrier Companies Headquarters: Lake Oswego, OR	Greenbrier Management Services	Rail car management company	Lake Oswego, OR	No
	Greenbrier Leasing Company	Full-service, net, and per diem leasing structures with both short-term and long-term options, sale-lease back and like-kind exchanges, upgrade and modification programs	Lake Oswego, OR	Yes
	Greenbrier Rail Services	Wheel set assembly and refurbishment; axle finishing repair services; freight car component parts such as doors, roofs, cushioning units, couplers, yokes, and associated parts	Lake Oswego, OR	No

TABLE 3 Domestic operations of U.S. freight rail car manufacturers, 2009—*Continued*

Parent company	Subsidiary	Products	Location of production facilities and/or services	Rail car lessor
	Gunderson	All types of freight rail cars manufactured except for coal	Lake Oswego, OR	No
	American Hydraulics	Design, development, and production of end-of-car cushioning units	Omaha, NE	No
	Axle facility	Axle machining services	Lewistown, PA	No
	Greenbrier Castings	Reconditioning car and locomotive parts	Peoria, IL	No
	GMO Parts	Parts for railcars manufactured by Gunderson, LLC, Gunderson Concarril, and Gunderson GIMSA (Mexico)	Portland, OR	No
	Roller bearing facility	Reconditioned OEM tapered roller bearings	Elizabethtown< KY	No
	YSD Industries	Rail car doors and roofs supplier	Youngstown, OH	No
Trinity Rail Group, LLC.: Headquarters: Dallas, TX	Trinity North American Freight Car, Inc.	Rail cars manufactured: box cars, gondolas, intermodal cars, covered and open hoppers, and auto carriers	United States (several sites)	Yes
	Trinity Tank Car, Inc.	Full line of tank cars that transport liquefied and pressurized commodities	United States and Mexico	No
	Trinity Parts and Components, LLC	Replacement rail car parts	Fort Worth, TX	No
	Standard Forged Products, LLC	Rail car axles	McKees Rocks, PA	No
	McConway & Torley, LLC	Rail car couplers	Kutztown and Pittsburgh, PA	No
	Trinity Industries Leasing Company	Leasing Rail car management	Dallas, TX	Yes
Union Tank Car, Inc. Headquarters: Chicago, IL		Rail cars manufactured: tank cars hopper cars Leasing and repair services	Alexandria, LA and Houston, TX	Yes
	McKenzie Valve & Machining Company	Valves for tank cars	McKenzie, TN	No

Source: Corporate Web sites, February 17, 2011.

Passenger Rail Cars

Demand for passenger rail cars in the United States is low and has not attracted U.S.-owned production. Foreign firms with a history of building commuter, light- and heavy-rail cars have established domestic assembly and production facilities to meet U.S. demand for passenger rail cars. Only one U.S.-owned company, Oregon Ironworks, currently produces light-rail cars (table 4).

TABLE 4 Commuter, light- and heavy-rail manufacturers and products used in the United States

Company	Subsidiary	Products used in the United States	Location of U.S. production facilities	Products currently in use in
Bombardier Transportation Berlin, Germany	Bombardier Transportation North America Saint-Bruno, Québec Canada	Light rail Heavy rail MonoRail	New York, Pennsylvania	California, Colorado, Georgia, Florida, Illinois, Minnesota, Nevada, New Jersey, New York, Texas, Washington
Construcciones y Auxiliar de Ferrocarriles (CAF), S.A. Guipúzcoa, Spain	CAF Elmira Elmira, NY	Light rail Heavy rail	Sacramento, CA	California District of Columbia Pennsylvania Texas
AnsaldoBreda, S.p.A. Pistoia, Italy	AnsaldoBreda, Inc. San Francisco, CA	Light rail Heavy rail	Pittsburg, CA	California District of Columbia Georgia Ohio Massachusetts
Kawasaki Heavy Industries, Ltd. (KHI) Kobe, Japan	Kawasaki Rail Car, Inc. Yonkers, NY	Light rail Heavy rail	Yonkers, NY	Maryland Massachusetts New York Pennsylvania Virginia
Kinki Sharyo Ltd. Osaka, Japan	KinkiSharyo International, LLC Westwood, MA	Light rail	Kinki Sharyo attempts to build cars it has contracted for at or near customers in the United States	Arizona California Massachusetts New Jersey Texas Washington
Oregon Iron Works Clackamas, OR	United Streetcar, LLC Clackamas, OR	Light rail	Clackamas, OR	Contracts with cities in Arizona and Oregon
Nippon Sharyo Nagoya, Japan	Nippon Sharyo U.S.A., Inc. Arlington Heights, IL	Light rail Heavy rail	None	Illinois Indiana Virginia
Siemens AG Industry Sector, Mobility Division, Turnkey Systems Berlin, Germany	Siemens Mobility Division U.S. Sacramento, CA	Light rail	Sacramento, CA	Unknown

Source: Corporate Web sites, January–December 2009.

Production Process

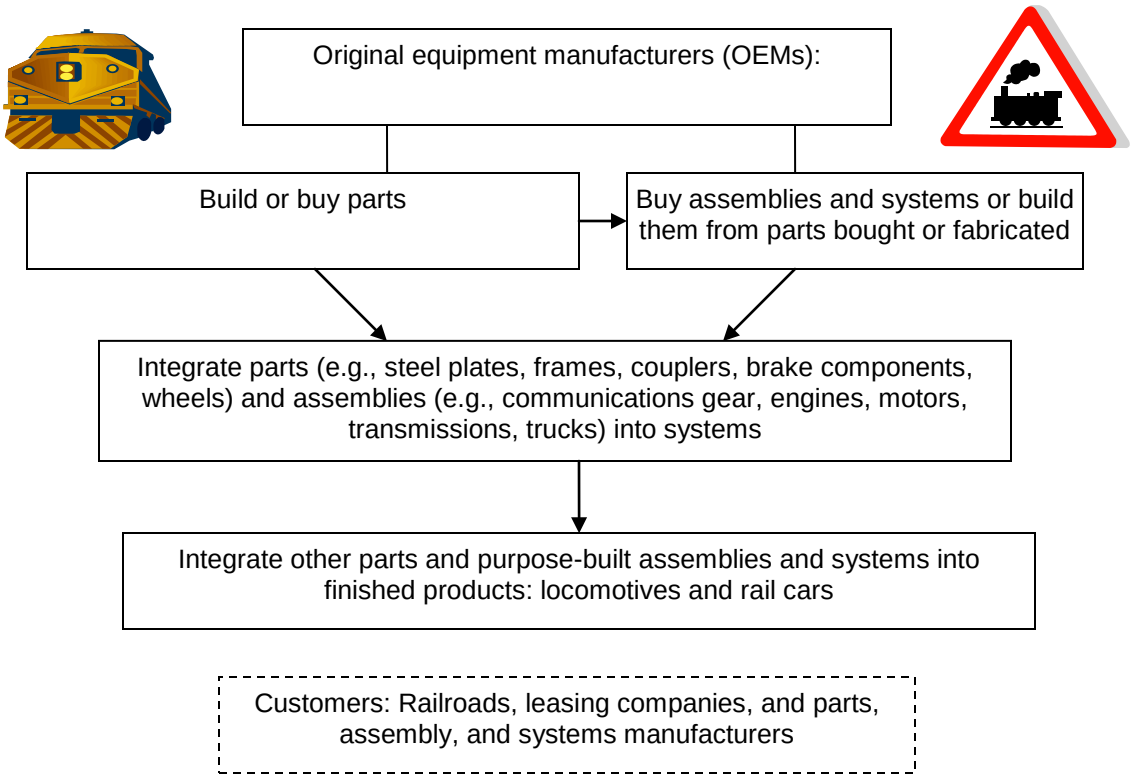
A locomotive, DMU, EMU, or rail car is built from a series of progressively more complex assemblies and subsystems that may be manufactured in-house or purchased from other railway rolling stock companies (figure 3). Wheels are attached to axles, which in turn are attached to an assembly built to house the axles, brakes, a traction motor, transmission, and a spring suspension for the locomotive known as a "truck." Rail cars are built similarly but do not have traction motors or a transmission incorporated. At least two complete truck assemblies are then attached to a frame, which will support the machinery of a locomotive or the body of a rail car. In the case of a diesel-electric locomotive, the frame will support a diesel engine, electric generator, air compressor, high-voltage control assembly, and a crew cab complete with electronic engine controls, and brake controls, and communications equipment.[16] A DMU has a diesel engine for motive power; an EMU has an electric motor for the same. Both have a conductor's cab, and passenger seats installed in each car. The frame of a rail car will support a body constructed from welded and riveted steel beams, structural shapes, and plates, to meet customer's demands.

The production process for locomotives is labor-intensive, demanding skilled and experienced workers to assemble and integrate the numerous subsystems. Labor input on rail cars is not as high as on a locomotive, typically about 10 percent of overall cost.[17] Although locomotive and rail car manufacturers produce some of their own parts, parts producers in the United States typically are not integrated with equipment manufacturers. Suppliers of major systems, such as air brakes and engine controllers, work with locomotive and rail car manufacturers to assure safe and efficient integration of their products during assembly.

The railway rolling stock industry is the largest single consumer of steel castings in the United States, accounting for half of all such shipments in 2009, by volume.[18] Manufacturers of these castings develop and document their processes and inputs, and allow their customers to audit this information.[19] Other significant inputs are diesel engines, electric traction motors, and the electronics necessary for engine control and communications equipment.

[16] Armstrong, *The Railroad,* "Figure 4-7 GE ES44AC Evolution Series Locomotive," 66.
[17] Industry officials, e-mail message to USITC staff, April 2010.
[18] Industry trade association, e-mail message to USITC, April 2010.
[19] USITC, *Foundry Products*, 2005, 2-4. In 2003, the railway industry accounted for 61 percent of total U.S. shipments of steel castings from U.S. foundries. Ibid, 6-3, table 6-3.

FIGURE 3 Railway rolling stock production process



Source: Compiled by USITC staff.

Industry Innovations

Several advances in railway rolling stock products are being developed by OEMs: kinetic energy regeneration, lighter freight cars with larger capacities, innovative braking systems for both locomotives and rail cars, and less polluting, more powerful locomotives.

At least one locomotive manufacturer is researching kinetic energy regeneration. Slowing or stopping a locomotive produces energy; capturing that energy and storing it for future use is the goal of such research.[20] Researchers are considering several types of systems for storing the energy, such as batteries, capacitors, and flywheels.[21]

Rail car manufacturers are developing lighter-weight rail cars that can transport more cargo weight or product. Since 2004, average freight car capacity has risen, from 94.9 tons to 101.1 tons in 2009 (an increase of 6.2 tons, or 6.5 percent).[22] This design change is driven by several factors, including pressure from shipping companies to reduce transportation costs and a shift in the composition of freight carried. For example, when the demand for coal shifts to lower-sulfur coal (a type of coal with a lower BTU

[20] GE Transportation, "Hybrid Locomotive," February 20, 2011.
[21] Industry official, interview by USITC staff, April 2009.
[22] AAR, *Railroad Facts, 2010 Edition*, 2009, 53.

value), more coal must be burned to obtain the equivalent BTUs. This, in turn, necessitates increased coal shipments using either more cars or larger-capacity cars.[23]

Another development pertains to rail car brakes. Manufacturers are developing a new technology to help slow cars more effectively. Known as electronically controlled pneumatic braking (ECPB), it allows 40–70 percent shorter stopping distances for cars.[24] Two U.S. railroads are assisting the creators of ECPB in this research and development. Should this new technology prove successful, trains will be able to travel at higher speeds with the ability to stop in the same distance as today's trains.

OEM Supply Chain

U.S. railway rolling stock producers have actively sought business opportunities around the world, both to secure foreign-made parts and to sell their finished products. The primary considerations when sourcing parts from any supplier—whether in-house or outsourced—are quality, delivery time, and price. The nationality of the supplier is not relevant in making a purchase decision.[25] Domestic and foreign suppliers as well as in-house subsidiaries compete on an equal basis for contracts to supply railway rolling stock producers.

U.S. locomotive and rail car manufacturers have both foreign subsidiaries and joint venture agreements with several international firms. For example, some U.S. rail car producers have production facilities in Mexico to supply the North American market (table 5). Both U.S. locomotive and rail car firms have formed joint ventures with companies located in China, Kazakhstan,[26] India, and Turkey to produce locomotives, rail cars, and/or car parts.[27]

[23] *Railway Age*, "Stored Rolling Stock Starts Rolling Again," September 2009, 41.

[24] *Railway Age*, "New Braking Technology Taking Hold," October 2009, 20. For a more thorough explanation of ECP, see Federal Railroad Administration, "ECP Brake System for Freight Service," August 2006.

[25] Industry official, interview by USITC staff, April 2009.

[26] GE Transportation, "First China Mainline Locomotive," November 25, 2008; and "GE Transportation Celebrates," December 7, 2009.

[27] Greenbrier Companies, *Annual Report, 2009*, 93; Freightcar America, *Annual Report 2009*, 4. Accessed August 16, 2009.

TABLE 5 Foreign subsidiaries of U.S. rail car manufacturers, 2010

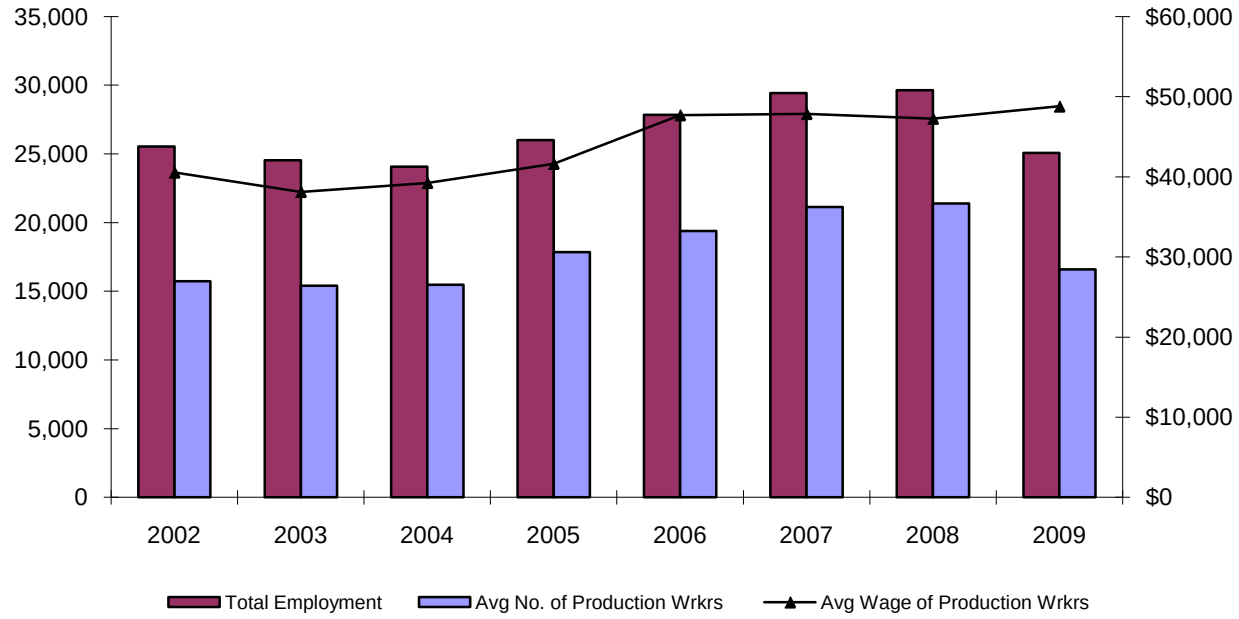
Company	Subsidiary	Products	Production facilities
American Railcar Industries, Inc. Headquarters: St. Charles, MO	Amtek Railcar Industries Private Limited	Freight rail cars	Rajasthan, India
Freightcar America, Inc. Headquarters: Chicago, IL	Titagarh FreightCar Private Ltd.	Prototype rail cars based on FreightCar America's aluminum rail cars and gondolas	West Bengal, India
The Greenbrier Companies Headquarters: Lake Oswego, OR	Gunderson Concarril	New freight cars wheel and axle shop	Sahagún, Mexico
	Gunderson-GIMSA (joint venture with Grupo Industrial Monclova [GIMSA])	New freight cars	Monclova, Mexico
	Greenbrier Europe: WagonySwidnica S.A.	New rail cars for Europe	Swidnica, Poland
	Greenbrier Europe: Greenbrier Germany GmbH	Sales support	Leipzig, Germany
	Joint venture with Zhuzhou Rolling Stock Works	Parts production	Zhuzhou, Hunan, China
Trinity Industries, Inc. Headquarters: Dallas, TX	Trinity Industries de Mexico Headquarters: Mexico City, Mexico	Rail cars manufactured: box cars, gondolas, intermodal cars, covered and open hoppers, and auto carriers	Castaños, Huehuetoca, Monclova, Sabinas, and Vallejo, Mexico
		Full line of tank cars that transport liquefied and pressurized commodities	Mexico
	Trinity Rail GmbH	Tank and freight cars	Switzerland
Union Tank Car, Inc. Headquarters: Chicago, IL	UTLX Carrotanques Servicios, S.A. de C.V.	Tank car repair	Celaya, Mexico

Source: Corporate Web sites, February 17, 2011.

Employment

Between 2004 and 2008, 5,565 workers were added to the railway rolling stock labor force. Total employment grew each year, rising from 24,077 to 29,642 workers (23.1 percent) for the period (figure 4). The number of production workers rose from 15,486 to 21,398, or by 38.2 percent. In 2009, total employment and production workers fell by 4,564 and 4,796, respectively. However, the average annual wages paid to production employees in 2009 remained relatively static, at $48,798.[28]

FIGURE 4 U.S. railway rolling stock industry: Total employment, average number of production workers, average yearly wages, 2002–09



Source: U.S. Census Bureau, Annual Survey of Manufactures, 2004–08, and "Sector 31: EC0731I1," 2007, January 4, 2010; 2009 Annual Survey of Manufactures, "Sector 31: Annual Survey of Manufactures: General Statistics: Statistics for Industry Groups and Industries: 2009 and 2008," January 18, 2011.

Geographic Distribution of Employers

In 2010, railway rolling stock manufacturing, including locomotives, rail cars, parts and containers, was located principally in three states—Pennsylvania, Illinois, and New York.

[28] U.S. Census Bureau, *Annual Survey of Manufactures*, 2004–08, and "Sector 31: EC0731I1," 2007, January 4, 2010; *2009 Annual Survey of Manufactures*, "Sector 31: Annual Survey of Manufactures: General Statistics: Statistics for Industry Groups and Industries: 2009 and 2008," December 3, 2010.

Together, they accounted for 17,026 workers (56.1 percent) of the total railway rolling stock workforce, according to the U.S. Census Bureau.[29]

U.S. Market

The U.S. market for railway rolling stock includes two segments: (1) finished goods (locomotives, rail cars) and (2) components, assemblies, and systems to manufacture finished products and repair existing stock. Railroads, shipping, and leasing companies are the primary markets for finished products, while OEMs are the primary market for components, assemblies, and systems.

U.S. demand for railway rolling stock shifted predominantly to freight rail after Congress passed the Rail Passenger Service Act of 1970.[30] Before 1971, the entry, exit, fare structure, and conditions of service provided by passenger railroads were regulated by the Interstate Commerce Commission; the railroads were incurring significant financial losses from their government-mandated passenger services. The Act offered existing passenger railroads the option of giving up long-distance passenger service. Railroads serving 46 states agreed, and a government-mandated railroad, Amtrak (box 1), was created on May 1, 1971.[31] In return for their exit from the passenger transport market, most existing railroads agreed to donate their passenger equipment or to provide cash or services to Amtrak. All but four railroads initially chose this path.[32] In 1978, the remaining four railroads exited the passenger market. Thereafter, privately held railroads of the United States thus became predominantly freight railroads.

BOX 1 Amtrak

In the United States, Amtrak carries all long-distance passenger traffic. At the end of 2009, it owned 328 locomotives (14 percent of the U.S. fleet), and 1,403 passenger cars (0.1 percent of the U.S. rail car fleet). Compared with freight railroads, Amtrak is not a significant source of demand for locomotives and cars. Its locomotives are up to 29 years old, while some cars in its fleet are as much as 61 years old.[a] Amtrak announced in 2009 it will be refurbishing some of its parked fleet and would be accepting bids on new equipment (20 locomotives and 130 passenger cars).[b] Amtrak carried 27.2 million passengers in FY 2009, a decrease of 1.5 million passengers (5.1 percent) from the FY 2008 level,[c] but still the second-highest ridership in its history.

[a] U.S. House of Representatives, Committee on Transportation and Infrastructure, "H.R. 2847, Jobs for Main Street Act, 2010," December 16, 2009, 3, http://transportation.house.gov/Media/file/Main%20Street/HR%202847%20Summary.pdf.

[b] *Railway Gazette*, "Amtrak Plans Fleet Refurbishment," April 1, 2009; *Railway Gazette*, "Amtrak Calls Bids for Locos and Passenger Cars," July 27, 2009.

[c] Amtrak, "Amtrak Posts Second-Best Ridership in History," October 12, 2009. http://www.amtrak.com/servlet/ContentServer/Page/1237608337144/1241245669129?passedYear=2009.

[29] U.S. Census Bureau, *2009 Annual Survey of Manufactures*, "Geographic Area Statistics: Statistics for All Manufacturing by State: 2008 and 2009," January 18, 2011.

[30] The Rail Passenger Service Act of 1971 (RPSA) (45 U.S.C. 501 et seq., subsequently recodified at 49 U.S.C. 24101 et seq.).

[31] The name is a contraction of "American" and "Track," given by Congress.

