Massachusetts Infrastructure Investment Coalition

Infrastructure Status Report: Massachusetts Freight Rail

Freight Railroads - an economical and environmental alternative

December 2008 Volume 5, Number 1

Freight Rail Facts and Terminology:

- ✓ *Twelve freight railroad companies serve Massachusetts carrying some 20 million tons of freight to and from the state.*
- ✓ *Freight movement is a critical component of Massachusetts' economy and well being with an annual increase projected well above the national average.*
- ✓ *Freight rail companies frequently share rights-of-way with passenger rail lines or each other.*
- ✓ ***Shared Use Corridor** – a rail right-of-way where passenger and freight trains operate on the same lines of track.*
- ✓ *A **Ton Mile** is the movement of one ton of cargo over the distance of one mile.*
- ✓ *Freight rail companies transport large volumes of cargo by train to and from major facilities such as seaports, truck terminals and companion rail terminals to and from destinations throughout the country.*
- ✓ ***Interchange** – the location where one railroad company exchanges rail freight cars with another railroad company (or the act of such exchange).*
- ✓ *The US Environmental Protection Agency estimates that trucks emit roughly three times more nitrogen oxides per ton mile than railroad locomotives.*

After waning for many decades the rail system in Massachusetts is positioned to take on a new role in the state's transportation system. Abandonment of light density lines, single tracking of main lines to reduce maintenance costs, and the diminishing manufacturing sector had reduced rail market share to less than 10%. Today increased fuel costs, driver shortages, and ever increasing highway congestion have slowed this downward spiral. Railroads are now aggressively marketing inter-modal services, placing trailers and containers on flat cars and developing new markets and services.

Massachusetts' surface transportation system includes the private rail freight system that both competes with and complements the publicly owned and financed highway and roadway system. Massachusetts railroads directly serve some 300 firms within the state with many more being served indirectly through inter-modal services. Most Massachusetts rail customers are receivers of goods.

Twelve freight railroad companies serve Massachusetts carrying some 20 million tons of freight annually to and from the state. The rail system consists of over 1,100 route miles of track, nearly two dozen rail switching yards, 5 inter-modal yards (rail-to-truck transfer) and several automobile transfer yards. While much of the rail freight system is in private ownership, the Commonwealth (through its Executive Office of Transportation or the Massachusetts Bay Transportation Authority) owns nearly 40% of the rail lines. Much of this state-owned property is jointly used for passenger (commuter rail and intercity) and freight operations.

