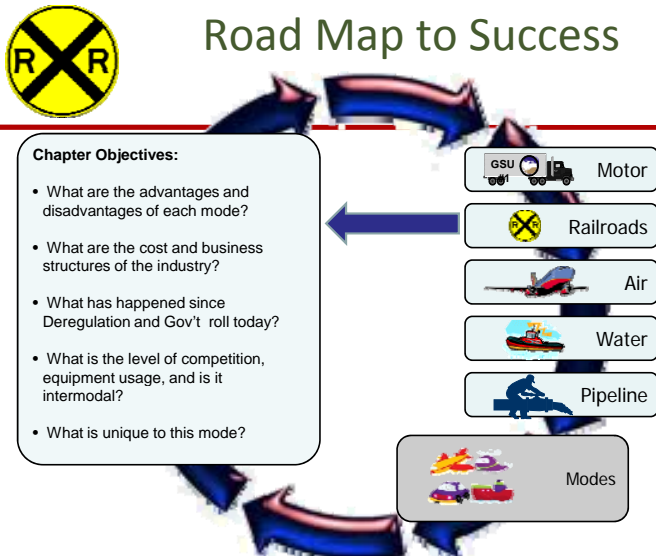


Railroads
Chapter 6


Road Map to Success



Chapter Objectives:


- What are the advantages and disadvantages of each mode?
- What are the cost and business structures of the industry?
- What has happened since Deregulation and Gov't roll today?
- What is the level of competition, equipment usage, and is it intermodal?
- What is unique to this mode?

Off The Track Rail Facts



- Electricity was first used to power trains in 1879
- The fastest trains to date are magnetic pulled and are called the Maglev trains, which stand for (magnetic levitation)
- The fastest moving train clocks in around 400 km/per hour
- More than 33 regional railroads operate in the United States
- The Orient Express was the first luxury train 1883, which operated from Paris to Romania

In The Beginning...




- Service introduced in 1827
 - System expansion 1840-1860
- Government aided expansion
 - of 130.4 million acres
 - Tax exemptions, govt. Securities
- Major impact on economic development of country
 - railway in 1869

 **Let's Be Harmonious**


- Equipment harmonization & innovation boosted the industry
 - Std gauge track
 - Diesel engines
- Discrimination & illegal activity led to in 1880's
- Poor performance led to regulation in 1900's




Page 6

 **Competition Anyone?**

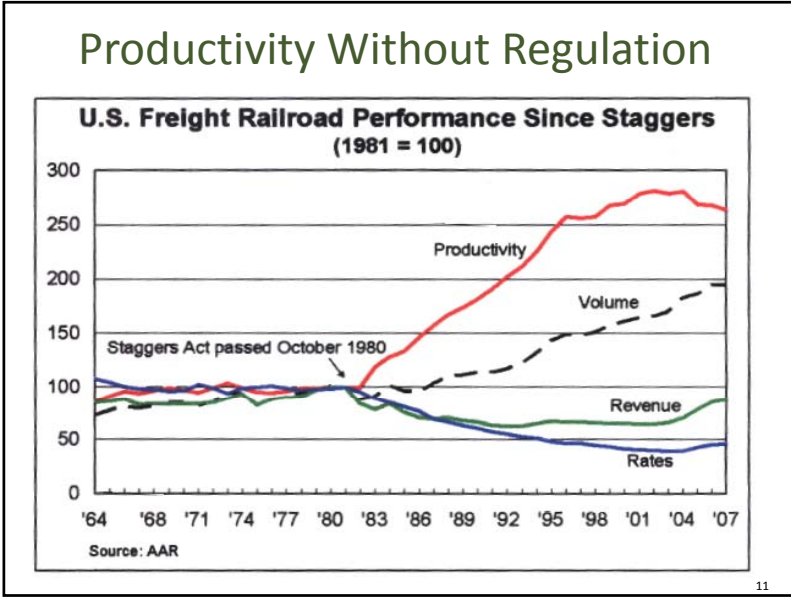
- Intermodal competition led to decline from 1940-1980
 - Emergence of trucking industry
- Govt. Intervention in 1970's
 - Conrail restructuring
 - Creation of Amtrak
- _____ sparked resurgence of the industry




Page 8


 **Rail Today**

- Over the past 25 years innovation in cars weight has led to a 85% increase in fuel efficiency
- In the United States rail moves 43 % of all goods
- Since 1980 the rail industry has invested nearly \$420 billion to maintain the infrastructure of the tracks
- With rail 99.996% of hazardous material reaches its destination safely