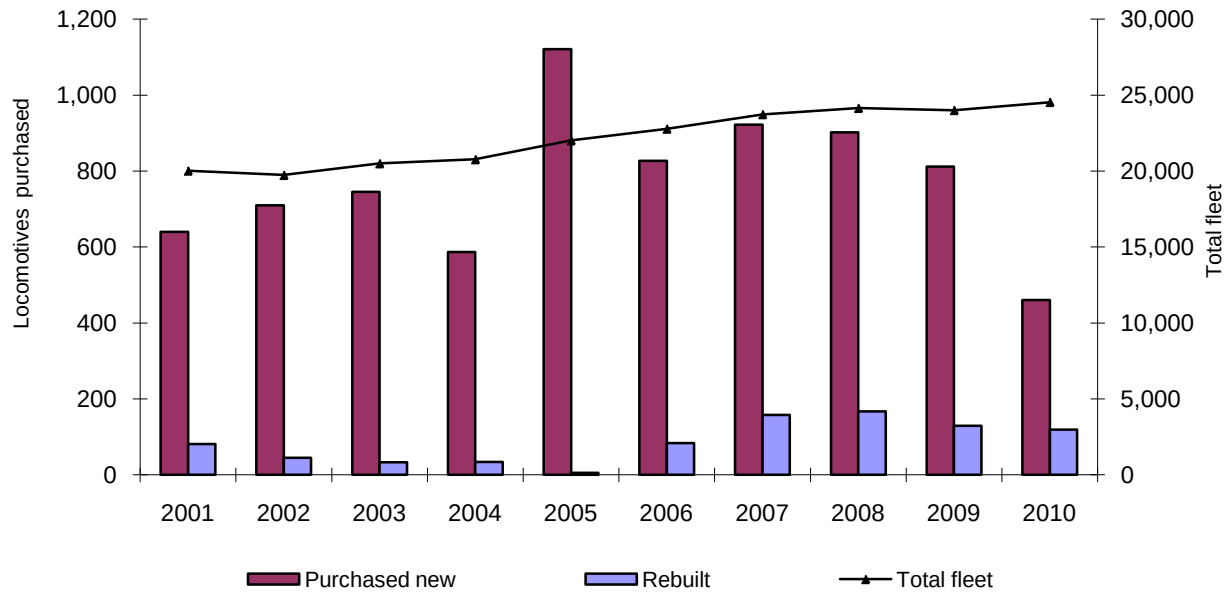
[32] Those choosing to remain passenger carriers were the Chicago, Rock Island and Pacific Railroad; the Denver and Rio Grande Western Railroad; the Georgia Railroad; and the Southern Railway. U.S. Department of Transportation, *Privatization*, 1998, 3; *Trains Magazine*, "All About Amtrak," June 30, 2006.

The U.S. Department of Transportation's Surface Transportation Board (STB) categorizes freight railroads into three groups, depending on their operating revenue. In 2009, Class I railroads were defined as those that earned at least $378.8 million in operating revenue; Class II, at least $30.3 million; Class III, less than $30.3 million.[33] In 2009, Class I railroads were the primary domestic market for new locomotives, and the second largest customers of freight cars.

Locomotives

Growth rates for the U.S. locomotive and rail car fleets diverged during the period. During 2004–09, the U.S. locomotive fleet grew from 20,774 to 24,443 units (17.7 percent; for the decade, the fleet expanded by 22.5 percent overall (figure 5).[34] The overwhelming majority of locomotives purchased were new-build locomotives, though the number of rebuilt locomotives in the fleet grew from 2005–08.

FIGURE 5 Locomotive purchases (new and rebuilt) by Class 1 railroads, total fleet as of January 1 of each year, 2001–10



Source: Progressive Railroading. Car and Locomotive Yearbook and Buyers Guide, 2008,12; Progressive Railroading, June 2009, 33; U.S. Department of Transportation, Surface Transportation Board, Report R1, December 9, 2010, Schedule 710, line 10.

[33] U.S. Department of Transportation, Surface Transportation Board, e-mail message to USITC staff, January 18, 2011.

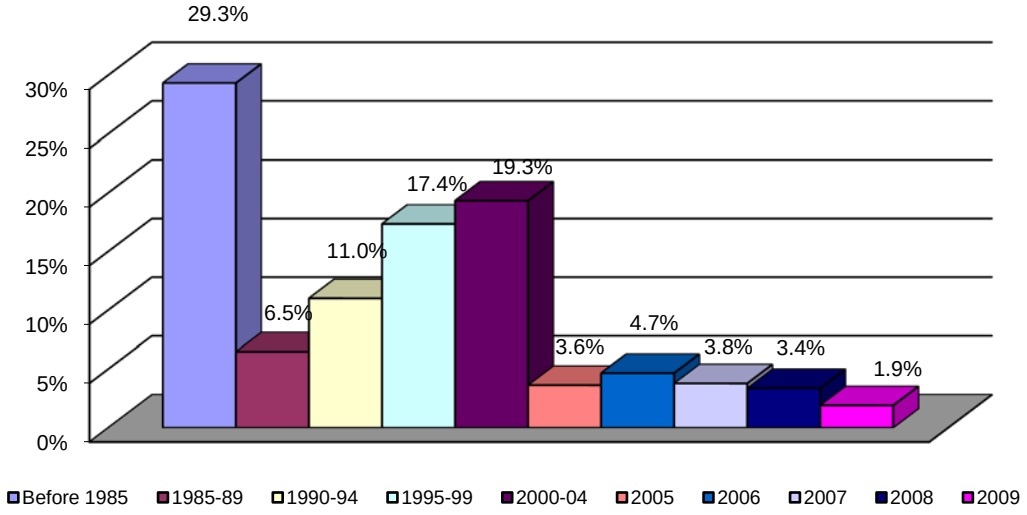
[34] *Progressive Railroading Car & Locomotive Yearbook*, 2008, 12*; Progressive Railroading*, "How the U.S. Freight Car Fleet has Changed," June 2009, 33; U.S. Department of Transportation, Surface Transportation Board, Report R1, December 9, 2010, Schedule 710, line 10. For a 10-year picture of the U.S. locomotive fleet, see appendix table C.1; AAR, *Railroad Facts 2009 Edition*, 2009, 49 and USITC calculations based on U.S. Department of Transportation, Surface Transportation Board, Report R1, December 9, 2010, Schedule 710, line 16.

In 2004, purchases of locomotives nearly doubled to over 1,100 units.[35] Three significant reasons for this include: (1) the railroads' strong fiscal position due to the increased traffic flowing through their network; (2) the railroads' desire to take advantage of an accelerated depreciation tax incentive that was scheduled to expire at the end of 2004; and (3) the wariness of railroads toward new technology that was scheduled to be incorporated on locomotives delivered after January 1, 2005. This technology was developed to allow engines to comply with the mandated U.S. Environmental Protection Agency (EPA) Tier-2 emissions regulations.[36]

U.S. railroads typically consider the useful life of a locomotive to be between 25 and 30 years, with a locomotive rebuild about every 10 years.[37] Nearly one-third of the 24,533 U.S. diesel-electric locomotives in service in 2009 were built before 1985 (figure 6), which would indicate they are nearing the end of their economic life, having typically gone through two rebuilds.

The locomotive fleet owned by Amtrak is considerably newer. While the oldest Amtrak locomotives are 21–29 years old, 86 percent of its locomotive fleet is 8 to 13 years old.[38]

FIGURE 6 U.S. Class 1 railroads locomotive fleet: Locomotives build dates, percentage of fleet as of December 2009



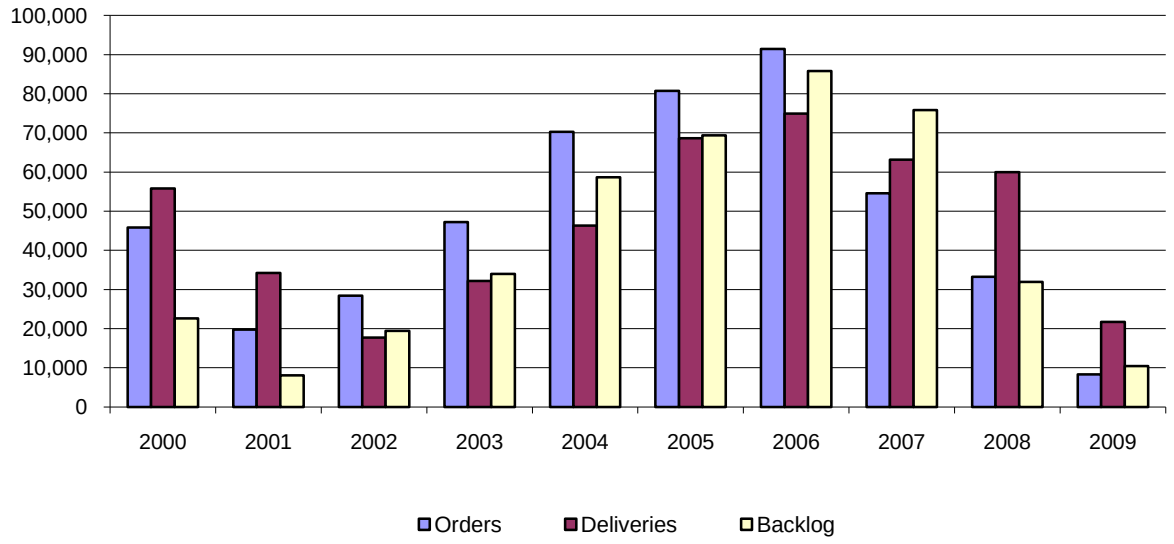
Source: AAR, *Railroad Facts, 2010 edition,* 50.

[35] Appendix table C.1.
[36] Industry official, interview by USITC staff, March 2010.
[37] Ibid., March 2009.
[38] U.S. House of Representatives, Committee on Transportation and Infrastructure, *Jobs for Main Street Act, 2010*, Summary of Transportation and Infrastructure Provision, "Title I—Infrastructure and Jobs, Amtrak," 3.

Freight Rail Cars

While the U.S. locomotive fleet increased by 17.5 percent during 2004–09, the rail car fleet grew at a slower rate, increasing 5.4 percent from 1.29 million in 2004 to 1.36 million in 2009.[39] Freight car orders outnumbered deliveries during 2004–06, while deliveries outpaced orders in subsequent years (figure 7). However, this growth did not affect all categories of rail cars equally: the number of gondola, both hopper and covered hopper, flat, and tank cars grew, while the number of box and refrigerated cars saw significant declines (table 6). Orders, deliveries, and backlog fell substantially in 2009, reflecting the prevailing weak economic conditions (figure 7).

FIGURE 7 Orders, deliveries, and backlog for U.S. freight rail cars, 2000–09



Source: Railway Supply Institute, "Freight Car Orders, Deliveries, and Backlog," e-mail message to USITC staff, April 23, 2009; *Railway Age,* "Freight car orders, backlog up sharply," Friday, October 22, 2010; *Progressive Railroading,* "Fleet Stats 2010: Freight Car, Locomotive and Passenger Rail Car Data," August 2010.

[39]AAR, *Railroad Facts, 2010 Edition*, 2010, 51. For a 10- year picture of the U.S. freight car fleet, see appendix table C.2.

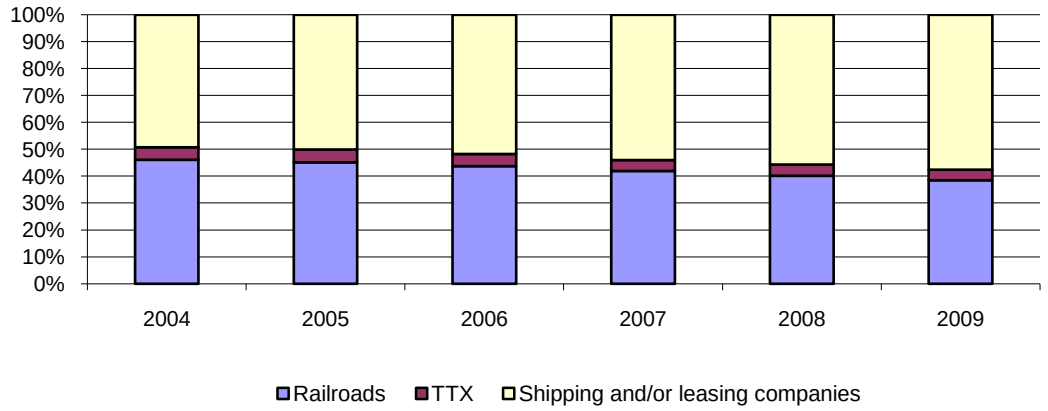
TABLE 6 Composition of U.S. freight rail car fleet as of January 1, 2005–10

Type of freight car	2005	2006	2007	2008	2009	2010	2005–10
							% change
Box, all sizes	134,339	133,879	132,145	121,570	114,282	103,895	–22.7
Gondola	201,295	203,574	213,717	217,775	220,238	215,609	7.1
Hopper	143,252	150,512	164,376	166,421	168,338	167,516	16.9
Covered hopper	377,055	382,779	395,843	411,503	414,418	409,564	8.6
Flat	158,798	168,132	171,484	172,243	170,191	163,029	2.7
Refrigerator	24,204	24,321	23,492	22,092	18,831	17,103	–29.3
Tank	243,632	248,083	255,116	269,076	281,430	281,923	15.7
Other	5,345	5,242	5,077	5,029	5,244	4,794	–10.3
Total	1,287,920	1,316,522	1,361,250	1,385,709	1,392,972	1,363,433	5.9

Source: AAR, *Railroad Equipment Report 2009,* 17, 23, 31, 41, 47, 57, 59, 61; AAR, *Railroad Facts, 2010 edition,* 51.

As noted earlier, U.S. railroad ownership of the U.S. freight rail car fleet continued to decline between 2004 and 2008, falling from 46.1 percent to 40.2 percent. In 2009, U.S. railroads owned 38.5 percent of the total U.S. fleet (figure 8).[40] At the same time, shipping companies continued to expand their ownership, accounting for the majority of freight cars during both the 2004–09 period and the decade.

FIGURE 8 Ownership of U.S. freight rail cars in service, 2004–09



Source: AAR, *Railroad Facts, 2010 edition,* 51.

Note: TTX Company is owned by U.S. Class I railroads, and serves as a pool of cars available to move intermodal, automotive, lumber, machinery, building materials, and steel products for Class I railroads. TTX Company Web site, http://www.ttx.com/ (accessed April 2, 2009).

[40] See appendix table C.3 for the complete 10-year ownership trend.

Passenger Rail Cars

While Amtrak transports passengers over long distances, urban and suburban service is provided by commuter, light-rail, and heavy-rail companies. Commuter rail generally consists of a locomotive or a self-propelled car pulling passenger coaches between urban and suburban locations.[41] Heavy rail includes subway, rapid transit, or metro systems on dedicated right of ways.[42] These systems can be found in major cities around the world; in the United States, New York, San Francisco, and Washington use one or more of these systems. All can employ EMUs, though commuter rail may also use diesel-electric locomotives.

Light-rail cars are similar to streetcars or trolleys. Typically one to three cars are linked together, operating on roadways shared by other wheeled traffic (cars, buses, trucks, etc.).[43] Although the smallest segment of the passenger rail fleet (excluding Amtrak), it is the fastest-growing segment (table 7). U.S. cities, searching for new ways to move their residents, are experimenting with light-rail concepts.

After the formation of Amtrak, passenger-oriented railroads represented a much smaller market for U.S. railway rolling stock manufacturers. The U.S. passenger fleet excluding Amtrak grew by 6 percent, with the light-rail fleet increasing by 20.1 percent during 2004–08.[44] The heavy-rail segment grew the least of the three segments. At 19,819 units in 2008, the total passenger rail car fleet is small when compared with the nearly 1.4 million freight rail cars in use in 2008.

TABLE 7 Passenger car rail fleet, excluding Amtrak, 2004–08[a]

Type of passenger car	2004	2005	2006	2007	2008	2004–08
			Cars in service			% change
Commuter rail	6,130	6,290	6,300	6,279	6,494	5.9
Light rail	1,622	1,645	1,801	1,802	1,948	20.1
Heavy rail	10,858	11,110	11,052	11,222	11,377	4.8
Total	18,700	19,045	19,153	19,303	19,819	6.0

Source: Bureau of Transportation Statistics, "Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances," August 16, 2010, table 1-11.

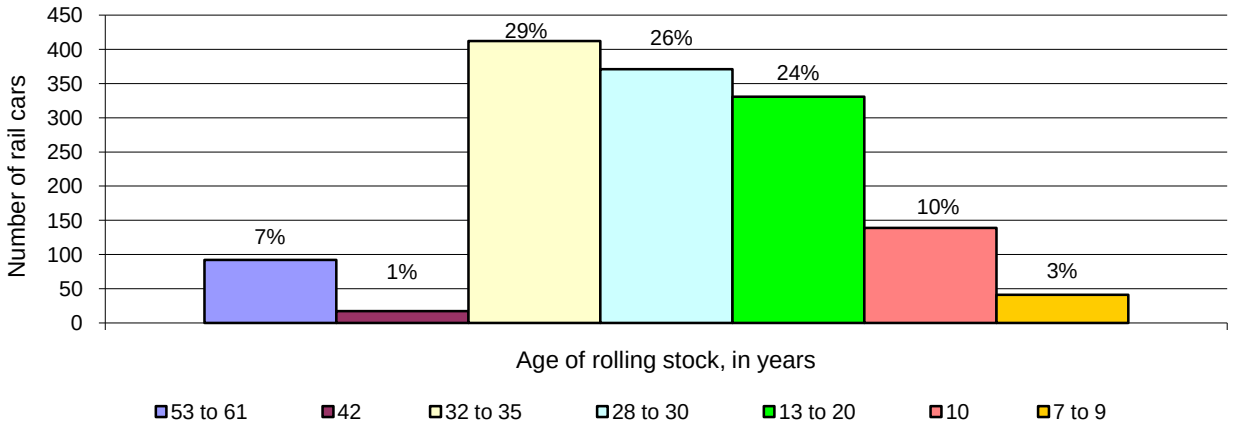
[a]Data for 2009 unavailable.

.

Amtrak's passenger car rail fleet presents a different story. It is not only the smallest passenger fleet (1,403 cars in 2008), but likely the oldest in the United States, with some car being up to 61 years old. As of December 2008, most of its cars are between 13 and 35 years old (figure 9). Amtrak has requested Congress to allocate a total of $2.4 billion in the FY11 budget in order to replace its entire rolling stock fleet by 2040.[45]

[41] *Railway Age*, *Comprehensive Railroad Dictionary*, 64.
[42] *Trainweb*, "Comparison of Selected Characteristics," November 23, 2009.
[43] IBIS*World*, "Train, Subway & Transit Car Manufacturing in the U.S," January 27, 2009; *Trainweb*, "Comparison of Selected Characteristics," November 23, 2009.
[44] For a 10-year picture of the U.S. passenger car fleet, see appendix table C.4.
[45] Joseph H. Boardman, Testimony, March 23, 2010.

FIGURE 9 Rolling stock: Age distribution and percentage of Amtrak rail car fleet, December 2008



Source: U.S. House of Representatives, Committee on Transportation and Infrastructure, "Title I—Infrastructure and Jobs, Amtrak," 3.

Factors Influencing Demand for Railway Rolling Stock

Railroad companies add to their fleet when a unit is no longer economically viable or rebuildable (i.e., to respond to replacement needs) or when demand increases. Railroads will weigh the cost of a proposed contract offered by OEMs against the projected income for the unit and make a decision to buy, rebuild, or pass on the contract. Occasionally, a purchase is made on the basis of new technology if there is a clear promise of tangible economic benefits to the railroad. However, innovations do not drive sales as much as the age and/or physical condition of the railway rolling stock.

About every 10 years, a freight locomotive is rebuilt[46] or remanufactured,[47] typically by the OEM. After the second rebuild, railroads typically buy a new locomotive from a U.S. manufacturer. It can take anywhere from six months to several years to acquire a new locomotive, depending on many factors associated with the design and production of these specialized machines.[48]

Freight cars are not rebuilt typically, but rather scrapped after about 40 years. New freight cars can be built on two weeks notice, according to industry sources. [49]

[46] Rebuilding a part is generally considered to be a simple replacement of only those components that may be broken or unusable, without a complete disassembly and inspection. Munson, "Rebuilt vs. Remanufactured Parts—Especially Engines," June 9, 2010.

[47] Remanufacturing is the process of renewing products by disassembling them; cleaning and repairing or replacing their parts; and then reassembling them to sound working condition. The Remanufacturing Institute, June 9, 2010.

[48] Industry official, interview by USITC staff, March 2009.

[49] Industry officials, e-mail message to USITC staff, April 2010.

Marketing Methods

Railway rolling stock manufacturers attempt to increase sales through direct marketing campaigns with customers, railroads, and leasing companies. However, as noted above, purchases are driven primarily by the need for new equipment and not by new technologies available on new equipment. Customers replace equipment infrequently, as the usable economic life of rolling stock is measured in decades. When new units are needed, railroads contact the locomotive or rail car manufacturers directly to negotiate a contract.[50]

Other than OEMs, there are few alternatives available to railroads seeking additional motive power or hauling capacity. Two alternatives are the used market and/or leasing companies. Class I railroads generally go to the used market and/or employ leasing companies to meet a temporary surge in demand for motive power. Railway rolling stock leasing companies primarily stock used locomotives and rail cars.[51]

Rail car leasing is more common, as railroads have divested themselves of ownership of the cars. As a result, the majority of cars are owned either by leasing companies or by companies that ship their own products. These companies, however, often do not wish to be in the transportation business themselves, likely because of competition from established service providers, the added expense of forming their own railroad, and their lack of expertise.[52] This gives rise to a mutually beneficial arrangement in which railroads supply the motive power while shippers and leasing companies supply cars ready for transport.

Consumer Characteristics

The principal customers of U.S. locomotive manufacturers are freight railroad companies headquartered in the United States, Canada, and Mexico, which use locomotives and rail cars to transport freight throughout North America. At the end of 2009, 563 U.S. railroads operated 1.4 million cars on 169,082 miles (272,111 kilometers) of track.[53]

While Class I railroads accounted for only seven of the 563 railroads in the United States in 2009 (table 8), these railroads were the principal customers for diesel-electric locomotive manufacturers. According to the Surface Transportation Board, Class I railroads operated 24,533 locomotives and 390,719 rail cars in 2009.[54]

[50] Industry official, interview by USITC staff, March 2009.
[51] Ibid., March 2010.
[52] Ibid.
[53] AAR, "U.S. Freight Railroad Statistics," November 23, 2010, 1.
[54] Surface Transportation Board, Report R1, January 7, 2010, Schedule 710, lines 10 and 55. These numbers differ from those published by the American Association of Railroads for 2009, which are 24,045 locomotives and 524,413 freight rail cars. AAR, *Railroad Facts, 2010 edition*, November 2010, 50, 51.

TABLE 8 U.S. Class I railroads: Operating revenues, locomotive and freight cars in service, year-end 2009 and revenue ton-miles traveled, 2009

Railroad	Operating revenue	Capital expenditures	Locomotives in service[a]	Freight cars in service[b]	Millions of revenue ton-miles[c]
	$ Billion		Units		
BNSF Railway Co.	14.1	2.0	6,759	79,327	593,573
CSX Transportation, Inc.	8.2	1.4	4,070	91,350	209,249
Grand Trunk Railway[d]	1.9	0.7	507	22,751	42,725
Kansas City Southern Railway Co.	0.9	0.2	552	10,950	28,599
Norfolk Southern Corp.	8.0	1.3	3,912	89,743	158,520
Soo Line Corp.[e]	0.7	0.1	383	13,401	20,361
Union Pacific Corp.	14.0	2.4	8,350	83,197	479,187

Sources: Definition of ton-miles: Investopedia, accessed November 30, 2010. Data on operating revenue, total capital expenditures, locomotives in service, and freight cars in service: Surface Transportation Board, Report R1, December 31, 2010, Schedule 210, line 13, Schedule 240, line 23, and Schedule 710, lines 10 and 55. Data for revenue ton-miles: AAR, *Railroad Facts, 2010 Edition*, 2009, 70–76.