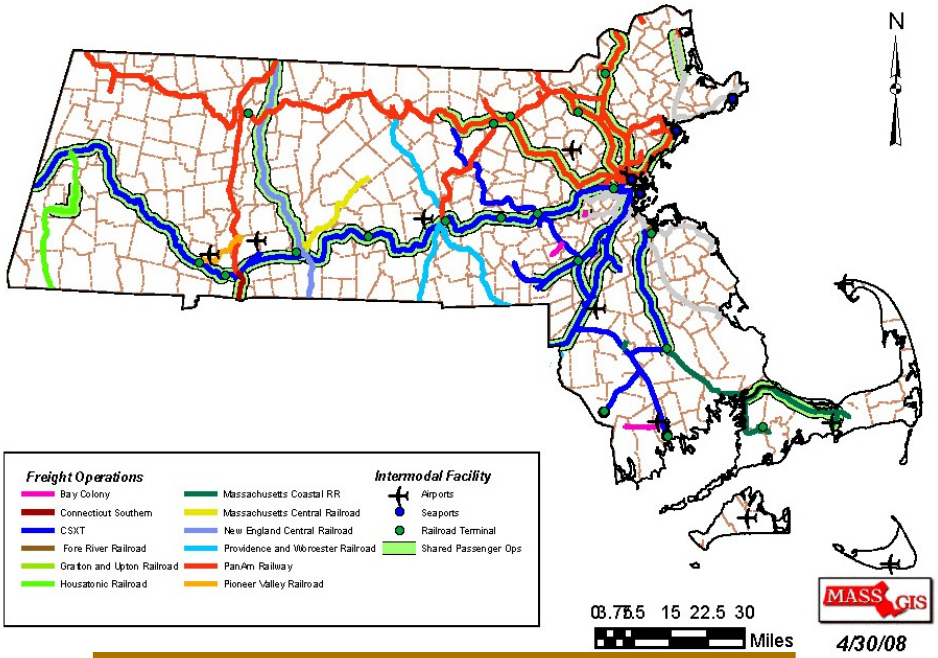

Figure 1 – Map of Massachusetts Major Freight Rail Lines

Freight movement is a critical component of the state's economy and general well-being. Massachusetts will continue to see growth in freight shipments of approximately 2.7% per year, well above the national average. Inter-modal operations will play a significant role in meeting this demand, requiring continued investment in both our railway and highway systems. Rail freight works together with trucking and warehousing companies, as well as their own direct customers. Key industries served by railroads include plastics and chemicals; energy generation; printing/publishing; food products and processing; automotive; and waste/scrap. Without rail service these facilities either would rely more on trucking or would relocate away from the state.

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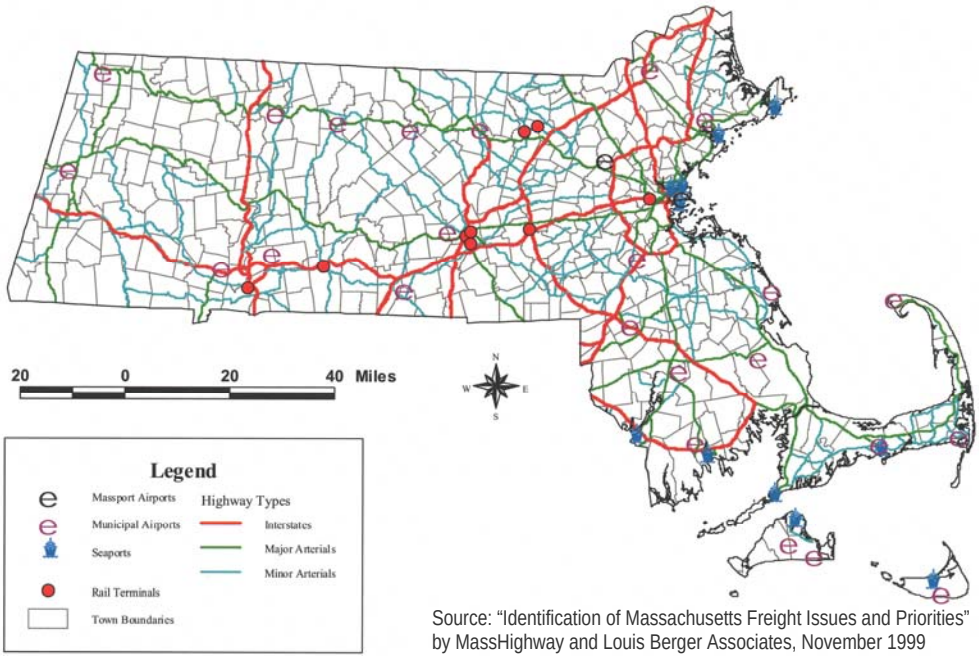
- ✓ ***Intermodal Facility –*** *a rail freight yard area consisting of railroad tracks, roadways, storage areas and equipment used as the point of transfer of trailers and containers between railroads, trucks, or ships.*
- ✓ ***Intermodal Freight –*** *any goods movement that utilizes multiple modes of transport – generally applies to trailers and containers carried on railcars and trucks. Also applies to bulk commodities transferred between rail and truck.*
- ✓ *The average truck takes up the space of 3.8 average size cars.*
- ✓ *A heavy truck creates as much damage to highways and bridges as nearly 8,000 automobiles.*
- ✓ *Reduced pavement quality increases costs to all highway users by increasing vehicle wear.*
- ✓ *Rail transport does not contribute directly to pavement wear and damage.*
- ✓ *Rail service saves the nation's shippers over $69 billion/year.*
- ✓ *The cost to move freight by rail a distance of 750 miles ranges between $20 and $40 per ton. The cost for a tractor-trailer truck moving the same distance and returning empty is $120 per ton.*
- ✓ *If 10% of the freight moved by highway were diverted to rail, the nation could save over 200 million gallons of fuel annually.*

Railroads provide significant environmental benefits. Depending on the pollutant measured, trucks are reported to be 6 to 12 times more polluting per ton mile than railroads. Thus, the movement of goods into Massachusetts by rail has a pragmatically positive environmental impact. Studies have found that a diversion of freight from highways to railroads can have a positive impact on fuel consumption, reduce air pollution, and reduce highway congestion, thereby reducing commuter costs and contributing to an overall improvement in the quality of life.