 **Economic Impact of USA Freight Railroads**




- America’s freight railroads carry:
 - 40 percent of the nation’s intercity freight
 - 70 percent of vehicles from domestic manufacturers
 - 64 percent of the nation’s coal
 - 40 percent of the nation’s grain
 - [Association of American Railroads](#)




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 **2004 Railroad Overview**

- Revenues
 - \$ 39.1 billion in operating revenues
 - Up 9.4% over pervious year
 - \$ 2.9 billion in net income
 - Up 7.4% over previous year
 - 86.6 operating ratio
 - Versus 85.8 from previous year
- Freight
 - 33 Million Carloads
 - 1.61 BILLION ton-miles
- Employees - 174,062
 - Average Salary of \$60,018






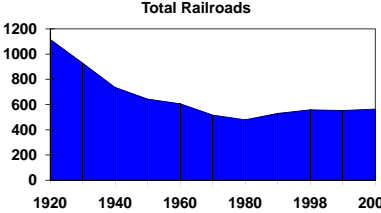
Page 13

 **Industry Characteristics**

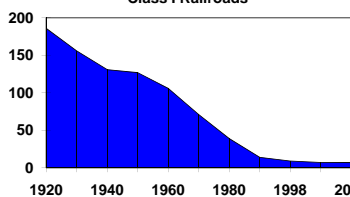
- Small number of large carriers
 - Economic Barriers To Market Entry
 - Only 9 Class 1 Carriers Due To Mergers Of Major Players
 - BN And
 - UP And SP
 - break Up
- Average shipment size is large
 - 76 tons per rail carload

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 **Number of Railroads**



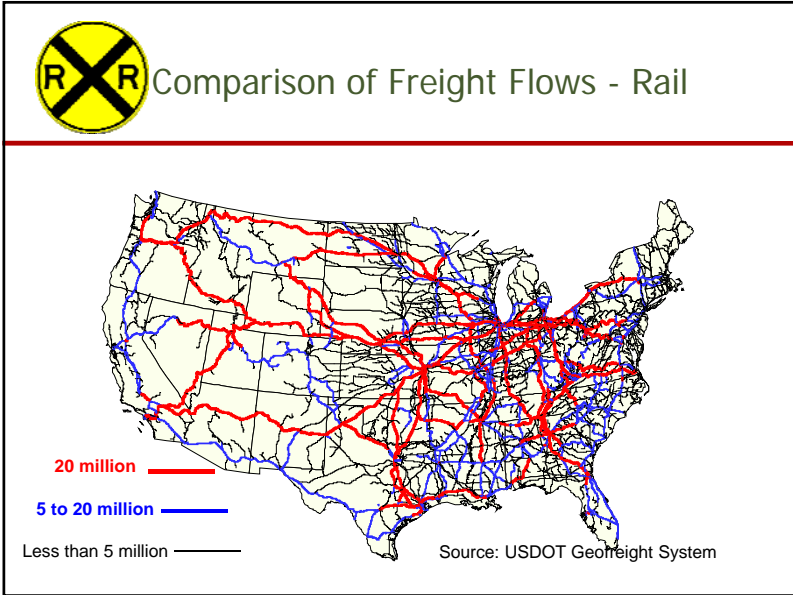
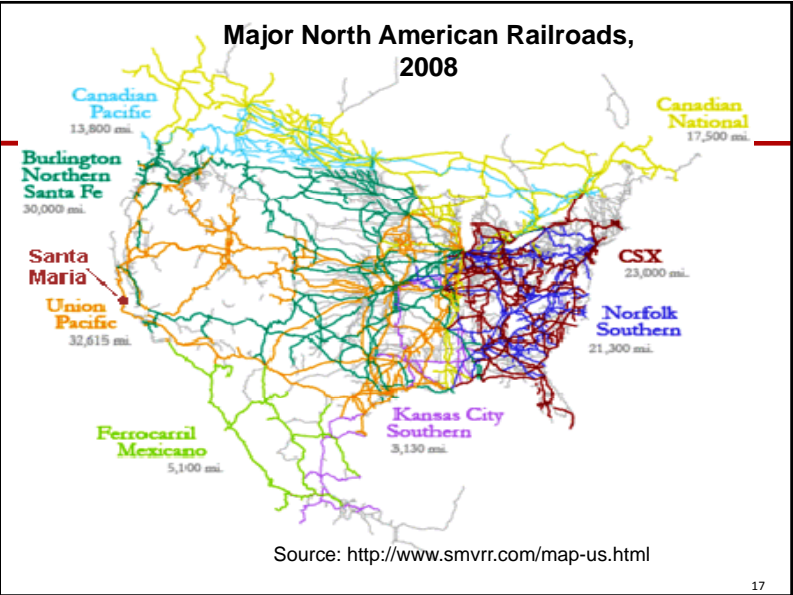
Year	Number of Railroads
1920	1100
1940	700
1960	600
1980	500
1998	550
2008	550