[a]Owned and leased.
[b]Owned and leased.
[c]A single ton of goods that is transported for one mile. Railroads determine revenue ton miles by multiplying the weight of paid tonnage by the total number of miles it has been transported.
[d]Grand Trunk Railway is a subsidiary of Canadian National Railways.
[e]Soo Line Corp. is a subsidiary of Canadian Pacific Railways.

Growth in Demand for Freight Transportation

Demand to move freight by rail increased during the period, driving the demand for railway rolling stock. In particular, the volume of freight from Asia landing on the U.S. West Coast grew, spurring demand for both truck and rail transportation.[55] For the period 2004–08, both the number of freight car loads and the tonnage moved by rail rose by 1.7 and 4.9 percent, respectively before declining in 2009 (table 9). The increased tonnage was likely transported using newer cars with larger capacities, or on longer trains, as the number of cars did not increase significantly during 2004–08. Both carloads and tons originating (i.e., weight in tons of product or goods loaded at the point of departure) were significantly affected in 2009 by the economic downturn in the United States.

[55] Industry official, interview by USITC staff, April 2009.

TABLE 9 Class I railroads: Freight traffic in the United States, 2004–09

Type	2004	2005	2006	2007	2008	2009	2004–09
							% change
Carloads originating, in millions	30.1	31.1	32.11	31.5	30.6	26.0	–13.6
Tons originating, in millions	1,844	1,899	1,957	1,940	1,934	1,668	–9.5

Source: AAR, *Railroad Facts 2009 edition*, 24, 28; AAR, "Class I Railroad Statistics," September 10, 2009 and November 23, 2010.

The increased number of carloads originating and higher tonnage moved by rail may have also been prompted by higher fuel costs. According to the American Association of Railroads, a freight train moving a ton of freight averages 480 miles per gallon, taking as many as 280 trucks off the road.[56] However, fuel economy may not be the only factor deciding how a given freight shipment will be handled, as both the type of fuel used and the ultimate destination of the goods must be considered.[57]

When the demand to move certain commodities rises, the customers will seek rail cars most capable of transporting the commodity. Breaking down the types of goods moved gives an indication of the market demand for the particular type of car demanded.

Table 10 shows the movement of certain commodities for 2004 to 2009. Out of 16 freight categories during 2004–08, 6 grew (coal; farm products; food and similar products; waste and scrap, pulp, paper, and allied products, and metallic ores) while the rest declined. This rise in demand also tracks the composition of the U.S. freight car fleet for the period (table 6).[58] Carloads of metallic ores rose the most during this period (97.9 percent), while motor vehicles and equipment led the decline (23.6 percent).

However, 2009 presented a different picture. All types of carloads declined, from 2.6 to nearly 40 percent year-on-year.

[56] AAR, Policy and Economics Department, "The Economic Impact of America's Freight Railroads," May 2010, 2.

[57] Annenberg Political Factcheck, Factcheck.org, "Can a Freight Train Really Move a Ton," March 9, 2010.

[58] The decline in the box car fleet runs counter to the overall trend.

TABLE 10 Class I railroads: Carloads transported, by commodity, 2004–09

Commodity group	2004	2005	2006	2007	2008	2009	2004–09	2008–09
			Thousands of carloads				% change	
Miscellaneous mixed shipments, primarily intermodal	7,791	8,153	8,536	8,465	8,078	6,897	–11.5	–14.6
Coal	7,102	7,202	7,574	7,480	7,713	6,842	–3.7	–11.3
All other carloads	2,498	2,709	2,896	2,588	2,500	2,017	–19.3	–19.3
Chemicals	2,008	1,966	1,969	2,069	2,058	1,909	–4.9	–7.2
Farm products	1,519	1,510	1,590	1,681	1,726	1,531	0.8	–11.3
Food and similar products	1,461	1,448	1,487	1.493	1,501	1,462	0.1	–2.6
Non-metallic minerals	1,430	1,488	1,470	1,398	1,322	1,054	–26.3	–20.3
Motor vehicles and equipment	1,730	1,787	1,714	1,639	1,322	912	–47.3	–31.0
Waste and scrap material	725	706	701	726	729	568	–21.7	–22.1
Pulp, paper, and allied products	679	669	671	652	666	546	–19.6	–18.0
Metallic ores	339	662	674	662	671	527	55.5	–21.5
Petroleum and coke	625	660	663	671	560	479	–23.4	–14.5
Metal and products	740	716	778	721	692	416	–43.8	–39.9
Stone, clay, and glass products	594	603	570	513	467	372	–37.4	–20.3
Lumber and wood products	616	611	548	456	392	285	–53.7	–27.3
Forwarder and shipper association traffic	248	241	276	246	225	188	–24.2	–16.4
Total carloads	30,105	31,131	32,117	31,459	30,622	26,005	–13.6	–15.1

Source: AAR, *Railroad Facts,* 2006, 2008, 2009, and 2010 editions, 25.

U.S. Government Regulatory Issues

Several U.S. government agencies, two within the U.S. Department of Transportation (USDOT), address railway issues. The Surface Transportation Board, successor to the Interstate Commerce Commission, is charged with resolving railroad rate and service disputes and reviewing proposed railroad mergers. Although administratively associated with the USDOT, it is an independent agency.[59] The Federal Railway Administration (FRA) is charged with the development of freight and passenger rail policy, safety regulations and initiatives, legislation, and research and development activities, as well as enforcement of FRA safety regulations.[60] The FRA mandates locomotive inspections daily, a periodic inspection at 92-day intervals, and an annual inspection.[61] The FRA also requires frequent inspections of consumable parts.

[59] U.S. Department of Transportation, Surface Transportation Board, "About STB: Overview," January 10, 2010.

[60] U.S. Department of Transportation, Federal Railway Administration, "Administrator/Deputy Administrator," January 7, 2010.

[61] 49 C.F.R. Title 49: Transportation.

The FRA is currently working on the implementation of Positive Train Control. This federally mandated collision-avoidance system monitors train speed during its operation and will be able to slow the train as conditions warrant.[62] Both the technology and braking algorithms are being developed, and field trials are underway. Widespread usage is mandated by 2015.[63]

While the FRA develops safety regulations for U.S. railroads, the EPA is charged with developing emission standards for diesel engines used in locomotives.[64] The EPA created several levels or "tiers" of standards that progressively limit the emissions of nitrous oxide, hydrocarbons, carbon monoxide, and particulate matter produced by these engines.[65] Both new and remanufactured locomotives must meet Federal emissions and safety regulations before they are put into service. Through research and development done both in-house and by contracting with independent engineering companies, locomotive and industrial diesel engine manufacturers are developing engines to comply with these regulations.

Competition between Foreign and U.S. Producers

Foreign diesel-electric locomotive manufacturers do not compete for sales in the U.S. rolling stock market; in large measure, this is likely tied to long-standing relationships between U.S. manufacturers and railroads, and U.S. railroad companies' familiarity with U.S. manufacturers' products. However, U.S. railway rolling stock producers also believe that foreign producers acknowledge the U.S. products as technologically advanced compared to other countries' goods, which in turn has contributed to manufacturing partnerships and expertise being sought by foreign companies. This has also allowed U.S. manufacturers to enter a number of foreign markets, including the establishment of joint ventures in China, India and Kazakhstan.[66]

Companies in the United States buy commuter and over-the-road passenger coaches from foreign-owned companies, as there are no U.S.-owned companies currently producing these products domestically in significant volume. These coaches are assembled from imported and domestic parts in the United States by manufacturers such as Alstom (France), Bombardier (Canada), and Kawasaki (Japan).

U.S. Trade

Overview

Reflecting the global competitiveness of U.S. exports, the U.S. railway rolling stock trade surplus grew steadily during 2004–08, peaking at $1.1 billion in 2008, declining to $888 million in 2009 and rising to $1.0 billion in 2010. In 2010, the United States' leading railway rolling stock trading partners were Canada, China, and Mexico. Taken

[62] Union Pacific, "Positive Train Control Fact Sheet," accessed June 15, 2010.
[63] U.S. Department of Transportation, Federal Railway Administration, "Positive Train Control: Summary," accessed June 15, 2010.
[64] Industry official, interview by USITC staff, March 2009.
[65] EPA, "Nonroad Engines, Equipment, and Vehicles: Locomotives," March 13, 2010.
[66] Industry officials, interview by USITC staff, March 2009.

together, they accounted for $1.3 billion (55.2 percent) of total U.S. railway rolling stock exports and $540 million (38.4 percent) of such imports. In 2010, the United States had a trade surplus in these goods with Canada and Mexico, and a trade deficit with China.

TABLE 11 Railway rolling stock: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, 2004–10

Type	2004	2005	2006	2007	2008	2009	2010	2004–10
				Million $				% change
Exports	1,649	2,124	2,600	2,663	2,935	2,140	2,410	46.1
Imports	1,282	1,516	1,742	1,668	1,883	1,251	1,405	9.6
Trade balance	367	607	858	995	1,132	888	1,005	173.8

Source: Compiled from official statistics of the U.S. Bureau of the Census.

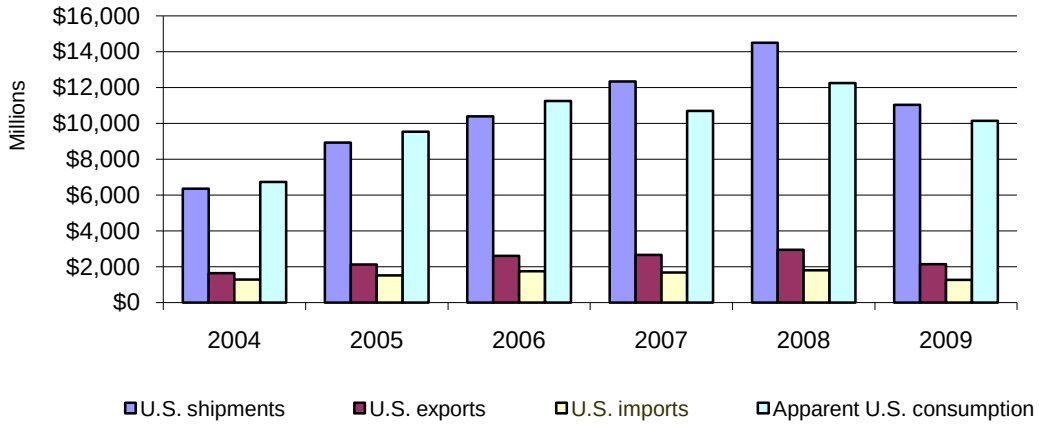
Note: Calculations based on rounded data.

U.S. shipments doubled during 2004–08, as both the global and domestic demand for U.S. railway rolling stock goods grew. The value of U.S. shipments of new and rebuilt or remanufactured railway rolling stock rose from $6.4 billion in 2004 to $13.4 billion (a 110.4 percent increase) in 2008 (figure 10). U.S. exports grew from $1.6 to $2.9 billion (78.0 percent) while U.S. imports grew from $1.3 billion to $1.8 billion (40.7 percent) during the same period. The ratio of imports to consumption fell irregularly, slipping from a high of 19 percent in 2004 to 15 percent in 2008, while the ratio of exports to shipments declined from a high of 26 percent in 2004 to 22 percent in 2008.

All of the aforementioned categories (U.S. shipments, exports, imports, and apparent consumption) fell in 2009. U.S. shipments fell by $3.5 billion (23.9 percent) to $11.0 billion; exports, by $796 million (27.1 percent) to $2.1 billion; imports, by $546 million (30.3 percent) to $1.3 billon; and, apparent consumption, by $210 million (17.2 percent) to $10.1 billion. The ratio of imports to consumption fell to its lowest point during the period, to 12 percent while the ratio of exports to shipments dropped to 19 percent.[67]

[67] USITC calculations based on U.S Department of Commerce data.

FIGURE 10 U.S. railway rolling stock shipments, imports, exports, and apparent consumption, 2004–09



Source: Compiled from official statistics of the U.S. Department of Commerce and USITC staff estimates.

U.S. Imports

Total U.S. railway rolling stock imports grew during 2004–08, from $1.3 billion to $1.8 billion, then declined in 2009 to $1.3 billion before rising to $1.4 billion in 2010 (table 12).[68] More than half of U.S. imports of railway rolling stock were represented by three groupings: containers specifically designed for shipping; parts of railway vehicles other than locomotives; and truck axles and wheels and parts thereof, including parts of truck assemblies, for railway or tramway vehicles. [69] Taken together, these three items represented 66.1 percent ($927.9 million) of total 2010 U.S. imports of railway rolling stock and parts thereof.

The top three countries supplying containers (including containers for the transport of fluids) specially designed and equipped for carriage by one or more modes of transport were China, France, and Germany ($257 million, 72.3 percent). Parts of railway or tramway vehicles, other than locomotives, nesoi,[70] were imported from Japan, Korea, and Canada, which accounted for $248 million (73.2 percent) of such goods. U.S. imports of truck axles and wheels and parts thereof, including parts of truck assemblies, for railway or tramway vehicles were primarily from Japan, China, and Canada ($126 million, 55.0 percent).

[68] For a 10-year picture of U.S. imports, see appendix table C.7.

[69] Containers are typically made of wood or metal, with doors or removable sides. Examples include furniture removal containers; insulated containers for perishable foods or goods; containers for the transport of liquids, if they have supports allowing them to be fitted to multiple modes of transportation; open containers for transport of coal, ores, etc.; and specialty containers constructed for the transport of fragile goods.

[70] Not elsewhere specified or indicated.

TABLE 12 U.S. railway rolling stock imports: Top three products, 2004–10

HTS number	Description	2004	2005	2006	2007	2008	2009	2010	2004–10
					$1,000				% change
860900	Containers (including containers for the transport of fluids) specially designed and equipped for carriage by one or more modes of transport	156,610	265,696	284,885	279,120	324,900	240,676	354,893	126.6
860799	Parts of railway or tramway vehicles, other than locomotives, nesoi[a]	435,837	468,245	407,106	412,342	459,885	437,646	339,520	–22.1
860719	Truck axles and wheels and parts thereof, including parts of truck assemblies, for railway or tramway vehicles	199,317	363,976	589,292	496,485	481,611	228,937	233,563	17.2
Subtotal		791,764	1,097,917	1,281,283	1,187,948	1,266,396	907,259	927,976	17.2
All other		489,842	418,467	460,907	480,113	536,310	343,978	476,829	–2.7
Total		1,281,606	1,516,385	1,742,190	1,668,060	1,802,706	1,251,237	1,404,806	9.6

Sources: Data compiled from tariff and trade data from the U.S. Department of Commerce and the USITC.

[a]Not elsewhere specified or indicated.

U.S. Exports

U.S. railway rolling stock exports presented a more robust picture, growing at nearly twice the rate of imports during 2004–08, from $1.6 billion to $2.9 billion, or by $1.3 billion (78.0 percent). U.S. exports then declined in 2009 to $2.1 billion before climbing to $2.4 billion in 2010 (table 13).[71] The top three products exported in 2010 were truck axles and wheels and parts thereof; parts of locomotives, nesoi; and railway or tramway service vehicles.

[71] For a 10-year picture of U.S. imports, see appendix table C.8.

TABLE 13 U.S. railway rolling stock exports: Top three products, 2004–10

HTS number	Description	2004	2005	2006	2007	2008	2009	2010	2004–10
					$1,000				% change
860719	Truck axles and wheels and parts thereof, including parts of truck assemblies, for railway or tramway vehicles	375,899	492,478	572,057	529,370	465,592	322,430	461,363	22.7
860791	Parts of railway or tramway locomotives, nesoi	261,056	285,774	388,871	423,080	391,794	248,368	301,088	15.3
860400	Railway or tramway service vehicles, whether or not self-propelled	79,205	84,450	86,813	85,044	151,809	277,614	289,692	265.7
Subtotal		716,159	862,701	1,047,740	1,037,494	1,009,196	848,413	1,052,143	46.9
All other		933,025	1,260,886	1,552,383	1,625,541	1,925,979	1,291,182	1,357,548	45.5
Total		1,649,184	2,123,588	2,600,124	2,663,035	2,935,175	2,139,595	2,409,691	46.1

Sources: Data compiled from tariff and trade data from the U.S. Department of Commerce and the USITC.

Taken together, these goods represented 43.7 percent ($1.1 billion) of total 2010 U.S. exports of railway rolling stock and parts thereof. Although not in the top three, U.S. diesel-electric locomotive exports experienced an unprecedented spike in 2007–08 (expanding by $447 million or 77.4 percent), likely because of both increased activity with international joint ventures and increased foreign demand to move freight by rail.[72]

The three leading markets for U.S. exports of truck axles and wheels and parts thereof in 2010 were Canada, Mexico, and Australia, which accounted for 50.0 percent ($230.2 million) of such exports. Exports of parts of locomotives, nesoi primarily went to Brazil, Canada, and Kazakhstan, accounting for 62.1 percent ($187.1 million) of such exports. In 2010, the three largest markets for U.S. exports of railway or tramway service vehicles were China, Canada, and India. Together, they accounted for 72.7 percent ($210.7 million) of U.S. exports of this category.

Over the report period, Canada was the largest export market for the U.S. railway rolling stock industry. During 2004–10, U.S. exports of railway rolling stock to Canada amounted to $5.6 billion, more than twice the value of U.S. exports ($2.3 billion) to Mexico, the second largest foreign market for U.S. railway rolling stock. Egypt alone accounted for 58.1 percent ($233.6 million) of total U.S. exports of diesel-electric locomotives in 2009, the second year in the past decade Egypt received such locomotives. Exports to Canada and Mexico, traditionally strong markets for U.S. producers, each declined by over 96 percent in 2008–09.

The Export-Import Bank of the United States (Ex-Im Bank) provides financing to U.S. manufacturers seeking international sales. In spite of the challenging credit environment,

[72] See "Foreign Market Profiles" later in this document.

in 2009 the Ex-Im Bank assisted three U.S. companies to sell their goods to foreign companies. L.B. Foster Co. (Pittsburgh, PA) was granted a $12 million loan guarantee to provide rail track equipment to Ferrocarril Transandino, S.A. (Peru). GE Transportation (Erie, PA) received a $86.5 million long-term loan for its sale of diesel-electric locomotives to MRS Logistica (Brazil) and a $10.3 million loan guarantee for the sale of diesel-electric locomotives to Iron Ore Co. of Canada. Lastly, Nucor Corp. (Charlotte, NC) received a guarantee for a $20 million line of revolving credit for the sale of its steel plate manufacturing facility to Gunderson-Gisma, a rail car manufacturer in Mexico.[73]

In 2010, Ex-Im Bank provided a medium-term insurance policy to Holland L.P., a U.S. manufacturer of in-track welding systems. Two such systems were sold to Concrenor Indústria e Comércio Ltda., a subsidiary of SPA Engenharia Indústria e Comércio (SPA), which provides engineering and construction services to Brazilian railroads.[74]

U.S. and Foreign Trade Measures

U.S. Tariff and Nontariff Measures

The U.S. aggregate trade-weighted average rate of duty for all products covered was 0.8 percent (table B.1) in 2010.[75] There are no known significant domestic nontariff measures affecting the importation of foreign railway rolling stock.

U.S. Government Trade-related Investigations

During the period 2004–09, the U.S. International Trade Commission (Commission) conducted one trade-related investigation with respect to imports of products relating to railway rolling stock. The investigation concerned imports of certain cast-steel railway wheels from China and was conducted under section 337 of the Tariff Act of 1930 (19 U.S.C. 1337). The Commission instituted the investigation on September 16, 2008 based on a complaint filed on August 14, 2008, by Amsted Industries Inc. (Chicago, IL) alleging violations of section 337 of the Tariff Act of 1930 in the importation of certain cast-steel railway wheels and certain products containing the same due to the misappropriation of trade secrets. [76] The Commission referred the matter to one of its administrative law judges for further proceedings. The complaint named four respondents:

- Tianrui Group Company Limited of China
- Tianrui Foundry Company Limited of China
- Standard Car Truck Company of Park Ridge, IL.

[73] Export-Import Bank, "Ex-Im Helps U.S. Railway Equipment," March 24, 2009 and "U.S. Locomotive and Mining Equipment Manufacturers," December 3, 2009.
[74] Export-Import Bank, "Railroad Equipment Manufacturer Uses Ex-Im Bank Medium-Term Insurance To Export to Brazil," May 18, 2010.
[75] USITC calculations based on data from U.S. Census Bureau.
[76] USITC, "In the Matter of: Certain Cast Steel Railway Wheels" September 11, 2008.

- Barber Tianrui Railway Supply, LLC, of Park Ridge, IL.

On October 16, 2009, the administrative law judge issued findings of violations of section 337 and a recommendation of remedy and bonding during the period of Presidential review. On February 16, 2010, the Commission issued a notice adopting the administrative law judge's findings and recommendations. [77]

Foreign Tariff and Nontariff Measures

The top three U.S. railway rolling stock trading partners in 2010 were Canada, China, and Mexico. Import duties for railway rolling stock ranged from zero to a high of 20 percent (table 14).

TABLE 14 Railway rolling stock: MFN import duty rates, top three trading partners, 2010

HTS number	Canada	China[a]	Mexico
860110	9.5	3.0	5.0
860120	9.5	3.0	5.0
860210	9.5	3.0	0.0
860290	9.5	3.0	5.0
860310	8.0	3.0	5.0
860390	8.0	3.0	5.0
860400	0–8.0	3–7.0	10.0
860500	11.0	5.0	12.5
860610	11.0	5.0	10.0
860630	11.0	5.0	5.0
860691	11.0	5.0	10.0
860692	11.0	5.0	10.0
860699	11.0	5.0	5.0
860711	0.0	3.0	5.0
860712	0.0	3.0	5.0
860719	0–9.5	3.0	4.3
860721	0–10.0	3.0	5.0
860729	0–10.0	3.0	5.0
860730	0–2.5	3.0	5.0
860791	0.0	3.0	5.0
860799	0–11.0	3.0	7.0
860800	0–6.5	3–4.0	5.0
860900	0–6.5	12.0	20.0

Source: Canada Border Services Agency, *Customs Tariff 2010*, chapter 86; U.S. Department of Commerce, Market Access and Compliance tariff schedule; World Trade Organization, tariff download facility, October 5, 2009.

[a]Bound rate at date of accession.

Canada imposed import duties on railway rolling stock ranging from zero to 11 percent, while China's import duties ranged from 3 to 10.5 percent. Mexico had a zero percent duty on diesel-electric locomotives, 5–10 percent duties on freight rail cars, 0–10 percent

[77] USITC, "Issuance of a Limited Exclusion Order," February 16, 2010.

duties on parts, and a 20 percent duty on containers.[78] However, railway rolling stock imports and exports among NAFTA partners traded duty free.