Source: "Identification of Massachusetts Freight Issues and Priorities" by MassHighway and Louis Berger Associates, November 1999

Figure 2 – Map of Massachusetts Major Truck Routes

Over 90% of all freight in Massachusetts is conveyed by truck. According to the Federal Highway Administration, one intermodal train can carry up to 280 truck trailers. A conventional train can carry the volume of 500 truck trailers. The Texas Transportation Institute projects that by shifting 25% of projected truck traffic to freight railroads, workers in the Boston Metro Area would save 33.2 hours commuting annually, resulting in an average savings of $470.00 per household, equating to 177 gallons of fuel per commuter. This 25% reduction in truck volume on the roads would remove 12,800 air pollution tons and 44,000 trucks from roads annually.

	RAIL	TRUCK
Pavement Wear & Tear	$0	$18,954,000
Excess User Costs	$0	$8,950,500
Congestion Costs	$0.00	$7,020,000
Air Pollution	$1,193,400	$6,318,000
Noise Impacts	$2,667,600	$11,337,300
Accident Costs	$1,067,040	$36,679,500
Total Cost	$4,928,040	$89,259,300
Cost per Ton	$6.32	$114.44

Above data based on 100 tons per rail car and 20 tons per single truck trailer.

Source: "A Comparison of the Full Costs of Moving Freight by Truck Compared to Moving Freight by Railroad", by Brian T. Ketcham, P.E., July 30, 2007

Table 1 - Cost of Long Distance Freight Movement

Poor road and bridge conditions and constraints on rail lines in New England and Massachusetts have a severe impact on the efficient, economical, and reliable movement of freight. Our highway system is now at or above its capacity at many critical urban centers and crossroads. Years of transit enhancements, highway expansion, and incentives to reduce single occupancy vehicle use have only seen further increases in non-attainment of air quality standards in most of our urban centers. Further exacerbating this increasing level of air pollution and congestion is the ever-increasing reliance on the movement of freight in our region by trucks.

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- ✓ *The AASHTO Freight Bottom Line Report identifies that without rail freight service expansion, truck vehicle miles traveled will increase by 37% nationally, requiring more than $64 billion in additional highway improvement needs and costing shippers an additional $1.4 trillion in shipping costs.*
- ✓ *The **Staggers Rail Act of 1980** removed many regulatory restraints on the railroad industry, providing railroads increased flexibility to adjust rates and tailor services to meet shipper needs.*
- ✓ *Nearly 40% of operating railroad rights-of-way in Massachusetts are publicly owned and additional miles of abandoned rail routes are held by environmental agencies or local communities for future transportation uses.*
- ✓ *Rail tonnage in Massachusetts is predicted to grow by nearly 8% by 2020, while motor carrier tonnage is expected to grow by 84%.*
- ✓ *Due to the increase in height of freight rail cars, vertical clearances below bridges are an issue, causing cost and time increases to move products into the region and thereby reducing the state's economic competitiveness with other states and regions.*
- ✓ *Trucks emit three times more nitrogen oxides and particulates per ton-mile than locomotives. Railroads are three times more fuel-efficient than trucks on average.*

As previously noted, the Commonwealth owns a considerable portion of rail rights-of-way, administered through the EOTPW or the MBTA, particularly in the eastern portion of the state. The MBTA operates its commuter rail system of slightly over 375 miles and 70% of these lines are shared use. These shared use lines present challenges for both the freight and passenger operators. Freight operations are subject to service demands with tight schedules, just in time delivery, and connections to other modes. This places demands on the rail network that sometimes may interfere with commuter service schedules, resulting in frustrated commuters and equally frustrated freight customers.

Demand for both freight and commuter services suggests that collaborative efforts must be undertaken to assure that the railway network has the capacity to accommodate growth and contribute to sustained economic health of the state and region. The federal government and states have been exploring such efforts to meet the increased demand for both freight and passenger transportation on the nation's railways.

Nationally the US freight rail industry is healthy and growing. Since the Staggers Rail Act of 1980, railroads have improved productivity, reduced operating costs, and increased tonnage hauled. Federal studies indicate that by 2020 freight tonnage will increase 70% over 1998 tonnage. This freight will move by road, rail, and water modes. Proportionally, the amount of rail share of this tonnage will decrease unless rail capacity improvements are made.