There were no known foreign nontariff measures in any markets.[79] Nonetheless, some U.S. rail car companies who do not currently export were considering initiating production abroad as a hedge against any future measures.[80]

Foreign Industry Profiles

The entire global market for diesel-electric locomotives and freight rail cars expanded over the period 2004–08, contracting significantly in 2009. In addition to the traditional U.S. export markets of Canada and Mexico, U.S. locomotive manufacturers successfully sold their products to Australia and Brazil over the past decade and more recently, are having success selling to China. U.S.-manufactured freight rail cars were exported to Canada, Mexico, Malaysia, Colombia, and Japan, among others, in 2010.

The global market (as defined by total exports from all countries) for diesel-electric locomotives more than doubled during 2004–08, from $1.1 billion to $2.3 billion (table 15). Most of this growth occurred between 2007 and 2008, when exports climbed from $1.4 billion to $2.3 billion. The market for diesel-electric locomotives then declined by 58.5 percent (($1.3 billion) in 2009.[81]

TABLE 15 Global exports of diesel-electric locomotives, HS 8602.10, 2004–09

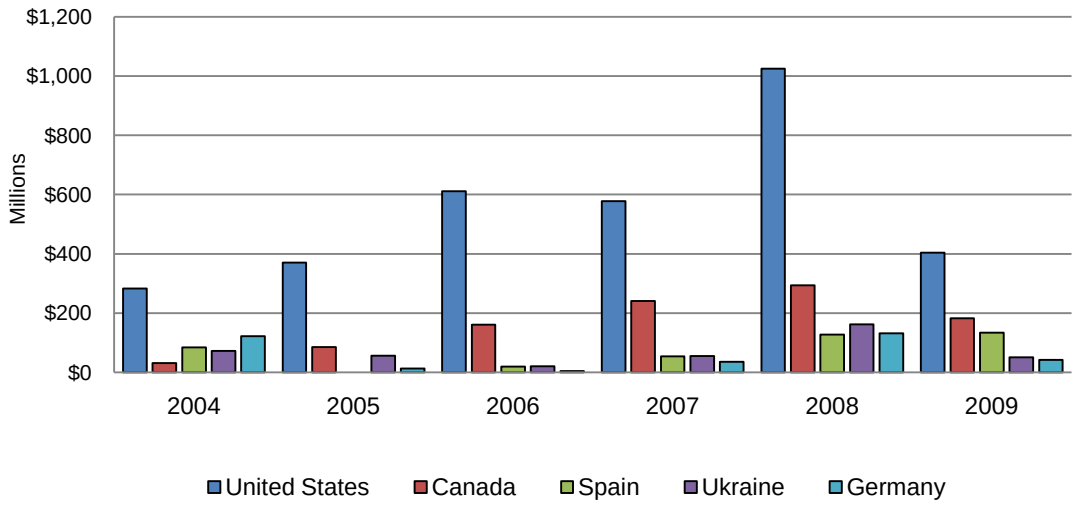
Country	2004	2005	2006	2007	2008	2009	2004–09
			$1,000				% change
United States	282,723	370,615	611,064	577,850	1,024,829	403,810	42.8
Canada	30,883	85,266	160,780	240,713	293,303	182,057	489.5
Spain	84,432	0	18,913	54,004	127,436	133,426	58.0
Ukraine	72,348	56,279	20,879	54,896	161,686	51,114	–29.3
Germany	122,195	12,385	4,666	35,623	131,187	42,404	–65.3
Subtotal	592,582	524,544	816,302	963,085	1,738,440	812,811	37.2
All other	526,291	184,041	223,342	448,686	522,624	128,015	–75.7
Total	1,118,873	708,585	1,039,644	1,411,771	2,261,063	940,826	–15.9

Source: Global Trade Information Services, Inc. (GTIS), *Global Trade Atlas*, December 2, 2009.

The United States has been the global leader in such exports since 2004 (figure 11), accounting for 43 percent (($404 million) of the market in 2009. Canada was the second-largest exporter during 2004–09, accounting for $182 million in 2009. For the decade, the United States, Mexico, and Canada were the principal sources of diesel-electric locomotive exports worldwide.

[78] World Trade Organization. Tariff download facility, October 5, 2009.
[79] Industry officials, interview by USITC staff, April 2009.
[80] Industry officials, e-mail message to USITC staff, April 2010.
[81] Schedule B does not differentiate between new and used locomotives. See appendix table C.5 for a 10-year picture.

FIGURE 11 Top five countries exporting diesel-electric locomotives, 2004−09



Source: Global Trade Information Services, Inc., (GTIS), *Global Trade Atlas,* data for HTS heading 8602.10, February 24, 2010.

During 2004–09, the global market for freight rail cars grew by $457.1 million (22.3 percent), from $2.0 billion to $2.5 billion (table 16).[82] The majority of this growth occurred between 2007 and 2008, when exports climbed from $3.7 billion to over $5.0 billion, before plunging in 2009 to $2.5 billion.[83]

TABLE 16 Global exports of freight rail cars, 2004–09

Country	2004	2005	2006	2007	2008	2009	2004–09
			$1,000				% change
Ukraine	576,604	629,369	710,407	1,330,918	1,826,233	489,483	–15.1
Romania	129,072	123,941	130,587	325,953	418,083	299,940	132.4
Slovakia	150,177	74,309	82,757	140,117	331,307	285,708	90.2
Mexico	166,488	392,827	611,450	825,781	774,369	283,488	70.3
China	34,831	50,276	40,634	90,000	266,833	230,385	561.4
Subtotal	1,057,171	1,270,722	1,575,835	2,712,769	3,616,825	1,589,004	50.3
United States	121,581	186,610	216,769	298,494	244,152	164,095	35.0
All other	869,908	637,163	762,319	684,925	1,142,295	758,644	–12.8
Total[a]	2,048,661	2,094,495	2,554,923	3,696,188	5,003,272	2,511,743	22.6

Source: Global Trade Information Services, Inc. (GTIS), *Global Trade Atlas, "*Commodity 8606: Railway or Tramway Goods Vans & Wagons, Not Self-Propelled," October 1, 2010.

[a]Total for all reporting countries, not all countries of the world.

Ukraine was the leading freight rail car exporter for the entire period, with its exports growing from $576.6 million in 2004 to $1.8 billion in 2008 before declining to $489 million in 2009 (figure 12). The majority of these exports ($293.6 million, or 60.0 percent) went to Russia. Others in the top five exporting nations include Romania,

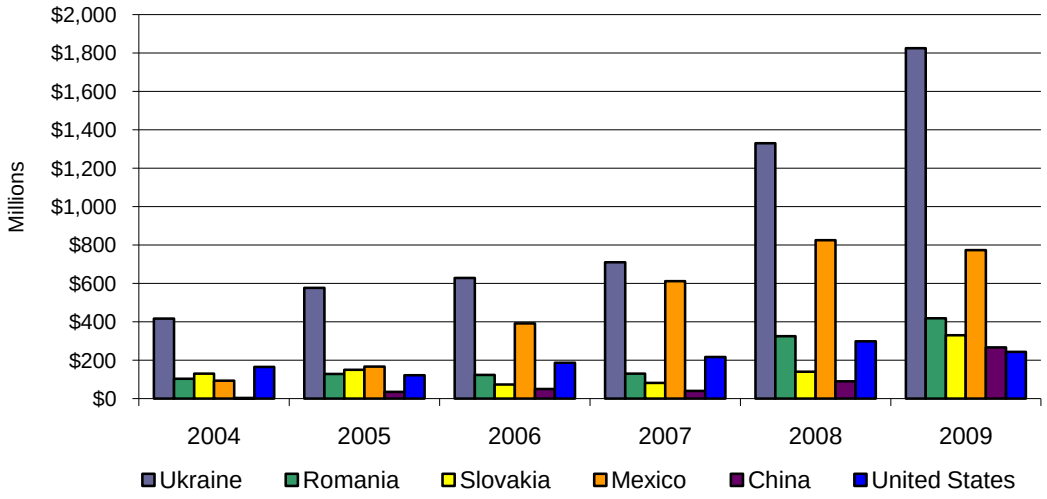
[82] A 10-year picture can be found in appendix table C.6.

[83] Global Trade Information Services, Inc. (GTIS), *Global Trade Atlas*, export statistics for HS 8606, "Railway or Tramway Goods, Vans, and Wagons, Not Self-propelled," April 16, 2010.

Slovakia, Mexico, and China. All of the top five nations experienced drops in their 2009 freight car exports from 2008 levels, with Ukraine declining by 73.2 percent ($1.3 billion); Romania, 28.2 percent ($118.1 million); Slovakia, 13.8 percent ($45.6 million); Mexico, 63.4 percent ($490.9 million); and China, 13.7 percent ($36.4 million).[84]

The United States was consistently among the top five exporting nations (by value) of freight cars through 2007. However, it was surpassed by China in 2008, with China's rail car exports totaling $267 million, compared to those of the United States at $244 million. China again surpassed the United States in freight rail car exports in 2009 by a wider margin ($66.3 million).

FIGURE 12 Top six countries exporting freight rail cars, 2004–09



Source: Global Trade Information Services, Inc., (GTIS), *Global Trade Atlas*, data for HS heading 8606, April16,2010.

The following discussion examines the state of the industry in two traditional markets for U.S. railway rolling stock, Canada and Mexico, and two new markets with significant export potential for U.S. railway rolling stock manufacturers, China and Russia (table 17). The next section, "Foreign Market Profiles," will describe the same four countries in terms of their market situation and potential.

[84] Global Trade Information Services, Inc. (GTIS), *Global Trade Atlas*, "Commodity 8606: Railway or Tramway Goods Vans & Wagons, Not Self-Propelled," April 16, 2010.

TABLE 17 Railway rolling stock industry: A comparison of key metrics in selected foreign markets, 2009

Countries	Locomotive fleet	Rail car fleet			Kilometers of track	Tonnage originating, thousands
		Freight	Passenger	Total		
Canada	2,671[a]	82,396[b]	567[a]	82,966	46,688	331,423[b]
Mexico	1,160	27,873	144	28,017	17,516	99,561
China	17,825	594,388	47,436	641,824	77,834	330,354
Russia	20,101	991,954	23,000[c]	617,022[c]	87,157	Unknown

Source:

Canada: *North American Transportation Statistics Database*, table 12-1; CIA, *The World Factbook* , "North America: Canada," Transportation: Railways, January 11, 2010.

Mexico: *North American Transportation Statistics Database*, table 12-1; *Secretaría de Comunicaciones y Transportes, Anuario Estadístico Ferroviario 2009*, 13; CIA, *The World Factbook* , "North America: Mexico," Transportation: Railways, January 11, 2010.

China: National Bureau of Statistics of China. *China Statistical Yearbook, 2005*, table 16-17; *2007*, table 16-17; *2009,* table 15-17; and *2010,* table 16-17; National Bureau of Statistics of China, *China Statistical Yearbook, 2005*, "Number of National Railway Passenger Coaches and Freight Cars Owned," table 16–18; *2009,* table 15–18; and *2010,* table 16-18; and CIA, *The World Factbook* , "East & Southeast Asia: China," Transportation: Railways, January 11, 2010.

Russia: JSCo Russian Railways, *Annual Report 2008*, 2009, appendix 18, 198 and JSCo Russian Railways, *Annual Report, 2009*, 2010, 111; CIA, *The World Factbook* , "Central Asia: Russia," January 11, 2010.

[a]Preliminary 2009 data.
[b]Data are for 2008.
[c]Estimated by Russian Railways in *2009 Annual Report*, 40.

Canada

Canadian companies manufacture locomotives and components for subassemblies (but few completed assemblies) both for their domestic needs and for the rest of the North American market.[85] Most of the systems used in Canadian-built locomotives and freight cars, such as trucks, wheel sets, propulsion equipment, and train control approaches, are manufactured in the United States.[86] Before February 2005, about 250 small businesses or subsidiaries of foreign firms in Canada supplied the Canadian railway rolling stock industry, with the dominant companies in Canada owned by multinational enterprises; in 2009, the number of industry enterprises was 51.[87]

There are three locomotive manufacturers in Canada, each headquartered outside of the country: Alstom (France), Bombardier, Inc. (Germany), and Electro-Motive Diesel ([EMD], United States). EMD, the largest producer of freight locomotives in Canada, manufactures in London, Ontario;[88] it is one of two significant diesel-electric freight locomotive producers in North America. The company has undergone several changes of

[85] Examples of parts manufactured in Canada include coil springs, wheel sets, gears, hatch covers, batteries, interior components, air compressors, brake components, power cables, freight car brakes, braking resistors, door operating systems, and HVAC components, as well as power supply and distribution equipment such as system controls, high voltage breakers, third-rail components, sub-station equipment, and utility transformers. Industry Canada, "Railway Equipment Manufacturing Overview," October 5, 2009.

[86] Industry Canada, "Railway Equipment Manufacturing Overview," October 5, 2009.

[87] Industry Canada, "Railway Equipment Manufacturing Overview," October 5, 2009; "Establishments: Railroad Rolling Stock Manufacturing," February 20, 2011.

[88] Electro-Motive Diesel, "About Electro-Motive Diesel," December 18, 2008. EMD is headquartered in LaGrange, IL, where it manufactures major systems for its locomotives.

ownership over the past decades, with the most recent sale occurring on June 1, 2010, to Progress Rail Services, a wholly owned subsidiary of Caterpillar, Inc.[89]

Bombardier, Inc., manufactures a range of railway rolling stock products both in Canada and abroad, including locomotives, cars, and systems for freight and passenger transport. Its customer base spans 60 countries, with the majority of its shipments destined for Europe.[90] Its major competitors, Alstom (France)[91] and Siemens (Germany), largely supply equipment for passenger rail service worldwide.[92] As of January 31, 2010, Bombardier Transport had a $27.1 billion order backlog and employed 33,800 people worldwide.[93]

Alstom's Canadian subsidiary remanufactures locomotives and builds new freight cars. It also manufactures and rebuilds transit cars and provides overhaul services for freight cars, locomotives, and components in Montreal, the state of New York, and Mexico.[94]

Two major Canadian companies supply the rail car market in North America. The largest is National Steel Car, Ltd., located in Hamilton, Ontario, where it currently produces a range of freight rail cars. Procar, Inc. (Oakville, Ontario), an affiliate of Union Tank Car (Chicago, IL), repairs rail cars and manages a fleet of more than 23,000 conventional and special-purpose tank and freight cars. Two other companies formerly active in this sector no longer manufacture rail cars: TrentonWorks, Ltd. (Trenton, Nova Scotia), which ceased operation in 2007,[95] and AMF Technotransport (Montreal, Québec).

Mexico

Mexico's railway rolling stock manufacturing is largely concentrated in the city of Sahagún, in the state of Hidalgo, with two locomotive manufacturers, two U.S. rail car manufacturers, and one repair site (see table 5) established there. Bombardier began its Sahagún production of railway rolling stock in May 1992 after acquiring the assets of Constructora Nacional de Carros de Ferrocarril (Concarril).[96] Most recently, it began fabricating parts and assembling finished EMD locomotives under an agreement with EMD for the North American market.[97]

Gunderson, a subsidiary of the Greenbrier Companies (Lake Oswego, OR), has two rail car manufacturing facilities in Mexico. Gunderson Concarril builds intermodal and conventional railcars in leased space in Sahagún, Mexico, and Gunderson-GIMSA, a joint venture with Grupo Industrial Monclova (GIMSA), manufactures new covered hopper and tank cars in Monclova, located in the state of Nuevo León.

[89] Caterpillar, Inc., "Progress Rail Services to Acquire Electro-Motive Diesel," June 1, 2010.
[90] Bombardier, *Annual Report, 2008*, 2009, 80.
[91] Alstom, "Key Figures," August 16, 2010. As of March 31, 2010, Alstom had a backlog of $57.3 billon and employed 76,500 worldwide. Note: exchange rate calculated based on €42.6 billion on March 31, 2010 at www.oanda.com.
[92] Bombardier, *Annual Report, 2008*, 2009, 83.
[93] Bombardier, "About Transportation: About Us," October 13, 2009.
[94] Alstom Transport, "Transport – Service," October 13, 2009.
[95] The Greenbrier Companies, *Annual Report, 2008*, 2009, 5.
[96] Bombardier, About Us: History," October 13, 2009.
[97] Relations Internationales Quebec, Two Contracts Worth $558 Million for Bombardier," November 3, 2009.

Trinity Industries, Inc. (Dallas, TX) has facilities in Castaños, Huehuetoca, Monclova, Sabinas, and Vallejo, where a range of freight cars are manufactured. Union Tank Car, Inc. (Chicago, IL), repairs tank cars in Celaya, Mexico, as well.

China

China's industry is dominated by two railway rolling stock industrial groups, China North Locomotive and Rolling Stock Industry Corporation (CNR) and China South Locomotive and Rolling Stock Corporation Limited (CSR). In 2008, CNR and CSR were the third and fourth largest railway rolling stock manufacturers in the world, respectively.[98] Guidance provided by the Central Government in its 10th (2001–05) and 11th (2006–10) five-year plans focused on developing new rail lines for both passenger transportation and freight shipment (primarily coal and containers).[99] New rail lines were constructed, and new railway rolling stock was put into service to meet the government's plans. U.S. and other Western suppliers partially met this demand.

CSR is managed by the State-owned Assets Supervision and Administration Commission (SASAC).[100] Currently, it has 16 subsidiaries and owns several research and development organizations to promote locomotive and rail car development.[101] The subsidiaries produce parts, systems, and complete locomotives and rail cars. They also renovate older locomotives and rail cars as needed.

CNR, the second largest group, is also under the management of SASAC, with headquarters in Beijing, and has 20 subsidiaries throughout China under SASAC management.[102] In June 2008, it was reorganized into China CNR Corporation Limited, remaining under SASAC's control.[103] Currently, it has an annual production capacity of 460 diesel-electric locomotives; 370 electric locomotives; 2,300 passenger coaches; 1,100 urban railway vehicles; and 26,000 freight cars.[104] In 2006, CNR shipped 175 diesel-electric locomotives, 235 electric locomotives, 18,445 freight cars, 995 passenger cars, and 327 metro and light rail cars.[105]

Russia

The majority of Russia's railway rolling stock manufacturing industry has been consolidated into Transmash Holdings, a company established in 2002.[106] In 2009, it employed 57,000 workers and had sales of $2.3 billion.[107] The 12 subsidiaries of Transmash produce:

[98] *International Railway Journal*, SCI Forecasts Solid Growth," December 29, 2009.

[99] China.org.cn, "Premier on 10th Five-Year Plan" and "Five-year Development Plan for Railway, Rapid Transit Systems," December 29, 2009.

[100] China South Locomotive and Railway Rolling Stock Corporation, Ltd., "About Us," November 3, 2009.

[101] Ibid.

[102] China CNR Corporation, Ltd., "History," November 3, 2009.

[103] China CNR Corporation, Ltd., "Profile," November 3, 2009.

[104] Ibid.

[105] China CNR Corporation, Ltd., *Annual Report 2006*, 2007, 8.

[106] Alstom Transport has acquired 25 percent plus one share of Transmash Holdings to develop and manufacture new railway rolling stock. Alstom Transport, "Alstom Acquires 25% of the Capital of Transmashholding," March 2, 2010.

[107] CJSC Transmashholding, "About: Company Profile," March 8, 2010.

- main-line and industrial electric locomotives;
- main-line and yard diesel-electric locomotives;
- passenger coaches and freight cars;
- DMUs and EMUs;
- metro cars;
- car castings;
- diesel engines and diesel generators; and
- spare parts;

Transmash subsidiaries also provide repair operations and maintenance service.

European companies recently have partnered with Russian industry in two joint ventures. Siemens AG and OJSC Sinara Transport Machines (a subsidiary of Transmash Holdings) was established in May 2010 to produce electric locomotives in Verkhnyaya Pyshma near Yekaterinburg.[108] Alstom is involved with Transmash Holdings in a joint venture to produce intercity electric locomotives.[109]

Vagonmash ZAO (VAGONMASH CJSC), an independent company, designs and manufactures passenger and metro cars, light rail cars, and tram cars. The company also refurbishes and modernizes metro cars, and provides spare parts and maintenance for all rail coaches and metro cars it produces. Vagonmash ZAO has an 82.9 percent-owned subsidiary and two affiliated companies located in Russia and Ukraine.[110]

A new Russian company, Tikhvin Railway Car Building Plant (TVSZ), was formed in 2009 to produce rail cars in a former Transmash facility located 125 miles east of St. Petersburg.[111] The U.S. company Starfire Engineering & Technologies, Inc. (Lawrence, KS) provided designs for three types of freight cars (covered hopper, container and/or flat, and gondola) to be produced at Tikhvin.

Foreign Market Profiles

Each of the four countries discussed in this section present a different market dynamic, with China emerging as the strongest in terms of growth during 2004–09. The locomotive fleets of China, Mexico, and Russia grew during the period, while those of Canadian railroads declined. China's rail car fleet also grew, while those of the other three nations declined. The following discussion will present the makeup and numbers in the locomotive and rail car fleets in each of the four nations, and the type of freight rail cars in use during the period.

[108] *Railway Gazette*, "RZD Orders 221 Locomotives from Siemens-Sinara JV," May 27, 2010.
[109] *Railway Gazette*, "Alstom-TMH Signs €1bn EP20 Locomotive Contract," June 3, 2010.
[110] Google Finance, "VAGONMASH ZAO," August 11, 2009.
[111] The Tikhvin Railway, "Brand-New Railway Cars Produced in Tikhvin," April 3, 2009, and *Railway Age*, "Russian Freight Car Builder Taps U.S. Designer," August 2009.

Canada

The largest traditional market for U.S.-produced railway rolling stock is Canada. Although Canada has a domestic railway rolling stock manufacturing industry, it depends on imports from the United States for the majority of its freight rail needs. Both proximity to the United States and long-standing relationships between buyers and producers account for much of the linkage.

With 46,688 kilometers of railroad track, Canada has the second-largest rail system in North America.[112] The Canadian railway rolling stock market is similar to that of the United States. It consists of two Class I railroads (Canadian National Railway Co. and Canadian Pacific Railways, Ltd., both of which own railroads in the United States), one major passenger railroad (VIA Rail Canada, Inc.), and hundreds of smaller railroads (table 18).

TABLE 18 Class I railroads and VIA Rail in Canada, 2009

Companies	Revenue	Total capital expenditures	Locomotives in service	Cars in service	Carloads originated	Gross ton-miles
	Million C$		Units		Thousands	Millions
Canadian National Railway Co.	7,367	1,424	1,820[a]	79,201[a]	3,991	304,690
Canadian Pacific	4,402	722.4	1,709	53,200	2,002	209,475
Railway VIA Rail	264.9	116.8	78	455	[b]	[b]

Source: Canadian National Railway Co., *2009 Annual Report, Financial Section*, 8; *2009 Fourth Quarter and Year End Results,* 4. Canadian Pacific Railways, Ltd., 2/*3 year Rail Data Summary,* fourth quarter 2009,16,19, 22, 24; VIA Rail, *2009 Annual Report,* 2011, 33; *About VIA Rail: Our Fleet*, January 24, 2011.

[a]Data are for 2008.
[b]Not applicable.

Canada's freight railroad companies are the second largest in North America. During 2000–09, the number of locomotives in the Canadian fleet fluctuated downward from 3,159 to 2,758, with actual units declining by 12.7 percent (401 units) during 2004–09 (table 19).[113]

TABLE 19 Locomotive fleet in Canada, 2004–09

Principal use of locomotive	2004	2005	2006	2007	2008	2009[a]	2004–09
							% change
Freight	3,062	3,097	3,062	3,000	2,909	2,671	–12.8
Intercity	97	83	85	98	95	87	–10.3
Total	3,159	3,180	3,147	3,098	3,004	2,758	–12.7

Source: North American Transportation Statistics Database, "Number of Transportation Vehicles/Equipment," January 14, 2011, table 12-1.

[a]Data are preliminary.

[112] CIA, "North America: Canada," Transportation: Railways, January 11, 2010.
[113] For a 10-year picture of Canada's locomotive fleet, see appendix table C.9.

The freight and passenger car fleet also declined during the decade. According to the North American Transportation Statistics Database, Canada's rail car fleet remained static from 1999 to 2000, fluctuating downward through 2008.[114] For the period 2004–08 (table 20), their total fleet declined by 15.4 percent (15,097 cars).

TABLE 20 Freight and intercity rail car fleet in Canada, 2004–08[a]

Car type	2004	2005	2006	2007	2008	2004–08
						% change
Freight	97,603	100,607	98,028	90,599	82,396	–15.6
Intercity passenger	560	595	602	691	670	19.6
Total	98,163	101,202	98,630	91,317	83,066	–15.4

Source: North American Transportation Statistics Database, "Number of Transportation Vehicles/Equipment," January 14, 2011, table 12-1.

[a]Data for 2009 unavailable.

While the passenger car fleet increased by 19.6 percent during 2004–08, the freight car fleet declined by 15.6 percent. Leading the rail car decline in 2007, the latest year data are available, were box cars and cabooses (table 21), while other or unspecified types and gondola cars increased their numbers in the mainline fleet.[115]

TABLE 21 Composition of active rail car fleet in Canada, 2004–07

Mainline fleet	2004	2005	2006	2007	2004–07
					% change
Box	19,035	21,692	20,072	16,460	–13.5
Hopper	36,297	36,674	37,207	35,339	–2.6
Gondola	9,789	9,652	10,076	11,002	12.4
Refrigerated	0	0	0	0	0
Flat	16,703	22,659	20,915	17,300	3.6
Stock	0	0	0	0	0
Caboose	153	145	143	137	–10.5
Other	2,299	3,125	3,015	2,937	27.8
Subtotal	84,276	93,947	91,428	83,175	–1.3
Other rail lines	15,048	6,728	6,788	7,492	–50.2
Total	99,344	100,675	98,216	90,667	–8.7

Source: Government of Canada, Statistics Canada, "Rail in Canada," 2004 through 2007, October 29, 2009, tables 10-1 and 10-2.

Note: Data from Statistics Canada differ from the data from the North American Transportation Statistics Database.

[a]Data for subsequent years unavailable.

The decline in Canada's freight car fleet (15.6 percent) exceeded the decline in demand for freight traffic. During the period 2004–08, total tonnage carried by Canadian railroads decreased by 30.3 million tons (7.6 percent). Regional and short haul railroads declined significantly in the tonnage they moved while Class I railroads declined less than one percent (table 22).[116] A possible explanation could be that Canadian railroads were

[114] For a 10-year picture of Canada's rail car fleet, see appendix table C.10.
[115] For a 2003–07 picture of the composition of Canada's freight car fleet, see appendix table C.11.
[116] For a 10-year picture of tonnage moved by Canadian railroads, see appendix table C.12.

divesting themselves of older, less capacious rail cars while using newer ones with higher load capacities.

TABLE 22 Tonnage carried by Canadian railroads, 2004–08[a]

Class of railroad	2004	2005	2006	2007	2008	2004–08
			Million tons[b]			% change
Class I	273.0	285.1	282.2	287.0	272.3	–0.3
Regional	43.0	37.5	35.5	33.6	33.5	–22.1
Short haul	79.6	86.1	76.1	71.3	59.6	–25.1
Total	395.6	408.7	393.8	391.8	365.3	–7.6

Source: Government of Canada, Transport Canada, "Transportation in Canada, an Overview: Addendum," table RA9, January 14, 2011.

[a]Latest year for which data are available. Per source, includes significant double-counting of tonnages; not to be considered as originating traffic.
[b]Data converted from metric to short tons.

In 2009, grain, coal, and iron ore were the top three commodities transported (table 23).[117] During 2004–09, significant declines in carloads of processed forest products, fertilizer materials, autos and parts, non-processed forest products occurred.

TABLE 23 Commodities transported in Canada, by weight, 2004–09

Product	2004	2005	2006	2007	2008	2009	2004–09
			Thousands of tons				% change
Grain	27,552.7	27,205.3	31,779.9	31,910.3	30,499.6	36,633.9	33.0
Other agricultural and food products	7,362.8	8,096.8	8,565.9	8,932.9	8,668.0	11,417.0	55.1
Coal	33,137.4	35,071.5	32,842.1	35,677.9	35,921.2	30,774.8	–7.1
Fertilizer materials	30,713.8	30,040.9	26,578.7	30,352.7	28,910.6	17,605.8	–42.7
Iron ore and concentrates (including pellets)	27,849.4	32,285.9	33,931.1	32,813.9	34,238.6	29,720.5	6.7
Ores and mine products	25,353.8	25,951.3	24,866.4	22,731.6	22,640.1	16,907.1	–33.3
Processed forest products	28,984.7	32,552.9	32,204.1	26,907.0	20,785.9	15,849.4	–45.3
Non-processed forest products	18,159.3	18,163.4	15,957.1	14,410.4	13,153.6	10,791.8	–40.6
Ferrous and non-ferrous metals	12,714.8	12,764.6	13,546.5	13,814.2	13,516.9	9,376.2	–26.3
Autos and parts	5,157.0	4,866.7	4,578.9	4,408.8	3,689.0	3,024.1	–41.4
Refined petroleum products	14,354.0	14,503.2	14,425.9	15,126.2	14,318.5	14,506.4	1.1
Chemicals	15,527.8	15,349.5	15,601.9	15,120.8	14,556.5	13,145.1	–15.3
Miscellaneous	1,246.7	1,183.1	1,071.9	736.2	765.6	1,730.4	38.8
Subtotal	248,114.2	242,685.6	255,950.4	252,942.9	241,664.1	211,482.5	–14.8
Intermodal	27,113.9	27,771.9	28,337.7	28,812.9	28,165.7	24,819.1	–8.5
Total	275,228.1	270,457.5	284,288.1	281,755.8	269,829.80	236,301.6	–14.1

Source: Government of Canada, Transport Canada, table RA10.

[117] For a 10-year picture of commodities transported, see appendix table C.13.

Mexico

Mexico is the second largest export market for U.S. railway rolling stock manufacturers. The country's proximity to U.S. manufacturers and the long standing business relationships with them likely explains Mexico's continued demand for U.S. railway rolling stock. During 2004–09, the primary market for railway rolling stock in Mexico was the country's freight railroads.

Before 1996, the Government of Mexico was the sole owner of Mexico's only railroad, Ferrocarriles Nacionales de México (FNM).[118] During 1995, the Government of Mexico amended its constitution to permit private ownership of railroads in Mexico.[119] The country was divided into regions, and the government sold concessions for service in each region.[120]

Thereafter, two Class I railroads emerged along with several short line railroads. Ferrocarril Mexicano (Ferromex), which began operating on February 19, 1998,[121] is currently the larger of the two railroads and is privately owned by Mexican nationals. During 2009, Ferromex operated more than 7,164 km (5,236 miles) of track and transported 46.0 percent of all Mexican rail freight tonnage.[122] It was responsible for 651,998 carloads of freight, or 42.8 percent of all freight car loadings in Mexico.

Transportación Ferroviaria Mexicana (TFM) was the second Class I railroad to be formed. Kansas City Southern Industries, along with its Mexican partner, Grupo TMM, S.A. de C.V. (Grupo TMM, a Mexican-based ocean shipping and logistics company), bought Transportación Ferroviaria Mexicana (TFM) in 1997.[123] Kansas City Southern became the sole owner of TFM in 2005, having purchased TMM's interest. The railroad was renamed Kansas City Southern de Mexico (KSSM). In 2009, KSSM operated 4,283 km (2,661 miles) of track and transported 32.2 percent of all domestic freight tonnage. It moved 563,297 carloads of freight, or 37.0 percent of Mexico's total freight carloadings.[124]

Mexico's railroads operated on 17,516 kilometers of track domestically in 2008.[125] During 2004–08, Mexico's fleet of locomotives grew by 574 units (47.7 percent) before declining by 617 to 1,160 units in 2009 (table 24).[126] During 2004–09, carloads of goods declined slightly while tonnage moved by rail increased at a modest pace (–3.2 and 2.5 percent, respectively) (table 25).[127]

[118] Allen, "The Structure and Regulation," September 10, 2001. Ferrocarriles Nacionales de México was officially dissolved on September 1, 1999. SourceMex, "State-run Railroad Ferrocarriles Nacionales Ceases to Exist, September 15, 1999.

[119] SourceMex, "State-run Railroad Ferrocarriles Nacionales Ceases to Exist," September 15, 1999.

[120] Allen, "The Structure and Regulation," September 10, 2001.

[121] BNSF, "BNSF and Ferromex Partner," May 8, 2002.

[122] Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario*, 2009, 9, 14.

[123] Kansas City Southern Railroad, "History of Kansas City Southern," 2007.

[124] Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario 2009*, table "Carga Movilizada En El Sfm Por Empresa Ferroviaria," January 31, 2011, 16.

[125] CIA, North America: Mexico, Transportation, Railways, January 11, 2010.

[126] For a 10-year picture of Mexico's locomotive fleet, see appendix table C.14.

[127] For a 10-year picture of Mexico's freight traffic, see appendix table C.15.

TABLE 24 Locomotive fleet in Mexico, 2004–09

	2004	2005	2006	2007	2008	2009	2004–09
							% change
Locomotives	1,203	1,199	1,245	1,178	1,777	1,160	–3.5

Source: Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario 2009*, September 1, 2009, and December 8, 2010, "Evolución de la Fuerza Motriz," 5.

TABLE 25 Freight traffic in Mexico, 2004–09

Reporting mode	2004	2005	2006	2007	2008	2009	2004–09
							% change
Carloads originating	1,574,209	1,590,506	1,691,305	1,743,121	1,737,207	1,523,950	–3.2
Tons miles, in thousands[a]	97,109	99,002	105,504	110,059	109,890	99,561	2.5

Source: Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario*, 2000–08, September 1, 2009, "Principales Productos Transportos por el Sistema Ferroviario Mexicano," 2004–08, December 8, 2010; "Total de la Carga Movilizada en el Sfm por Producto," *2009*.

[a]Source data presented in metric tons, converted to short tons by USITC staff.

During the period, Mexico's freight rail car fleet declined by 6,665 cars (19.3 percent), while the number of passenger coaches grew by 87 cars (152.6 percent) (table 26).[128] The freight car fleet saw declines in all categories (table 27).[129] This is in contrast to the experience of the United States, whose total fleet grew by 75,513 cars (5.9 percent) (table 6). Canada's fleet, by one estimate, declined by 15.4 percent during 2004–08 (table 20).

TABLE 26 Active rail car fleet in Mexico, 2004–09

Type of car	2004	2005	2006	2007	2008	2009	2004–09
							% change
Freight	34,538	36,452	33,383	32,762	31,845	27,873	–19.3
Intercity passenger coaches	57	55	60	71	144	144	152.6
Total	34,595	36,507	33,443	32,833	31,989	28,017	–19.0

Source: North American Transportation Statistics Database, table 12-1.

Although Mexico's rail car fleet and carloads transported declined, the tonnage moved increased slightly (tables 25). Containers, other industrial products, and other agricultural products were the top three commodities transported by Mexico's railroads in 2009 (table 28).[130] During 2004–09, carloads of animal and animal product shipments rose significantly, while those of other mineral products declined by almost half.

[128] For a 10-year picture of Mexico's active rail car fleet, see appendix table C.16.
[129] For a 10-year picture of the composition of Mexico's freight car fleet, see appendix table C.17.
[130] For a 10- year picture of carloads transported by Mexico's railroads, see appendix table C.18.

TABLE 27 Composition of active (owned and rented) freight rail car fleet in Mexico, 2004–09

Type of car	2004	2005	2006	2007	2008	2009	2004–09
							% change
Box	9,042	9,731	8,647	7,741	7,320	6,341	–29.9
Cage	[a]	3	2	1	[a]	[a]	[a]
Gondola	10,238	11,217	10,326	10,520	10,586	9,820	–4.1
Hopper	8,009	8,518	8,104	8,267	7,448	6,656	–16.9
Platform and piggyback	1,899	1,970	1,748	1,775	1,649	794	–58.2
Tank	1,467	1,403	1,274	986	755	577	–60.7
Auto rack	[a]	1,628	1,626	1,629	1,607	1,518	–6.8[b]
Other	1,733	50	88	134	542	561	–67.6
Caboose	[a]	299	198	174	[a]	[a]	[a]
Total	32,388	34,819	32,013	31,227	29,907	26,267	–18.9

Source: Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario*, 2004–08, September 1, 2009, "Tipo de Equipo," and December 8, 2010, "Equipo de Carga y de Pasajeros por Tipo," *2009*, 7.

[a]Not available.
[b]Percent change 2005–09.

TABLE 28 Carloads transported by commodity in Mexico, 2004–09

Commodity group	2004	2005	2006	2007	2008	2009	2004–09
							% change
Forest products	10,360	11,727	17,947	17,729	15,651	12,073	16.5
Wheat	32,298	35,680	39,131	41,299	41,250	35,953	11.3
Other agricultural products	201,651	198,735	241,660	244,719	243,071	236,816	17.4
Animal and animal products	3,945	3,457	4,826	5,546	5,176	5,343	35.4
Coal	36,054	36,732	33,730	35,665	38,377	32,281	–10.5
Iron ore	69,764	60,442	59,904	61,246	61,993	58,872	–15.6
Coke	19,205	18,062	14,520	20,847	22,662	16,463	–14.3
Other mineral products	31,302	28,280	24,509	24,223	32,463	17,151	–45.2
Petroleum and derivative products	72,335	74,862	71,213	69,459	70,147	84,079	16.2
Clay or mud	6,208	4,749	6,659	6,038	6,374	5,151	–17.0
Other inorganic products	60,420	57,604	58,732	60,928	58,898	49,022	–18.9
Armed vehicles	120,344	126,282	140,449	149,759	148,525	113,761	–5.5
Containers	321,692	309,777	279,714	322,209	447,173	391,866	21.8
Cement	146,362	160,925	165,115	147,121	130,182	114,155	–22.0
Other industrial products	442,269	463,192	533,196	536,333	415,265	350,964	–20.6
Total	1,574,209	1,590,506	1,691,305	1,743,121	1,737,207	1,523,950	–3.2

Source: Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario*, 2004–08, "Principales Productos Transportos por el Sistema Ferroviario Mexicano," and December 8, 2010, "Total de la Carga Movilizada en el Sfm por Producto," *2009*, 13.

China

According to one industry analyst, the potential demand for freight rail service within China is formidable. All of China's railway transport industries have been targeted for development by China's central government to meet this demand.[131]

In 2009 China had 17,825 locomotives in its fleet (table 29), including steam, diesel-electric, and electric units. It also had 641,824 cars (table 30) and 48,364 miles (77,834 kilometers) of track.[132]

TABLE 29 Locomotive fleet in China, 2004–09

Powered by:	2004	2005	2006	2007	2008	2009	2004–09
							% change
Steam	82	94	91	89	89	83	1.2
Diesel-electric	11,125	11,331	11,348	11,229	11,041	10,844	–2.5
Electric	4,849	5,122	5,465	5,993	6,206	6,898	42.3
Total	16,056	16,547	16,904	17,311	17,336	17,825	8.0

Source: National Bureau of Statistics of China. *China Statistical Yearbook, 2005*, table 16-17; *2007*, table 16-17; *2009*, table 15-17; and *2010*, table 16-17.

While there has been some growth in the stock of steam locomotives, the fleet of electric locomotives rose significantly, by 42.3 percent. The number of diesel-electric locomotives declined slightly during the period.

China's total rail car fleet grew by 14.6 percent during the period.[133] In 2009, 594,388 freight cars and 47,436 passenger cars were in service (table 30). Both the passenger and freight car fleet grew steadily during the period.

TABLE 30 Rail car fleet in China, 2004–09

Type of car	2004	2005	2006	2007	2008	2009	2004–09
							% change
Passenger	39,766	40,328	40,945	42,471	43,215	47,436	19.3
Freight	520,101	541,824	558,483	571,078	584,961	594,388	14.3
Total	559,867	582,152	599,428	613,549	628,176	641,824	14.6

Source: National Bureau of Statistics of China, *China Statistical Yearbook, 2005*, "Number of National Railway Passenger Coaches and Freight Cars Owned," table 16–18; *2009*, table 15–18; and *2010*, table 16-18.

China's freight rail fleet consists of covered and open cars, flat cars, hazardous materials cars, tank cars, refrigerated cars, and other types (table 31).[134] While the numbers of both tank and refrigerated cars declined, all other types increased their presence in China's fleet.

[131] IBISWorld, February 27, 2009, 12, 13.

[132] CIA, *The World Factbook,* "East & Southeast Asia**:** China," January 10, 2010. For a 10-year picture of China's locomotive fleet, see appendix table C.19.

[133] For a 10-year picture of China's rail car growth, see appendix table C.20.

[134] For a 10-year picture of the composition of China's freight car fleet, see appendix table C.21.

TABLE 31 Composition of China's freight rail car fleet, 2004–09

Type of car	2004	2005	2006	2007	2008	2009	2004–09
							% change
Covered	96,107	99,206	99,399	102,192	103,449	103,850	8.1
Open	323,970	343,480	360,500	366,767	379,050	388,118	19.8
Flat	29,530	30,290	32,222	36,336	37,665	38,766	31.3
Hazardous materials	2,056	2,956	2,056	2,056	2,056	2,056	0.0
Tank	40,222	38,331	35,654	34,592	33,593	32,346	–19.6
Refrigerated	7,696	7,419	7,393	7,196	6,588	6,587	–14.4
Other	20,250	21,047	21,259	21,939	22,560	22,665	11.9
Total fleet	519,831	542,729	558,483	571,078	584,961	594,388	14.3

Source: National Bureau of Statistics of China, *China Statistical Yearbook, 2005*, table 16-18; *2009*, table 15-18; and *2010*, table 16-18.

For the period 2004–09, total freight traffic tonnage moved by rail in China exceeded that of the United States.[135] In 2009, U.S. freight rail moved 1.7 billion tons (see table 9), while China's railways moved 3.3 billion tons (table 32). One likely explanation is the differing levels of surface transportation development in the two countries. During the period 2000–09, China's railroads increased their tonnage moved by 66.9 percent.[136]

TABLE 32 Railway freight traffic in China, 2004–09

Railway type	2004	2005	2006	2007	2008	2009	2004–09
			Million tons				% change
National	2,178.2	2,318.4	2,454.8	2,624.0	2,752.4	2,775.7	27.4
Joint venture	149.2	178.0	195.9	243.9	271.3	238.7	60.0
Local	162.8	196.6	231.5	274.5	279.8	319.0	96.0
Total	2,490.2	2,693.0	2,882.2	3,142.4	3,303.5	3,333.5	33.9

Source: National Bureau of Statistics of China, *China Statistical Yearbook, 2010*, table 16-8.

Coal was the primary commodity transported by rail in China, far outdistancing other commodities by weight (table 33).[137] While other products grew at a faster rate than coal during the decade, none came close to the tonnage shipped during the period.

[135] For a 10-year picture of tonnage moved by rail in China, see appendix table C.22.

[136] U.S. railroads' tonnage moved decreased by 4 percent during the same decade. AAR, *Railroad Facts, 2010 edition*, 2010, 28.

[137] For a 10-year picture of commodities moved by rail in China, see appendix table C.23.

TABLE 33 Commodities transported by rail in China, by weight, 2004–09

Commodity	2004	2005	2006	2007	2008	2009	2004–09
			Million tons				% change
Coal	992.1	1,070.8	1,120.3	1,220.8	1,343.3	992.1	33.8
Coke	71.9	79.2	88.3	93.3	87.8	71.9	18.9
Petroleum	119.4	126.7	127.4	127.0	126.7	119.4	4.9
Steel and iron	160.8	175.4	200.6	215.9	207.2	160.8	33.8
Metal ores	193.2	221.9	285.7	275.8	298.0	193.2	84.7
Nonmetal ores	80.4	82.4	86.8	91.9	90.5	80.4	–2.1
Mineral building materials	77.9	78.2	80.2	80.3	95.2	77.9	–60.0
Cement	37.0	34.7	38.0	35.4	35.5	37.0	1.1
Timber	32.4	35.0	36.1	37.3	29.4	32.4	–23.5
Chemical fertilizers and pesticides	63.9	71.6	74.2	81.5	78.1	63.9	25.6
Grain	109.1	110.8	101.1	104.7	114.7	109.1	–9.0
Cotton	2.6	2.8	3.9	3.9	3.9	2.6	67.8
Salt	12.8	12.9	12.9	13.6	14.1	12.8	3.1
Others	216.2	206.8	218.6	231.1	215.1	216.2	–4.1
Total	2,169.6	2,309.2	2,444.0	2,612.4	2,739.3	2,762.8	27.3

Source: National Bureau of Statistics of China, *China Statistical Yearbook, 2005*, table 16-18; *2009*, table 15-8; *2010*, table 16-19.

It is difficult for new manufacturers to compete independently with the governmental-controlled enterprises in China's railway rolling stock industry.[138] There are high start-up costs for potential manufacturers and, as in the United States, long-established relationships between domestic producers and China's railroads to overcome. Research and development requirements and governmental regulations add further cost to production in China. Realizing this, a number of Western companies, including U.S. firms, took advantage of China's increasing demand for freight and passenger rail during the report period by forming joint ventures with local companies to compete in the domestic market (table 34).

In 2009, China's principal railway rolling stock imports were parts for locomotives; truck axles, wheels, and parts thereof; and railway or tramway maintenance or service vehicles (table A.2). Together, these three categories accounted for $857.8 million (53.7 percent) of total railway rolling stock imports ($1.6 billion). Germany, Japan, and the United States were the top three nations exporting rolling stock goods to China in 2009, together sending China $1.03 billion worth, or 65.0 percent of railway rolling stock imports (table A.3).