	RAIL	TRUCK	SAVINGS
Direct Cost to Move Freight ($/ton)	$20-$40	$120	67%-83%
Externality Costs (millions $'s/year)	$4.92	$89.30	94%
Air Pollution Savings (tons/year)			
Nitrogen Oxides	261	1,321	80%
Particulates	9	80	89%
Carbon Dioxide (greenhouse gas)	29,975	104,110	71%
Fuel Consumption (gal's diesel/year)	2,854,800	10,446,429	73%

Above data based on 2,500 tons per day, six days per week, 52 weeks per day, 750 miles

Source: "A Comparison of the Full Costs of Moving Freight by Truck Compared to Moving Freight by Railroad", by Brian T. Ketcham, P.E., July 30, 2007

Table 2 – Benefits of Moving Freight by Rail

As a net consumer of goods, Massachusetts residents are dependent on the efficient movement of goods, but our current transportation network is constrained by bottlenecks and congestion. Although our population is stabilizing, our demand for goods is increasing; freight tonnage growth is a direct result of the ever-growing need to bring in all kinds of products and materials from clothing and food, lumber and plastics, to fuel and automobiles. The transportation system is integral to the effective movement of both people and goods to sustain the economy and the quality of life we rightly expect to maintain.

In an effort to improve and expand freight movement in Massachusetts the Commonwealth has commissioned the development of a Freight Rail Plan. The EOTPW is currently conducting a comprehensive review of the freight transportation system throughout the state, including all modes – trucking, railroads, maritime and air freight. More information about this plan can be obtained at www.massfreightandrailplan.com. The EOTPW recognizes the need for an efficient and multi-modal transportation system to meet the current and future economy and well-being of the state and its citizens. Such a plan would enable proper budgeting for maintenance and expansion of rail infrastructure. Also, legislation and regulations will be reviewed with regard to funding projects involving both public and private entities. A public policy needs to be developed concerning the funding of projects involving public/private concepts.

Call to Action: What does all this mean? Clearly the environmental and economic advantage of rail freight meets the public need for an efficient and multi-modal solution to the ever-growing congestion on our public roadways. State leaders and communities need to work together with the freight railroads to enhance rail's role in our state and regional transportation network. As demand for consumer goods continues to grow Massachusetts must take advantage of the railroad network to provide for a safe and efficient means of bringing goods to and shipping out from the Commonwealth.

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The **Massachusetts Infrastructure Investment Coalition** is identifying the long-term needs for infrastructure investments to support economic development and improve the quality of life for the citizens of Massachusetts. The Infrastructure Status Report for **Massachusetts Freight Railroads** was prepared to provide information about the investment requirements for Massachusetts wastewater treatment facilities and collection systems. The coalition is currently preparing status reports for other infrastructure elements including: **Aviation, Bridges, Dams, Drinking Water, Energy, Government Facilities, Hazardous Waste, Homeland Security, Housing, Navigable Waterways, Ports and Harbors, Roadways, Schools, Transit (Rapid/Bus/Commuter Rail), Telecommunications and Wastewater.** These reports are available at www.engineers.org/resources/news.htm.

Infrastructure Investment Coalition

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Aviation – Bridges – Dams – Drinking Water – Energy – Government Buildings - Hazardous Waste – Homeland Security – Housing - Navigable Waterways – Ports and Harbors – Railroads (Freight) – Roadways - Schools – Transit (Rapid/Bus/Commuter Rail) – Telecommunications - Wastewater

*The **Massachusetts Infrastructure Investment Coalition** is supported by:*

- A Better City
- American Planning Association/Massachusetts Chapter
- American Council of Engineering Companies of Massachusetts
- American Public Works Association of New England
- Associated Builders and Contractors of Massachusetts
- Associated General Contractors of Massachusetts
- Associated Subcontractors of Massachusetts
- Boston Society of Civil Engineers Section/ASCE
- Construction Industries of Massachusetts
- Environmental Business Council of New England
- LSP Association
- Massachusetts Association of Land Surveyors & Civil Engineers
- Massachusetts Highway Association
- Massachusetts Municipal Association
- MassInsight Corporation
- Massachusetts Water Pollution Control Association
- National Association of Industrial and Office Properties - Massachusetts Chapter
- New England Water Environment Association
- New England Water Works Association
- North Central Massachusetts Chamber of Commerce
- Rasky Baerlein Strategic Communications Inc.
- The Engineering Center
- Utility Contractors Association of New England
- Women's Transportation Seminar - Boston Chapter
- 495/MetroWest Corridor Partnership