In 2009, China exported $2.9 billion in railway rolling stock. The chief product exported was containers for one or more modes of transport: at $1.9 billion, this category represented 67.6 percent of China's total railway rolling stock exports (table A.4). The United States, Denmark, and Hong Kong were the chief destinations of China's railway rolling stock exports in 2009, together taking $1.3 billion, or 44.8 percent, of all railway rolling stock exports (table A.5).

[138] At the end of 2008, only five of an estimated 43 manufacturers of railway rolling stock had foreign investments. IBISWorld, *Rail Transportation Equipment Manufacturing in China*, February 27, 2009, 15, 19.

TABLE 34 Western companies in joint ventures with China's railway rolling stock manufacturers

Western company	China domestic company	Goal
Alstom Ltd. (France)	Changchun Railway Vehicles Co., Ltd. (CRC) dba Alstom Qingdao Railway Equipment Co., Ltd.	High-speed trains[a]
Alstom Ltd. (France)	Shanghai Alstom Transport Electric Equipment Co., Ltd.	Traction equipment
Alstom Ltd. (France)	Casco Signal Ltd. (Shanghai)	Signalling system
Alstom Ltd. (France)	Shanghai Alstom Transport Co., Ltd.	Rolling stocks
Alstom Ltd. (France)	Xayeeco (Xi'an)	Traction motors
Alstom Ltd. (France)	Alstom Qingdao Railway Equipment Co.	Dampers
Alstom Ltd. (France)	Alstom HK Ltd.	Signaling and metro
Bombardier (Canada)	CNR	Development, manufacture, and assembly of subway vehicles, light trains, and passenger trains[b]
Bombardier (Canada)	CSR Sifang Locomotive and Rolling Stock Co. Ltd. dba Bombardier Sifang (Qingdao) Transportation Ltd. (BST)	Design and manufactures railway passenger cars and rolling stock
Bombardier (Canada)	Changchun Railway Vehicles Co., Ltd. (CRC)	Metro cars
Bombardier (Canada)	Changzhou Railcar Propulsion Engineering R&D Center (CPC) dba Bombardier CPC Propulsion System Co. Ltd. (BCP)	Production, marketing, and maintenance of propulsion equipment for rail vehicles
Electro-Motive Diesel Inc. (USA)	CNR Dalian Locomotive and Railway Rolling Stock Co, Ltd.	Diesel-electric locomotives
General Electric (USA)	CSR Qishuyan Locomotive Co., Ltd.	Diesel-electric locomotives[c]
The Greenbrier Companies (USA)	Zhuzhou Railway Rolling Stock Works	Manufactured parts and components for freight cars
Kawasaki Heavy Corporation and Itochu Corporation (Japan)	CSR Sifang Locomotive and Railway rolling stock Co., Ltd.	Subway vehicles, high-speed trains[d]
Siemens Company (Germany)	CSR Zhuzhou Electric Locomotive and Railway rolling stock Company, Ltd.	Rail vehicles

TABLE 34 Western companies in joint ventures with China's railway rolling stock manufacturers—*Continued*

Western company	China domestic company	Goal
Siemens Company (Germany)	CNR Dalian Locomotive and Railway Rolling Stock Co, Ltd.	Diesel locomotives
Siemens Company (Germany)	Siemens Signalling Co., Ltd. (SSCX), Xi'an	Signaling products And systems for both mass transit and main line operations[e]
Siemens Company (Germany)	Siemens Traction Equipment Ltd. (STEZ), Zhuzhou	Components for electric locomotives[e]
Siemens Company (Germany)	Saitong Railway Electrification (Nanjing) Co., Ltd (SREN), Nanjing	Manufactures and distributes railway electrification products[e]
Wabtec Corporation (USA)	Beijing Huaxia United Friendship New Technology of Electrification Development Co., Ltd.	Friction products for railway applications
Wabtec Corporation (USA)	Shenyang Locomotive and Railway Rolling Stock Railways Brakes Co., Ltd.	Pneumatic control valves and other braking related equipment for freight car builders and overhaulers in China

Source: Corporate Web sites except where noted, 2011.

[a]IBIS*World*, *Rail Transportation Equipment Manufacturing in China,* February 27, 2009, 23.
[b]*IBISWorld,* Ibid., 22.
[c]General Electric press release, November 25, 2008.
[d]IBIS*World*, February 27, 2009, 24.
[e]Siemens, "Siemens Transportation Systems Group," February 20, 2011.

China's 11th Five-Year Plan (2006–10) highlighted two significant areas of rail transportation improvement. First, China intended to develop a network of high-speed passenger rail lines and improve the transport of freight from major regions in China.[139] In addition to its existing rail links, China plans on having 13,000 kilometers of high-speed track used by 800 high-speed trains by 2012. As of 2007, there were 1,012 km of such track used by 105 trains.[140] China is enlisting aid from Japanese and Western companies to meet their goal of high-speed rail service.

Secondly, China aimed to encourage the introduction of new technologies and co-development with foreign enterprises. China wanted to upgrade its current knowledge base and railway rolling stock fleet, develop new rail communication systems, and create a Chinese domestic brand.[141] This process is happening via its joint ventures with Western companies.

Russia

With 87,157 kilometers of track, Russia is second only to the United States in terms of track length.[142] In April 2010, the European Bank for Reconstruction and Development

[139]KPMG, "Transport in China: Property and Infrastructure," April,2008, 6.
[140]*Independen*t, "World's Largest High-speed Rail System Set to Seduce China's Commuters," November 19, 2009.1
[141] Ministry of Commerce, People's Republic of China, *Invest in China*, "Railway 11th Five-Year Plans," April 13, 2009. China.org.cn, "Key Projects for Revitalizing China's Equipment Manufacturing Industry," March 6, 2006.
[142] CIA, *The World Factbook*, "Central Asia: Russia," January 11, 2010.

stated that 93 percent of Russian cargo traffic was transported by rail.[143] Russia represents a sizeable market for railway rolling stock manufacturers.

JSCo Russian Railways is the primary Russian market for both domestic and international railway rolling stock manufacturers. It is the state-owned railroad serving the entire country with both freight and passenger service. Currently, it has over a million employees,[144] 20,003 passenger and freight locomotives, and 404,927 freight cars.[145] In 2008, it accounted for 3.6 percent of Russia's GDP.[146] There are smaller, privately held railroads in Russia as well.[147] One market research firm states that the Russian freight railway sector will be opening up as a result of Russia's accession to the WTO,[148] which may present opportunities for new railway rolling stock vendors.

Russia's locomotive fleet is similar in size to that of the United States, although it relies on electric rather than diesel-electric units. In 2008, freight locomotives outnumbered passenger locomotives, with electric locomotives the predominant choice of railroads (table 35).

TABLE 35 JSCo Russian railways locomotive fleet, 2004–09

Type	Motive power	2004	2005	2006	2007	2008	2009	2004–09
								% change
Passenger	Diesel-electric	511	510	516	524	541	536	4.9
	Electric	1,920	20,29	2,136	2,222	2,322	2,409	25.5
Freight	Diesel-electric	4,009	3,905	3,839	3,804	3,803	3,750	–6.5
	Electric	7,284	7,272	7,262	7,300	7,362	7,417	1.8
Yard	Diesel-electric	5,826	5,833	5,878	5,916	5,975	5,989	2.8
Total		19,550	19,549	19,631	19,766	20,003	20,101	2.8

Source: JSCo Russian Railways, *Annual Report 2008*, 2009, appendix 18, 198 and JSCo Russian Railways, *Annual Report, 2009*, 2010, 111.

Russia is considering new types of locomotives to meet its needs. On July 4, 2008, JSCo Russian Railways ran an experimental locomotive using a liquefied natural gas-powered turbine for motive power.[149] A similar train has run on two more occasions since then, carrying 10,000 and 15,000 tons of freight, respectively. On July 30, 2009, Russia ran a Siemens-built high-speed train on the Moscow-to-St. Petersburg route, attaining a top speed of 155 mph.[150] Siemens has indicated that it could shift production of this type of train to Russia, if there were sufficient orders for them.

Russia's freight car fleet has changed over the period, with Russian Railways nearly eliminating its tank (largely been absorbed by nonState entities) and refrigerator car fleet

[143] European Bank for Reconstruction and Development, "EBRD Lends $130 Million to Russian Rail Freight Operator," January 29, 2009.

[144] JSCo Russian Railways, *Annual Report 2008*, Appendix 18, 198; Appendix 20, 199; Appendix 26, 207.

[145] JSCo Russian Railways, "Profile," October 2, 2009.

[146] DataMonitor, *Road and Rail in Russia*, December 2008, 14.

[147] Yahoo Finance UK and Ireland, *Results & Trading Statements*, "Russia Globaltrans '08 Profit Up as Freight Flat," April 14, 2009, April 30, 2009.

[148] DataMonitor, *Road and Rail in Russia*, December 2008, 13.

[149] JSCo Russian Railways,. *Annual Report 2008*, 2009, 42.

[150] *Railway Age*, "The Russians Are Moving," August 2009, 12.

(table 36). All other car types owned or operated by JSCo Russian Railways declined as well.

TABLE 36 Composition of Russian freight rail car fleet, 2004–09

Owned or operated by JSCo Russian Railways	2004	2005	2006	2007	2008	2009	2004–09
							% change
Covered	78,769	78,533	73,994	70,817	55,536	42,657	–45.8
Platforms	64,385	61,610	57 897	50,511	39,520	32,109	–50.1
Gondola cars	251,403	257,677	259,608	261,751	221,145	203,160	–19.2
Tank cars	80,145	79,292	76,263	71,186	8,436	480	–99.4
Refrigerated cars	8,896	7,558	6,913	2,664	1,045	962	–89.2
Other	139,069	144,634	142,148	109,949	77,810	58,526	–57.9
Transporter	1,428	1,430	1,432	1,432	1,435	1,362	–4.6
Subtotal	624,095	630,734	560,358	568,310	404,927	339,256	–45.6
Other car types	[a]	[a]	57,897	55,129	212,095	237,198	309.7[b]
Total, JSCo	624,095	630,734	618,255	623,439	617,022	576,454	–7.6
Other railway companies	[a]	[a]	[a]	[a]	[a]	415,500	[a]
Total	625,523	630,734	626,958	623,439	617,022	991,954	58.6

Source: JSCo Russian Railways, *Annual Report 2008*, 2009, 69, and appendix 20, 199, and JSCo Russian Railways, *Annual Report, 2009*, 2010, 112.

[a]Unknown.
[b]For the period 2006–09.

In 2009, Russia's railway rolling stock imports amounted to $1.0 billion (table A.6). The top three goods imported included self-propelled railway or tramway coaches, powered from an external source of electricity, tank cars, and self-discharging cars, not self-propelled. Together, these imports totaled $538 million, or 53.8 percent of all Russian railway rolling stock imports. Ukraine was the principal source of Russia's railway rolling stock imports, accounting for $527.7 million (52.8 percent) of all railway rolling stock imports (table A.7).

In 2009, Russia's top three exports of railway rolling stock included truck axles and wheels for rail vehicles, tank cars, and self-propelled railway or tramway coaches, powered from an external source of electricity. Together, these three goods represented $175.7 million, or 39.7 percent of Russia's total railway rolling stock exports (table A.8). Most of Russia's exports went to Kazakhstan ($158.5 million), the Ukraine ($64.4 million), and Bulgaria ($19.8 million) (table A.9).

Tariffs, Nontariff Measures, and Government Programs

As previously mentioned, there were no known foreign nontariff measures affecting U.S. railway rolling stock manufacturers, according to industry officials.[151] However, the central government is the majority shareholder in railway rolling stock manufacturing industries in both China and Russia. Therefore, outside companies seeking to deal with China's and Russia's railway rolling stock manufacturers must consider negotiating with a partner whose concerns may include variables not solely associated with the purchase, such as the contract's impact on domestic labor. Competitors also face the possibility of the state providing below-market financing rates to the domestic companies.

[151] Industry officials, interview by USITC staff, April 2009.

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APPENDIX A
Railway Rolling Stock

TABLE A.1 Railway rolling stock: U.S. exports, imports for consumption, and merchandise trade balance, by selected countries and country groups, 2004–09

Item	2004	2005	2006	2007	2008	2009	2010	% change, 2009–10 Absolute	% change, 2009–10 Percent
				Million $					
U.S. exports of domestic merchandise:									
Canada	738	804	988	774	953	548	751	202	36.9
China	47	83	203	84	224	206	255	48	23.4
Mexico	240	317	401	606	253	150	325	175	116.7
Japan	32	42	43	38	40	66	38	–28	–42.2
Germany	16	29	16	16	19	22	20	–2	–10.3
Brazil	90	202	107	163	463	108	158	50	46.5
Australia	132	128	183	303	250	153	123	–30	–19.8
Korea	11	12	17	14	11	42	48	6	13.5
India	11	14	29	60	31	51	67	15	29.7
United Kingdom	61	31	41	21	27	53	48	–6	–10.8
All other	271	462	572	586	665	739	579	–161	–21.7
Total	1,649	2,124	2,600	2,663	2,935	2,140	2,410	270	12.6
EU-27	121	124	139	139	131	126	128	2	1.2
OPEC	39	115	69	54	93	74	65	–9	–11.9
Latin America	405	670	652	962	920	412	681	269	65.2
Asia	132	195	372	281	391	444	510	66	14.7
Sub-Saharan Africa	27	44	65	61	97	53	74	21	38.8
U.S. imports for consumption:									
Canada	547	544	495	379	369	253	113	–140	–55.4
China	138	267	340	306	354	209	316	107	51.0
Mexico	122	153	177	155	275	140	111	–29	–20.5
Japan	134	136	104	235	226	188	264	76	40.3
Germany	42	48	85	72	68	86	273	187	216.2
Brazil	29	52	91	75	98	112	31	–81	–72.4
Australia	4	6	19	3	20	5	9	5	95.0
Korea	10	16	12	13	16	14	71	57	412.3
India	16	24	21	23	25	17	16	–1	–7.3
United Kingdom	16	16	13	27	28	24	27	2	9.4
All other	224	254	386	380	324	202	173	–28	–14.1
Total	1,282	1,516	1,742	1,668	1,803	1,251	1,405	154	12.3

See footnote(s) at end of table.

TABLE A.1 Railway rolling stock: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 2004–09—*Continued*

Item	2004	2005	2006	2007	2008	2009	2010	% change, 2009–2010 Absolute	% change, 2009–2010 Percent
					Million $				
EU-27	244	251	364	375	322	268	431	163	60.7
OPEC	1	([a])	([a])	([a])	([a])	([a])	([a])	([a])	136.4
Latin America	153	208	269	232	375	254	144	–110	–43.3
Asia	303	448	486	588	632	444	686	242	54.6
Sub-Saharan Africa	13	19	28	25	28	10	11	1	11.5
U.S. merchandise trade balance:									
Canada	191	259	493	395	584	296	638	343	115.9
China	–91	–184	–137	–222	–130	–3	-62	–59	–1,900.5
Mexico	118	164	224	451	–23	10	214	204	2,026.5
Japan	–101	–94	–61	–198	–186	–123	–226	–104	–84.5
Germany	–26	–19	–69	–56	–49	–64	–253	–189	–294.5
Brazil	61	150	16	88	365	–4	127	132	([b])
Australia	128	121	164	300	230	149	114	–35	–23.5
Korea	1	–4	5	1	-6	28	–23	–51	([b])
India	19	–10	8	37	6	34	51	17	48.6
All other	68	224	186	206	340	537	405	–132	–24.6
Total	367	607	858	995	1,132	888	1,005	117	13.1
EU-27	–122	–127	–224	–236	–191	–142	–303	–161	–113.6
OPEC	38	115	69	54	93	74	65	-9	–12.1
Latin America	252	463	383	730	545	158	537	378	239.1
Asia	–171	–252	–114	–307	–241	1	–176	–177	([b])
Sub-Saharan Africa	14	25	37	36	69	43	63	20	45.1

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Import values are based on customs value; export values are based on f.a.s. value, U.S. port of export. Calculations based on unrounded data.

[a]Less than $500,000.
[b]Not meaningful for purposes of comparison.

TABLE A.2 China's top 15 railway rolling stock imports, 2000–09

HS number	Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
						Million $					
860791	Parts, nesoi, of locomotives	11.0	9.4	40.6	166.7	46.3	67.3	97.3	210.3	610.6	392.8
860719	Truck axles and wheels and parts, etc. for rail vehicles	15.4	18.0	30.2	17.4	20.7	56.9	154.9	123.7	76.3	252.9
860400	Railway or tramway maintenance or service vehicles	10.2	46.9	22.2	19.6	9.6	40.3	56.6	56.7	33.6	212.1
860721	Airbrakes and parts thereof	5.3	1.5	6.1	21.1	33.9	48.7	72.4	204.0	160.8	205.8
860799	Parts of railway or tramway rolling stock, except locomotives, nesoi	20.0	30.6	40.6	43.9	61.1	75.3	354.5	214.3	225.9	197.6
860730	Hooks and other coupling devices, buffers and parts thereof	11.9	7.1	8.7	11.7	19.6	15.3	27.8	42.5	61.9	123.8
860310	Self-propelled railway or tramway coaches, powered from an external source of electricity	97.0	91.8	96.4	9.8	12.3	26.9	92.2	78.4	116.4	58.0
860800	Railway or tramway track fixtures and fittings; mechanical (including electro-mechanical) signaling, safety or traffic control equipment for railways, tramways, roads, inland waterways, parking facilities, port installations or airfields; parts of the Foregoing	62.1	21.4	61.8	20.7	63.4	74.4	51.8	75.7	63.1	53.2
860729	Brakes, except airbrakes, and parts thereof	3.7	0.1	1.0	2.9	2.6	3.5	42.8	22.9	13.9	32.1
860110	Rail locomotives powered from external source of electricity	13.0	5.1	47.7	84.8	13.6	0.3	49.9	123.8	17.7	29.9
860712	Truck assemblies, for non self-propelled railway vehicles	0.7	0.4	0.4	0.4	4.0	22.3	32.7	81.4	17.6	20.3
860210	Diesel-electric locomotives	0.0	0.9	1.1	7.4	14.1	6.7	130.2	83.6	36.8	6.7
860900	Containers for one or more modes of transport	7.2	8.0	6.1	8.1	6.3	4.8	7.6	8.0	4.4	5.1
860711	Truck assemblies for self-propelled railway vehicles	0.0	0.0	14.5	32.0	37.1	38.3	39.5	97.5	10.9	2.9
860120	Rail locomotives powered by electric accumulators (batteries)	0.0	0.0	0.0	0.2	0.0	0.3	0.0	1.4	0.6	1.7
	Subtotal	257.4	241.2	377.5	446.7	344.5	481.3	1,210.2	1,424.1	1,450.7	1,595.0
	All other	0.1	0.9	8.4	1.6	2.5	0.8	0.8	1.1	0.2	1.2
	Total	257.6	242.1	385.9	448.3	347.0	482.1	1,211.0	1,425.2	1,450.9	1,596.1

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

TABLE A.3 Value of China's railway rolling stock imports: Top 15 countries, 2000–09

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
						Million $				
Germany	168.7	111.4	148.3	164.3	122.6	144.4	186.3	303.6	751.9	494.7
United States	6.2	9.7	10.8	10.1	16.6	46.3	177.5	142.5	134.9	275.0
Japan	20.4	8.2	5.4	17.7	41.4	86.8	523.8	123.6	230.9	268.6
Italy	0.3	2.2	1.2	1.8	3.5	12.8	70.0	325.6	27.2	170.8
Austria	14.4	47.3	53.0	50.6	49.3	55.1	43.2	72.0	134.3	165.5
France	7.0	25.3	102.7	71.6	37.7	43.3	32.8	232.2	79.8	101.9
Sweden	13.5	0.3	0.4	0.8	5.5	3.9	76.1	127.7	8.1	22.7
Hungary	0.0	0.1	1.1	0.3	0.0	0.1	0.2	4.2	15.6	16.6
Netherlands	6.8	7.4	5.9	7.4	6.6	8.0	4.3	3.6	5.7	12.7
Spain	0.1	0.4	16.8	91.9	22.3	43.6	51.7	25.6	5.4	10.8
Canada	0.2	0.4	0.5	0.2	0.2	0.4	0.5	16.1	12.5	9.4
Australia	1.2	0.7	1.2	0.2	0.3	1.9	4.5	1.2	7.8	7.6
Czech Republic	0.0	0.0	0.8	0.0	0.5	1.2	4.8	6.4	8.6	7.3
United Kingdom	1.7	1.2	0.7	7.7	18.1	9.9	4.9	4.7	3.6	5.8
Switzerland	0.2	5.9	6.1	1.9	5.1	3.9	5.3	9.1	4.9	5.7
Subtotal	240.6	220.5	354.8	426.4	329.6	461.7	1,185.8	1,398.2	1,431.3	1,575.2
All other	16.9	21.5	31.1	21.9	17.3	20.5	25.1	27.0	19.6	21.0
Total	257.6	242.1	385.9	448.3	347.0	482.1	1,211.0	1,425.2	1,450.9	1,596.1

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

TABLE A.4 China's railway rolling stock exports: Top 15 commodities, 2000–09

HS number	Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
							Million $				
860900	Containers for one or more modes of transport	2,376.8	2,155.1	2,164.8	3,854.2	5,124.5	5,870.6	5,989.6	8,781.2	9,102.5	1,944.3
860692	Railway or tramway cars, open, with non-removable sides of a height exceeding 60 cm	0.1	0.0	0.0	4.0	24.2	7.3	9.6	47.9	167.2	186.1
860719	Truck axles and wheels and parts, etc. for rail vehicles	8.3	9.1	14.1	13.7	32.6	67.0	127.0	123.8	223.2	121.3
860791	Parts, nesoi, of locomotives	2.1	5.4	13.7	14.3	28.4	37.8	47.9	59.1	133.4	107.9
860799	Parts of railway or tramway rolling stock, except locomotives, nesoi	13.8	7.8	11.2	17.2	28.0	47.4	44.8	46.0	78.9	74.0
860290	Rail locomotives and tenders nesoi	0.0	3.7	2.6	2.0	2.0	5.1	48.3	43.1	28.0	59.3
860110	Rail locomotives powered from external source of electricity	0.1	0.4	0.1	3.3	62.4	12.8	8.2	7.6	2.7	56.9
860800	Railway or tramway track fixtures and fittings; mechanical (including electro-mechanical) signaling, safety or traffic control equipment for railways, tramways, roads, inland waterways, parking facilities, port installations or airfields; parts of the foregoing	22.4	20.8	23.4	28.0	28.4	36.1	27.6	51.0	80.4	53.8
860730	Hooks and other coupling devices, buffers, and parts thereof	6.3	7.9	8.6	13.1	17.4	17.8	31.1	35.7	64.1	40.7
860500	Railway or tramway passenger coaches, not self-propelled; luggage vans, post office coaches and other special purpose railway or tramway coaches, not self-propelled excluding those of heading 8604)	41.5	0.2	8.5	32.7	45.2	85.1	76.8	127.3	54.3	39.7
860210	Diesel-electric locomotives	0.0	9.1	81.2	29.8	30.6	47.0	74.7	80.7	120.5	29.5
860699	Railway, tramway freight cars, not self-propelled, nesoi	1.8	1.3	2.2	0.1	9.4	28.1	18.6	21.7	67.5	28.4
860712	Truck assemblies, railway, nesoi	16.7	9.0	0.8	16.8	36.1	31.6	23.1	20.6	32.8	26.1
860310	Self-propelled railway or tramway coaches, powered from an external source of electricity	60.0	0.0	0.0	0.1	0.0	80.6	94.7	28.0	0.1	23.0
860400	Railway or tramway maintenance or service vehicles	1.9	1.4	3.9	1.8	7.1	3.1	3.4	10.8	28.4	22.7
	Subtotal	2,551.8	2,231.1	2,335.0	4,030.9	5,476.3	6,377.3	6,625.4	9,484.3	10,183.9	2,813.8
	All other	9.5	1.8	9.9	3.4	18.5	28.0	32.0	62.2	122.0	63.4
	Total	2,561.4	2,233.0	2,344.9	4,034.3	5,494.8	6,405.3	6,657.4	9,546.5	10,305.8	2,877.2

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

TABLE A.5 China's railway rolling stock exports: Top 15 countries, 2000–09

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
					Million $					
United States	466.4	441.8	416.9	1,026.3	1,556.4	1,757.2	1,569.8	1,940.7	2,287.0	505.1
Denmark	88.9	163.1	140.6	280.5	425.8	453.5	378.9	845.0	1,106.4	444.9
Hong Kong	674.1	548.9	588.3	1,070.7	1,023.4	1,253.5	1,390.3	1,944.2	1,737.3	337.6
Australia	21.1	14.1	29.4	12.2	25.8	63.0	70.7	94.7	291.7	219.1
Germany	115.5	84.5	81.7	234.8	240.5	393.6	321.9	401.7	475.1	149.1
Iran	69.2	2.4	4.0	23.8	68.0	172.5	191.0	74.7	131.3	135.3
Japan	70.6	68.1	82.8	222.8	243.1	333.2	349.7	543.7	481.1	95.8
United Kingdom	123.2	90.8	79.4	200.3	329.8	277.7	405.9	539.6	557.2	87.6
Korea South	382.8	342.7	267.0	280.7	383.8	378.5	201.6	296.3	290.9	87.0
India	7.3	0.5	0.6	0.3	7.7	21.9	29.2	74.8	128.1	78.7
Bermuda	13.3	8.7	12.6	28.0	54.3	118.0	75.4	70.9	77.0	65.7
Turkmenistan	0.0	0.0	0.0	0.0	0.6	17.2	53.2	37.5	29.6	48.0
Costa Rica	0.0	0.0	0.9	6.4	4.8	3.3	34.1	50.4	18.6	42.2
Netherlands	30.0	63.5	179.7	127.5	176.7	117.4	77.5	126.1	166.5	37.7
Sudan	0.0	0.0	0.1	0.2	0.0	2.1	23.8	21.2	36.7	32.4
Subtotal	2,062.5	1,829.3	1,884.0	3,514.4	4,540.6	5,362.6	5,173.0	7,061.7	7,814.6	2,366.3
All other	498.9	403.7	460.9	520.0	954.2	1,042.7	1,484.3	2,484.9	2,491.3	510.9
Total	2,561.4	2,233.0	2,344.9	4,034.3	5,494.8	6,405.3	6,657.4	9,546.5	10,305.8	2,877.2

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

TABLE A.6 Russia's railway rolling stock imports: Top 15 commodities, 2000–09

HS number	Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
						Million $					
860310	Self-propelled railway or tramway coaches, powered from an external source of electricity	3.9	3.0	1.6	3.2	0.5	0.4	1.5	2.4	20.4	210.8
860610	Railway or tramway tank cars not self-propelled	10.7	33.1	99.5	110.8	147.9	195.7	274.0	297.7	317.3	162.6
860692	Railway or tramway cars, open, non-removable sides of a height exceeding 60 cm	0.5	2.0	3.0	23.3	64.6	108.2	96.3	506.1	698.9	161.8
860500	Railway, tramway passenger coaches not self-propelled	0.8	16.2	26.8	63.2	78.6	58.2	3.9	12.4	26.0	120.5
860719	Truck axles and wheels and parts, etc. for rail vehicles	7.1	13.6	37.3	67.4	196.4	88.5	78.5	129.9	268.5	63.7
860210	Diesel-electric locomotives	6.6	10.5	5.4	11.6	53.9	50.1	20.1	40.9	157.1	63.2
860900	Containers for one or more modes of transport	11.6	21.2	24.8	19.1	28.8	36.4	40.0	66.4	114.5	55.1
860630	Railway or tramway self-discharging cars not self-propelled	3.0	7.1	21.2	9.8	46.2	40.2	138.0	201.1	278.6	45.4
860699	Railway, tramway freight cars, not self-propelled, nesoi	1.1	5.0	12.2	11.7	58.2	124.6	75.9	137.9	267.8	23.0
860799	Parts of railway/tramway rolling stock except locomotives, nesoi	8.6	14.3	17.4	14.6	19.5	23.4	19.9	24.8	24.0	22.0
860290	Rail locomotives and tenders nesoi	1.7	3.2	2.2	1.3	5.1	7.7	7.5	15.2	18.9	13.7
860791	Parts, nesoi, of locomotives	0.7	1.1	0.7	1.0	1.3	1.0	1.7	15.4	24.7	13.3
860800	Railway or tramway track fixtures and fittings; mechanical (including electro-mechanical) signaling, safety or traffic control equipment for railways, tramways, roads, inland waterways, parking facilities, port installations or airfields; parts of the foregoing	1.4	1.5	3.2	1.5	3.8	5.7	8.1	13.2	16.1	11.0
860400	Railway or tramway maintenance or service vehicles	8.0	0.8	6.5	1.3	0.9	3.7	6.0	1.7	6.4	7.1
860730	Hooks and other coupling devices, buffers, and parts thereof	0.1	1.8	4.3	5.6	13.9	16.6	19.8	30.9	39.7	6.5
	Subtotal	65.8	134.4	266.2	345.6	719.4	760.2	791.3	1,495.9	2,278.7	979.7
	All other	11.1	10.7	18.9	19.6	32.0	47.3	87.0	87.8	164.0	20.3
	Total	76.9	145.1	285.1	365.1	751.4	807.5	878.3	1,583.7	2,442.7	1,000.0

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

TABLE A.7 Russian railway rolling stock imports: Top 15 countries, 2000–09

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
					Million $					
Ukraine	29.6	75.0	184.3	231.9	583.5	641.7	764.8	1,417.7	2,154.2	527.7
Germany	9.8	19.0	31.9	45.6	35.0	23.8	6.9	16.0	59.6	343.0
Russia	8.3	11.0	10.2	29.7	69.4	69.4	22.6	30.1	33.5	26.3
China	0.2	0.6	1.2	0.8	2.3	6.7	13.0	21.2	76.6	22.1
Czech Republic	6.1	2.7	4.6	18.6	9.6	9.6	10.6	14.8	22.0	13.0
Austria	5.1	3.0	6.8	1.6	1.1	8.1	12.9	8.8	10.1	12.2
Finland	1.2	3.1	3.2	3.1	1.0	4.2	5.4	6.2	3.8	9.5
United States	6.1	11.4	15.1	12.3	4.9	10.3	8.4	17.6	17.6	8.7
Italy	0.7	0.7	0.5	0.6	2.3	3.2	3.1	9.1	8.2	8.6
European Union	0.0	3.9	8.1	3.8	6.7	3.5	2.7	0.0	7.1	6.5
Korea South	0.4	0.9	1.4	1.8	3.0	4.4	2.6	5.7	6.0	2.5
Poland	1.3	5.3	3.0	3.0	5.8	3.2	4.4	3.7	5.4	2.3
Israel	0.0	0.1	0.0	0.4	0.0	0.0	0.4	0.7	1.0	2.2
Slovakia	0.6	0.7	0.5	0.2	0.1	0.3	0.3	0.4	4.6	2.0
South Africa	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.1	1.6
Subtotal	69.5	137.4	270.9	353.4	724.7	788.5	858.2	1,552.5	2,410.9	988.3
All other	7.5	7.7	14.2	11.7	26.7	19.0	20.1	31.2	31.7	11.7
Total	76.9	145.1	285.1	365.1	751.4	807.5	878.3	1,583.7	2,442.7	1,000.0

Source: Global Trade Information Services, Inc. *Global Trade Atlas*.

TABLE A.8 Russia's railway rolling stock exports: Top 15 commodities, 2000–09

HS number	Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
						Million $					
860719	Truck axles and wheels and parts, etc. for rail vehicles	48.8	60.6	56.4	51.9	90.9	118.3	151.1	207.7	239.0	98.6
860610	Railway or tramway tank cars not self-propelled	36.3	10.8	32.5	70.9	100.9	20.8	44.8	15.4	6.2	47.2
860310	Self-propelled railway or tramway coaches, powered from an external source of electricity	12.8	9.9	15.0	14.9	17.2	17.1	30.2	45.3	49.9	29.9
860691	Railway or tramway cars, covered, closed, nesoi	1.0	0.3	0.0	6.3	23.4	2.8	19.0	31.1	35.8	26.9
860800	Railway or tramway track fixtures and fittings; mechanical (including electro-mechanical) signaling, safety or traffic control equipment for railways, tramways, roads, inland waterways, parking facilities, port installations or airfields; parts of the foregoing	10.4	12.6	6.2	7.0	8.7	17.4	21.2	39.3	43.2	26.0
860400	Railway or tramway maintenance or service vehicles	17.8	18.9	19.2	83.6	35.5	21.6	30.6	83.1	71.6	24.5
860692	Railway or tramway cars, open, non-removable sides of a height exceeding 60 cm	9.2	10.5	11.0	9.8	57.4	153.2	128.3	16.6	115.4	23.7
860390	Self-propelled railway or tramway coaches, nesoi	0.0	0.0	13.8	40.9	44.9	0.0	0.1	5.0	31.6	22.5
860721	Airbrakes and parts thereof	6.1	5.4	9.0	16.5	22.6	26.0	28.4	47.6	56.6	18.8
860900	Containers for one or more modes of transport	10.3	11.3	9.6	10.8	10.3	7.7	8.4	12.0	30.0	17.2
860730	Hooks and other coupling devices, buffers, and parts thereof	1.5	2.4	7.9	19.9	16.8	20.3	23.4	38.2	46.7	16.6
860699	Railway, tramway freight cars, not self-propelled, nesoi	0.2	0.3	0.4	5.2	7.7	11.7	20.6	7.1	15.9	16.2
860210	Diesel-electric locomotives	6.1	6.7	8.4	12.2	11.1	12.6	21.6	29.7	29.4	16.1
860500	Railway, tramway passenger coaches not self-propelled	5.2	9.1	7.1	11.4	2.0	4.6	0.5	21.6	77.0	11.7
860799	Parts of railway/tramway rolling stock excluding locomotives, nesoi	3.4	4.9	4.8	7.5	7.9	11.3	14.3	14.9	16.0	8.7
	Subtotal	169.1	163.6	201.2	368.7	457.4	445.4	542.5	614.5	864.6	404.8
	All other	12.4	6.6	10.0	24.7	28.0	47.2	54.2	69.6	141.1	37.7
	Total	181.5	170.2	211.2	393.5	485.4	492.7	596.7	684.1	1,005.7	442.5

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

TABLE A.9 Russia's railway rolling stock exports: Top 15 countries, 2000–09

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
						$1,000				
Kazakhstan	74,677.6	51,114.1	56,624.8	134,506.5	153,347.7	231,078.8	243,151.5	181,669.9	279,275.1	158,474.7
Ukraine	24,112.4	40,666.7	40,102.1	63,603.4	93,231.5	104,664.1	141,644.4	245,249.0	384,530.2	64,388.4
Bulgaria	519.8	708.6	2,054.4	225.4	531.8	13,744.2	13,607.7	3,472.7	5,271.4	19,819.1
Poland	512.4	103.8	70.8	86.2	709.5	83.9	1,341.3	20,547.1	18,511.6	19,669.9
Uzbekistan	5,825.7	11,017.5	6,702.3	10,592.9	10,210.8	11,866.7	14,053.5	30,518.0	34,122.4	17,845.3
Latvia	11,952.6	4,021.5	3,843.5	15,152.1	20,477.6	13,836.1	8,039.7	17,969.6	26,332.5	17,804.1
Lithuania	505.2	1,793.1	1,976.7	5,267.0	8,081.3	4,440.4	18,036.9	47,074.4	89,915.8	16,073.0
Mongolia	2,737.6	2,071.4	2,664.0	2,436.4	6,435.1	7,446.7	2,794.3	1,392.2	16,095.3	12,547.6
Azerbaijan	139.6	456.7	13,203.6	15,950.7	9,095.0	2,038.1	13,945.6	24,600.8	48,339.3	11,900.9
China	9,795.4	12,117.2	8,291.2	10,884.6	11,456.9	14,360.7	12,458.2	2,897.4	3,644.1	9,735.1
Cuba	528.0	973.6	102.4	284.6	265.9	872.1	1,667.4	2,987.7	6,953.7	9,233.4
Tajikistan	0.0	197.1	38.6	74.8	129.1	363.6	767.8	2,984.7	2,769.9	8,387.4
India	1,210.4	2,513.6	1,004.4	1,654.4	1,503.7	729.0	19.4	3,230.3	2,484.3	8,126.1
Iran	4,215.9	2,722.4	2,668.8	1,475.6	2,087.9	7,498.3	18,229.8	3,774.5	6,267.8	8,088.3
Armenia	42.4	55.0	52.0	23.6	130.0	221.2	77.6	4,765.6	3,652.9	6,714.6
Subtotal	136,775.1	130,532.1	139,399.7	262,218.0	317,693.7	413,243.8	489,835.1	593,134.1	928,166.5	388,807.8
All other	44,743.7	39,686.5	71,832.5	131,249.6	167,688.8	79,411.9	106,852.9	90,939.4	77,484.3	53,691.1
Total	181,518.8	170,218.6	211,232.2	393,467.6	485,382.5	492,655.7	596,687.9	684,073.4	1,005,650.7	442,498.9

Source: Global Trade Information Services, Inc., *Global Trade Atlas*.

APPENDIX B
Harmonized Tariff Schedules Numbers

TABLE B.1 Harmonized Tariff Schedule number, column 1 duty rate, special duty rate, U.S. exports and imports, 2010 *($1,000)*

HTS number	Description	Column 1 duty rate, in percent	Special duty rate	U.S. exports, 2010	U.S. imports, 2010
8601.10.00	Rail locomotives powered from an external source of electricity	Free	(blank)	6,665	0
8601.20.00	Rail locomotives powered by electric accumulators (batteries)	Free	(blank)	2,302	94
8602.10.00	Diesel-electric locomotives	Free	(blank)	262,962	436
8602.90.00	Other rail locomotives, nesoi; locomotive tenders	Free	(blank)	15,717	216,138
8603.10.00	Self-propelled railway or tramway coaches, vans and trucks (except railway or tramway maintenance or service vehicles), powered externally, electric	5.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	40,856	13,668
8603.90.00	Self-propelled railway or tramway coaches, vans and trucks (except railway or tramway maintenance or service vehicles), nesoi	5.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	3,713	0
8604.00.00	Railway or tramway maintenance or service vehicles, whether or not self-propelled (for example, workshops, cranes, ballast tampers, trackliners, etc.)	2.9	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	289,692	17,461
8605.00.00	Railway or tramway passenger coaches, not self-propelled; luggage vans, post office coaches, and other special purpose coaches, not self-propelled, nesoi	14.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE) 1.8% (SG)	55,107	0
8606.10.00	Railway or tramway tank cars and the like, not self-propelled	14.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE) 1.8% (SG)	161,949	0

TABLE B.1 Harmonized Tariff Schedule number, column 1 duty rate, special duty rate, U.S. exports and imports, 2010 *($1,000)—Continued*

HTS number	Description	Column 1 duty rate, in percent	Special duty rate	U.S. exports, 2010	U.S. imports, 2010
8606.30.00	Railway or tramway freight cars, not self-propelled, self-discharging cars, other than those of subheading 8606.10	14.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE) 1.8% (SG)	51,571	4,395
8606.91.00	Railway or tramway freight cars, not self-propelled, covered and closed	14.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE) 1.8% (SG)	10,997	0
8606.92.00	Railway or tramway freight cars, not self-propelled, open, with non-removable sides of a height exceeding 60 cm	14.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE) 1.8% (SG)	20,697	1,305
8606.99.01	Other railway or tramway freight cars, not self-propelled, nesoi	14.0	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE) 1.8% (SG)	6,941	655
8607.11.00	Truck assemblies for self-propelled railway or tramway locomotives or rolling stock	Free	(blank)	27,625	33,078
8607.12.00	Truck assemblies, nesoi, for railway rolling stock	3.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	22,424	2,780
8607.19.03	Axles for railway or tramway locomotives or rolling stock	0.4	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	62,847	16,087
8607.19.06	Parts of axles for railway or tramway locomotives or rolling stock	0.4	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	25,992	9,162

TABLE B.1 Harmonized Tariff Schedule number, column 1 duty rate, special duty rate, U.S. exports and imports, 2010 *($1,000)—Continued*

HTS number	Description	Column 1 duty rate, in percent	Special duty rate	U.S. exports, 2010	U.S. imports, 2010
8607.19.12	Railway wheels, whether or not fitted with axles	Free	(blank)	72,667	107,716
8607.19.15	Parts of railway wheels	Free	(blank)	4,381	4,359
8607.19.30	Parts of truck assemblies of vehicles of heading 8605 or 8606	3.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	41,744	41,561
8607.19.90	Parts of truck assemblies, nesoi	2.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	253,731	54,679
8607.21.10	Air brakes and parts thereof for railway or tramway vehicles of heading 8605 or 8606	3.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	28,596	21,971
8607.21.50	Air brakes and parts thereof for railway or tramway vehicles (excluding vehicles of heading 8605 or 8606), nesoi	3.9	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	56,376	24,408
8607.29.10	Brakes and parts thereof (excluding air brakes and parts thereof) for railway or tramway vehicles of heading 8605 or 8606, nesoi	3.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	49,273	2,222
8607.29.50	Brakes and parts thereof (excluding air brakes and parts thereof) for railway or tramway vehicles (excludes vehicles of heading 8605 or 8606), nesoi	2.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	29,129	6,269

TABLE B.1 Harmonized Tariff Schedule number, column 1 duty rate, special duty rate, U.S. exports and imports, 2010 *($1,000)—Continued*

HTS number	Description	Column 1 duty rate, in percent	Special duty rate	U.S. exports, 2010	U.S. imports, 2010
8607.30.10	Hooks and other coupling devices, buffers, and parts thereof for railway or tramway vehicles of heading 8605 or 8606	3.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	52,499	27,339
8607.30.50	Hooks and other coupling devices, buffers, and parts thereof for railway or tramway vehicles (excludes vehicles of heading 8605 or 8606), nesoi	2.6	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	50,599	14,238
8607.91.00	Other parts of locomotives, nesoi	Free	(blank)	301,088	73,897
8607.99.10	Other parts (except brake regulators) for railway or tramway vehicles of heading 8605 or 8606	2.8	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	86,003	77,781
8607.99.50	Parts, nesoi, of railway rolling stock, nesoi	3.1	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	145,092	261,740
8608.00.00	Railway track fixtures; mechanical signaling, safety or traffic control equipment for railway, roads, inland waterways, airfields, ports; and parts	3.8	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	63,856	16,475
8609.00.00	8609.00.00 Containers (including containers for the transport of fluids) specially designed and equipped for carriage by one or more modes of transport	Free	(blank)	106,600	354,893

Source: Compiled from official statistics of the U.S. Department of Commerce, Bureau of the Census.

APPENDIX C
Locomotives and Freight Car Data

TABLE C.1 Locomotive purchases, new and rebuilt, by U.S. Class 1 railroads, total fleet as of January 1, 2001–10

Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2001–10
					Units						% change
New	640	710	745	587	1,121	827	922	902	812	460	–28.1
Rebuilt	81	45	33	34	5	84	158	167	129	103	46.9
Total	20,028	19,745	20,506	20,774	22,015	22,779	23,732	24,143	24,003	24,533	22.5

Source: Progressive Railroading. Car and Locomotive Yearbook and Buyers Guide, 2008,12; *Progressive Railroading*, June 2009, 33; U.S. Department of Transportation, Surface Transportation Board, Report R1, December 9, 2010, Schedule 710, line 10.

TABLE C.2 Composition of U.S. freight car fleet, as of January 1, 2001–10

Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2001–10
					Units						% change
Box	155,791	140,576	138,056	132,622	134,339	133,879	132,145	121,570	114,282	103,895	–33.3
Gondola	210,004	201,336	200,416	199,217	201,295	203,574	213,717	217,775	220,238	215,609	2.7
Hopper	167,936	154,206	151,129	143,720	143,252	150,512	164,376	166,421	168,338	167,516	–0.3
Covered hopper	408,106	390,444	385,461	378,354	377,055	382,779	395,843	411,503	414,418	409,564	0.4
Flat	157,237	149,993	148,938	151,083	158,798	168,132	171,484	172,243	170,191	163,029	3.7
Refrigerator	26,848	25,556	24,696	24,124	24,204	24,321	23,492	22,092	18,831	17,103	–36.3
Tank	247,600	246,108	245,173	244,124	243,632	248,083	255,116	269,076	281,430	281,923	13.9
Other	7,274	5,917	5,801	5,736	5,345	5,242	5,077	5,029	5,244	4,794	–34.1
Total	1,380,796	1,314,136	1,299,670	1,278,980	1,287,920	1,316,522	1,361,250	1,385,709	1,392,972	1,363,433	–1.3

Source: AAR*, Railroad Equipment Report 2009*, 17, 23, 31, 41, 47, 57, 59, 61.

TABLE C.3 Ownership of U.S. rail car fleet, as of January 1, 2001–10

Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2001–10
					Units						% change
Railroads	692,602	625,330	608,341	591,643	593,942	595,034	596,103	580,635	559,784	524,413	–24.3
TTX	52,572	51,770	51,585	55,829	59,478	61,952	61,556	57,119	57,371	54,513	3.7
Other	635,622	637,036	639,744	631,508	634,500	659,536	703,591	747,955	775,817	784,507	23.4
Total	1,380,796	1,314,136	1,299,670	1,278,980	1,287,920	1,287,920	1361,250	1,385,709	1,392,972	1,363,433	–1.3

Source: AAR, *Railroad Facts, 2009 edition*, 51.

TABLE C.4 Passenger car rail fleet, excluding Amtrak, 1999–2008

Type	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1999–2008
						Units					% change
Commuter rail	5,549	5,497	5,528	5,631	5,866	6,130	6,290	6,300	6,279	6,494	17.0
Light rail	1,160	1,306	1,359	1,448	1,482	1,622	1,645	1,801	1,802	1,948	67.9
Heavy rail	10,362	10,311	10,718	10,849	10,754	10,858	11,110	11,052	11,222	11,377	9.8
Total	17,071	17,114	17,605	17,928	18,102	18,610	19,045	19,153	19,303	19,819	16.1

Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, table 1-11: "Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances."

TABLE C.5 Global exports of HS 8602.10, diesel-electric locomotives, 2000–09

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
					$1,000						% change
United States	186,035	331,128	203,015	233,043	282,723	370,615	611,064	577,850	1,024,829	403,810	117.1
Canada	397,819	113,223	69,215	92,374	30,883	85,266	160,780	240,713	293,303	182,057	–54.2
Spain	52,864	20,538	12,203	18,659	84,432	0	18,913	54,004	127,436	133,426	152.4
Ukraine	[a]	[a])	487	10,589	72,348	56,279	20,879	54,896	161,685	51,114	[b]10,394.8
Germany	3,902	8,692	52,622	83,960	122,195	12,385	4,666	35,623	131,187	42,404	986.6
Subtotal	640,620	473,581	337,543	438,626	592,582	524,544	816,302	963,085	1,738,440	812,811	26.9
All other	370,590	416,555	547,171	182,201	526,291	184,041	223,342	448,686	522,624	128,015	–65.5
Total	1,011,210	890,136	884,714	620,827	1,118,873	708,585	1,039,644	1,411,771	2,261,063	940,826	–7.0

Source: Global Trade Information Services, Inc. (GTIS), *Global Trade Atlas*, data for 8602.10, April 15, 2010.

[a]Number not reported.
[b]Percent change from 2002–09.

TABLE C.6 Global exports of freight cars, in US $, 2000–09

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Ukraine	[a]	[a]	197,129	417,401	576,604	629,369	710,407	1,330,918	1,826,233	489,483
Romania	26,287	46,988	71,439	103,570	129,072	123,941	130,587	325,953	418,083	299,940
Slovakia	60,049	93,178	58,781	130,736	150,177	74,309	82,757	140,117	331,307	285,708
Mexico	143,246	82,906	27,240	93,338	166,488	392,827	611,450	825,781	774,369	283,488
China	3,603	1,316	9,527	4,717	34,831	50,276	40,634	90,000	266,833	230,385
Subtotal	233,186	224,389	364,116	749,762	1,057,171	1,270,722	1,575,835	2,712,769	3,616,825	1,589,004
United States	125,210	169,497	67,456	164,839	121,581	186,610	216,769	298,494	244,152	164,095
All other	603,262	649,416	457,270	765,197	869,908	637,163	762,319	684,925	1,142,295	758,644
Total	961,657	1,043,302	888,842	1,679,798	2,048,661	2,094,495	2,554,923	3,696,188	5,003,272	2,511,743

Source: Global Trade Information Services, Inc. (GTIS), *Global Trade Atlas*, data for HS 8606, October 1, 2010.

[a]Number not reported.

TABLE C.7 Rolling stock: Top three U.S. imports, 2000–10

HTS Number	Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2000–10
							$1,000						% change
860900	Containers (including containers for the transport of fluids) specially designed and equipped for carriage by one or more modes of transport	112,997	109,942	94,392	172,072	156,610	265,696	284,885	279,120	324,900	240,676	354,893	214.1
860799	Parts of railway or tramway rolling stock, except locomotives, nesoi	357,768	475,044	439,412	350,727	435,838	468,245	407,106	412,342	459,885	437,646	339,520	–5.1
860719	Truck axles and wheels and parts thereof, including parts of truck assemblies, for railway or tramway vehicles	187,295	148,413	96,857	116,518	199,317	363,976	589,292	496,485	481,611	228,937	233,563	24.7
	Subtotal	658,060	733,399	630,661	639,316	791,764	1,097,917	1,281,283	1,187,948	1,266,396	907,259	927,976	41.0
	All other	1,169,729	623,524	408,690	465,222	489,842	418,467	460,907	480,113	536,310	343,978	476,829	–59.2
	Total	1,827,789	1,356,923	1,039,352	1,104,538	1,281,606	1,516,385	1,742,190	1,668,060	1,802,706	1,251,237	1,404,806	–23.1

Source: Data on this site have been compiled from tariff and trade data from the U.S. Department of Commerce and the U.S. International Trade Commission

TABLE C.8 Top three U.S. exports of rolling stock, 2000–10

HTS Number	Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2000–10
							$1,000						% change
860210	Diesel-electric locomotives	186,035	324,576	184,972	222,711	269,605	364,474	610,081	577,685	1,024,829	402,037	461,363	148.0
860719	Truck axles and wheels and parts thereof, including parts of truck assemblies, for railway or tramway vehicles	245,454	251,691	209,137	241,607	375,899	492,478	572,057	529,370	465,592	322,430	301,088	22.7
860400	Railway or tramway maintenance or service vehicles, whether or not self-propelled (for example, workshops, cranes, ballast tampers, trackliners, etc.)	41,586	30,132	48,406	106,440	79,205	84,450	86,813	85,044	151,809	277,614	289,692	596.6
	Subtotal	473,075	606,399	442,514	570,758	724,708	941,401	1,268,951	1,192,099	1,642,231	1,002,082	1,052,143	122.4
	All other	862,447	815,541	563,415	815,735	924,476	1,182,187	1,331,173	1,470,936	1,292,944	1,137,513	1,357,548	57.4
	Total	1,335,523	1,421,940	1,005,930	1,386,493	1,649,184	2,123,588	2,600,124	2,663,035	2,935,175	2,139,595	2,409,691	80.4

Sources: Data on this site have been compiled from tariff and trade data from the U.S. Department of Commerce and the U.S. International Trade Commission.

TABLE C.9 Locomotive fleet in Canada, 2000–09

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009[a]	2000–09
					Units						% change
Freight	2,979	3,020	2,949	3,002	3,062	3,097	3,062	3,000	2,909	2,671	–10.3
Intercity	107	119	115	97	97	83	85	98	95	87	–18.7
Total	3,086	3,139	3,064	3,099	3,159	3,180	3,147	3,098	3,004	2,758	–10.6

Source: North American Transportation Statistics Database, "Number of Transportation Vehicles/Equipment," table 12-1.

[a]Data are preliminary.

TABLE C.10 Freight and intercity rail car fleet in Canada, 1999–2008

Type	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008[a]	1999–2008
						Units					% change
Freight cars	105,096	104,684	103,244	96,784	95,625	97,603	100,607	98,028	90,626	77,278	–26.5
Intercity passenger cars	445	477	483	497	532	560	595	602	691	627	40.9
Total	105,541	105,161	103,244	97,281	96,157	98,163	101,202	98,630	91,317	77,905	–26.2

Source: North American Transportation Statistics Database, "Number of Transportation Vehicles/Equipment," table 12-1.

[a]Data are preliminary.

TABLE C.11 Composition of active freight rail car fleet in Canada, mainline fleet, 2003–07

Type	2003	2004	2005	2006	2007	2003–07
			Units			% change
Box	19,718	19,035	21,692	20,072	16,460	–16.5
Hopper	35,180	36,297	36,674	37,207	35,339	[a]
Gondola	9,220	9,789	9,652	10,076	11,002	19.3
Refrigerator	0	0	0	0	0	0
Flat	15,729	16,703	22,659	20,915	17,300	10.0
Stock	0	0	0	0	0	0
Caboose	161	153	145	143	137	–14.9
Other	2,338	2,299	3,125	3,015	2,937	25.6
Subtotal	82,346	84,276	93,947	91,428	83,175	1.0
Other rail lines	13,278	15,048	6,728	6,788	7,492	–43.6
Total	95,624	99,344	100,675	98,216	90,667	–5.2

Source: Statistics Canada, “Rail in Canada,” 2003 through 2007, tables 10-1 and 10-2.

Note: Data from Statistics Canada conflict with data from the North American Transportation Statistics Database.

[a]Less than 1.0 percent increase.

TABLE C.12 Tonnage carried by Canadian railroads, 1999–2008[a]

Type	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2004–08	1999–08
					Million tons						% change	
Class I	243.2	253.9	254.2	250.6	253.5	273.0	285.1	282.2	287.0	272.3	–0.3	12.0
Regional	54.8	59.9	52.4	47.2	47.7	43.0	37.5	35.5	33.6	33.5	–22.1	–38.8
Short Haul	73.5	77.9	74.9	71.8	73.3	79.6	86.1	76.1	71.3	59.6	–25.1	–18.9
Total	371.4	391.7	381.5	369.7	374.4	395.6	408.7	393.8	391.8	365.3	–7.6	–1.6

Source: Transport Canada. *Transportation in Canada, an Overview: Addendum*, January 14, 2011, table RA9.

[a]Includes significant double-counting of tonnages; not to be considered as originating traffic. Data for 2009 unavailable. Data converted from metric tons to short tons.

TABLE C.13 Commodities transported in Canada, by weight, 2000–09

Product	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
					Thousand tons						% change
Grain	30,844.5	30,429.5	21,844.3	22,692.3	27,552.7	27,205.3	31,779.9	31,910.3	30,499.6	36,633.9	18.8
Other agricultural and food products	7,614.4	6,990.2	5,581.3	6,647.7	7.362.8	8,096.8	8,565.9	8,932.9	8,668.0	11,417.0	49.9
Coal	40,437.4	41,518.0	37,003.1	31,773.1	33,137.4	35,071.5	32,842.1	35,677.9	35,921.2	30,774.8	–23.9
Fertilizer materials	27,129.5	24,472.2	26,121.4	27,614.2	30,713.8	30,040.9	26,578.7	30,352.7	28,910.6	17,605.8	–35.1
Iron ore and concentrates (including pellets)	38,589.3	28,976.6	30,090.6	32,916.1	27,849.4	32,285.9	33,931.1	32,813.9	34,238.6	29,720.5	–23.0
Ores and mine products	24,754.7	25,085.1	25,516.9	23,129.0	25,353.8	25,951.3	24,866.4	22,731.6	22,640.1	16,907.1	–31.7
Processed forest products	23,227.6	23,465.5	25,198.2	24,840.2	28,984.7	32,552.9	32,204.1	26,907.0	20,785.9	15,849.4	–31.8
Non-processed forest products	16,625.8	16,448.8	19,334.1	17,219.9	18,159.3	18.163.4	15,957.1	14.,410.4	13,153.6	10,791.8	–35.1
Ferrous and non-ferrous metals	9,253.3	9,674.6	10,720.3	10,630.1	12,714.8	12,764.6	13,546.5	13,814.2	13,516.9	9,376.2	1.3
Autos and parts	5,082.6	4,869.7	5,199.2	5,165.8	5,157.0	4,866.7	4,578.9	4,408.8	3,689.0	3,024.1	–40.5
Refined petroleum products	11,339.6	12,003.4	13,641.8	14,371.1	14,354.0	14,503.2	14,425.9	15,126.2	14,318.5	14,506.4	27.9
Chemicals	14,517.5	14,269.6	15,051.9	14,318.8	15,527.8	15.349.5	15,601.9	15,120.8	14,556.5	13,145.1	–9.5
Miscellaneous	1,801.6	1,781.8	1,468.4	1,261.6	1,246.7	1,183.1	1,071.9	736.2	765.6	1,730.4	–4.0
Subtotal	251,217.8	239,985.0	236,771.5	232,579.9	240,751.4	224,522.2	255,950.4	238,532.5	241,664.1	211,482.5	–15.8
Intermodal	21,917.9	22,610.1	24,798.4	26,241.4	27,113.9	27,771.9	28,337.7	28,812.9	28,165.7	24,819.1	13.2
Total	273,135.7	262,595.1	261,569.9	258,821.3	267,865.3	252,294.1	284,288.1	267,345.4	269,829.8	236,301.6	–13.5

Source: Transport Canada, *Transportation in Canada, an Overview: Addendum,* January 14, 2011, table RA10.

TABLE C.14 Locomotive fleet in Mexico, 2000–09

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
					Units						% change
Locomotives	1,446	1,365	1,302	1,269	1,203	1,199	1,245	1,178	1,777	1,160	–19.8

Source: Secretaría de Comunicaciones y Transportes, Dirección General de Transporte Ferroviario y Multimodal, *Anuario Estadístico Feroviario 2009*, "Evolución de la Fuerza Motriz 1995-2009," 5.

TABLE C.15 Freight traffic originating in Mexico, 2000–09

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
											% change
Carloads originating	1,511,444	1,443,347	1,470,067	1,447,674	1,574,209	1,590,506	1,691,305	1,743,121	1,737,207	1,523,950	1.0
Tons miles, in thousands	77,164	76,182	80,451	85,168	88,097	89,814	95,713	99,845	99,692	90,321	17.1

Source: Secretaría de Comunicaciones y Transportes, *Anuario Estadístico Ferroviario*, 2000–08, September 1, 2009, "Principales Productos Transportos por el Sistema Ferroviario Mexicano," 2004–08; December 8, 2010, "Total de la Carga Movilizada en el Sfm por Producto," 2009.

TABLE C.16 Active rail car fleet in Mexico, 2000–09

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
						Units					% change
Freight cars	34,764	33,816	33,694	33,635	34,538	36,452	33,383	32,762	31,845	27,873	–19.8
Intercity passenger coaches	220	48	56	56	57	55	60	71	144	144	–34.5
Total	34,984	33,864	33,750	33,691	34,595	36,507	33,443	32,833	31,989	28,017	–19.9

Source: North American Transportation Statistics Database, "Number of Transportation Vehicles/Equipment," table 12-1.

TABLE C.17 Composition of active (owned and rented) Mexico's freight car fleet, 2000–09

Type of car	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
											% change
Box	9,287	8,095	8,565	9,844	9,042	9,731	8,647	7,741	7,320	6,341	–31.7
Cage	[a]	[a]	[a]	[a]	[a]	3	2	1	[a]	[a]	[a]
Gondola	9,731	9,053	9,085	9,194	10,238	11,217	10,326	10,520	10,586	9,820	1.0
Hopper	7,142	8,309	8,298	7,879	8,009	8,518	8,104	8,267	7,448	6,656	–6.8
Platform and piggyback	1,923	2,058	1,851	1,921	1,899	1,970	1,748	1,775	1,649	794	–58.7
Tank	732	768	1,106	1,167	1,467	1,403	1,274	986	755	577	–21.2
Auto rack	[a]	[a]	[a]	[a]	[a]	1,628	1,626	1,629	1,607	1,518	–6.8[b]
Other	1,820	1,775	1,875	1,697	1,733	50	88	134	542	561	–69.2
Caboose	[a]	[a]	(1)	[a]	[a]	299	198	174	[a]	[a]	[a]
Total	30,635	30,058	30,780	31,702	32,388	34,819	32,013	31,227	29,907	26,267	–14.3

Source: Secretaría de Comunicaciones y Transportes, Dirección General de Transporte Ferroviario y Multimodal, *Anuario Estadístico*, 1999–2008.

[a]Not available.

TABLE C.18 Carloads transported by commodity in Mexico, 2000–09

Commodity group	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09 % change
Forest products	14,027	12,316	9,901	9,586	10,360	11,727	17,947	17,729	15,651	12,073	–13.9
Wheat	38,712	39,342	36,341	33,467	32,298	35,680	39,131	41,299	41,250	35,953	–7.1
Other agricultural products	243,964	175,047	175,872	193,043	201,651	198,735	241,660	244,719	243,071	236,816	–2.9
Animal and related products	3,758	4,150	4,590	4,172	3,945	3,457	4,826	5,546	5,176	5,343	42.2
Coal	45,031	38,892	31,806	34,600	36,054	36,732	33,730	35,665	38,377	32,281	–28.3
Iron ore	56,132	31,323	60,422	64,987	69,764	60,442	59,904	61,246	61,993	58,872	4.9
Coke	10,143	9,272	8,401	20,211	19,205	18,062	14,520	20,847	22,662	16,463	62.3
Other mineral products	12,256	13,582	20,562	29,909	31,302	28,280	24,509	24,223	32,463	17,151	39.9
Petroleum and derivative products	62,764	59,780	62,442	60,095	72,335	74,862	71,213	69,459	70,147	84,079	34.0
Clay or mud	5,489	6,751	7,047	6,140	6,208	4,749	6,659	6,038	6,374	5,151	–6.2
Other inorganic products	68,560	69,401	72,945	58,127	60,420	57,604	58,732	60,928	58,898	49,022	–28.5
Motor vehicles and parts	124,734	124,480	136,015	100,013	120,344	126,282	140,449	149,759	148,525	113,761	–8.8
Containers	246,814	314,974	293,720	293,043	321,692	309,777	279,714	322,209	447,173	391,866	58.8
Cement	147,703	133,691	135,732	130,078	146,362	160,925	165,115	147,121	130,182	114,155	–22.7
Other industrial products	431,357	410,346	414,271	410,203	442,269	463,192	533,196	536,333	415,265	350,964	–18.6
Total	1,511,444	1,443,347	1,470,067	1,447,674	1,574,209	1,590,506	1,691,305	1,743,121	1,737,207	1,523,950	0.8

Source: Secretaría de Comunicaciones y Transportes, Dirección General de Transporte Ferroviario y Multimodal, *Anuario Estadistico*, 1999–2008.

TABLE C.19 Locomotive fleet owned by China national railways, by power source, 2000–09

Powered by	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
					Units						% change
Steam	601	381	109	94	82	94	91	89	89	83	–86.2
Diesel-electric	10,355	10,598	10,752	10,778	11,125	11,331	11,348	11,229	11,041	10,844	4.7
Electric	3,516	3,976	3,876	4,584	4,849	5,122	5,465	5,993	6,206	6,898	96.2
Total	14,472	14,955	14,737	15,456	16,056	16,547	16,904	17,311	17,336	17,825	23.2

Source: National Bureau of Statistics of China, *China Statistical Yearbook*, 2000, tables 15–17*;* 2002, tables 15–17; 2004, tables 16–17; 2005, tables 16–17; 2007, tables 16–17; 2009, tables 15–17; and 2010, tables 16–17.

TABLE C.20 Rail car fleet in China, 2000–09

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
					Units						% change
Passenger cars	35,989	37,214	37,942	38,972	39,766	40,328	40,945	42,471	43,215	47,436	31.8
Freight cars	439,943	449,921	446,707	503,868	520,101	541,824	558,483	571,078	584,961	594,388	35.1
Total	475,932	487,135	484,649	542,840	559,867	582,152	599,428	613,549	628,176	641,824	34.9

Source: National Bureau of Statistics of China, *China Statistical Yearbook, "*Number of National Railway Passenger Coaches and Freight Cars Owned," 2001, tables 15–18; 2003, tables 15–18; 2005, tables 16–18; 2009, tables 15–18; and 2010, tables 16–18.

TABLE C.21 Composition of freight rail car fleet in China, 2000–09

Type of car	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
											% change
Covered	92,569	89,035	91,835	95,678	96,107	99,206	99,399	102,192	103,449	103,850	12.2
Open	252,977	262,886	257,642	308,578	323,970	343,480	360,500	366,767	379,050	388,118	53.4
Flat	24,685	26,681	28,028	29,115	29,530	30,290	32,222	36,336	37,665	38,766	57.0
Hazardous materials	1,578	1,778	1,956	2,056	2,056	2,956	2,056	2,056	2,056	2,056	30.3
Tank	37,778	38,804	39,258	40,495	40,222	38,331	35,654	34,592	33,593	32,346	–14.4
Refrigerated	7,909	7,977	7,711	7,696	7,696	7,419	7,393	7,196	6,588	6,587	–16.7
Other	22,447	22,760	20,277	20,250	20,250	21,047	21,259	21,939	22,560	22,665	1.0
Total	439,943	449,921	446,707	503,868	519,831	542,729	558,483	571,078	584,961	594,388	35.1

Source: National Bureau of Statistics of China, *China Statistical Yearbook,* 2005, tables 16–18; 2009, tables 15–18; and 2010, tables 16–18.

TABLE C.22 Railway freight tonnage transported in China, 2000–09

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000–09
					Million tons						% change
National railways	1,660.6	1,792.0	1,855.8	1,998.1	2,178.2	2,318.4	2,454.8	2,624.0	2,752.4	2,775.7	67.2
Local railways	83.7	95.4	112.4	130.6	149.2	178.0	195.9	243.9	271.3	238.7	185.3
Joint-venture railways	41.6	44.5	61.4	113.7	162.8	196.6	231.5	274.5	279.8	319.0	667.6
Total	1,785.8	1,931.9	2,049.6	2,242.5	2,490.2	2,693.0	2,882.2	3,142.4	3,303.5	3,333.5	86.7

Source: National Bureau of Statistics of China, *China Statistical Yearbook, 2010*, tables 16–18.

TABLE C.23 Commodities transported by rail in China, 2000–09

Commodity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
					Million tons					
Coal	685.5	766.3	818.5	881.3	992.1	1,070.8	1,120.3	1,220.8	1,343.3	1,327.2
Coke	47.3	49.9	56.1	71.2	71.9	79.2	88.3	93.3	87.8	85.5
Petroleum	93.9	98.5	103.0	107.7	119.4	126.7	127.4	127.0	126.7	125.3
Steel and iron	115.4	128.9	141.2	152.8	160.8	175.4	200.6	215.9	207.2	215.3
Metal ores	130.2	149.9	167.8	180.8	193.2	221.9	285.7	275.8	298.0	356.8
Nonmetal Ores	81.4	85.0	81.8	79.5	80.4	82.4	86.8	91.9	90.5	78.7
Mineral building materials	96.7	98.0	86.0	76.6	77.9	78.2	80.2	80.3	95.2	107.5
Cement	39.0	39.3	36.0	36.5	37.0	34.7	38.0	35.4	35.5	37.4
Timber	34.4	33.7	31.5	30.5	32.4	35.0	36.1	37.3	29.4	24.8
Chemical fertilizers and pesticides	51.9	56.0	59.4	56.6	63.9	71.6	74.2	81.5	78.1	80.3
Grain	79.4	70.9	82.8	101.4	109.1	110.8	101.1	104.7	114.7	99.3
Cotton	2.3	1.6	2.4	2.2	2.6	2.8	3.9	3.9	3.9	4.4
Salt	12.5	12.2	12.6	12.6	12.8	12.9	12.9	13.6	14.1	13.2
Others	185.3	195.9	189.9	201.0	216.2	206.8	218.6	231.1	215.1	207.3
Total	1,655.0	1,785.9	1,868.9	1,990.8	2,169.6	2,309.2	2,444.0	2,612.4	2,739.3	2,762.8

Source: National Bureau of Statistics of China. *China Statistical Yearbook, 2000, 2002, 2004, 2005, 2007, 2009,* and *2010*. Tables 15–20, 16–20, or 16–19.