Year	Number of Railroads
1920	180
1940	130
1960	110
1980	50
1998	15
2009	10


Source: <http://www.aar.org/~media/AAR/Industry%20Info/Statistics%202010%2004%2012.ashx>

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Industry Characteristics


- Average length of haul
 - 720 miles
- Value of freight is low
 - Bulk commodities
 - Automobiles are an exception
- Intermodal freight is beginning to change the rail industry
 - More time sensitive freight
 - More competitive with trucks




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Industry Needs Improvement

- Service levels
 - History of poor customer service and inflexible management
 - Reputation has improved greatly in the last five years
- Speed
 - Not fast (23 mph)
 - Not consistent as truck
 - Unit trains are fastest



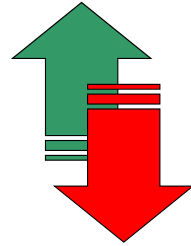
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Industry Capabilities

- Carrying capacity is
 - Average is 88.2 tons
 - Maximum of 120 tons

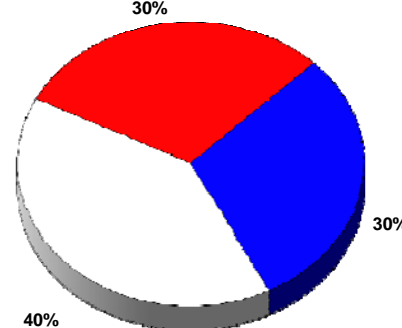
- Cargo safety is
 - High damage and claim rates
 - Major problems are caused by vibration, swaying, and bumping



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Cost Characteristics




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Economic Characteristics

- - Exist in this industry
- Infrastructure
 - Privately owned by rail companies
- Market orientation
 - within the mode
 - Small number of interdependent large sellers
 - Competition with other modes

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Where's The Money


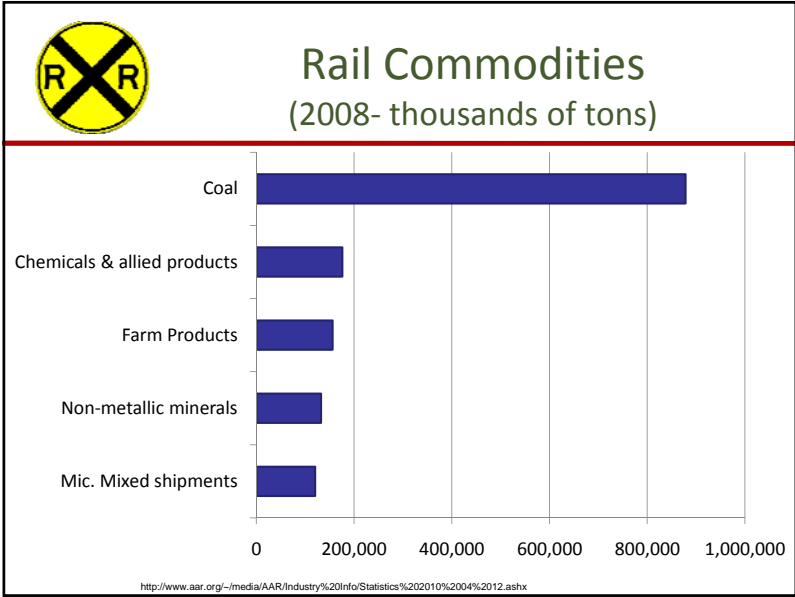
- Mostly bulk products
- Low revenue per ton
- Growth in Intermodal and Auto


Type of Freight Carried for Year 2008

Commodity Group	Tons Oriented		Gross Revenue**	
	(000)	% Of Total	(millions)	% Of Total
Coal	878,569	45.4 %	\$14,200	23.5 %
Chemicals & allied prod.	176,108	9.1	7,717	12.8
Farm products	155,950	8.1	5,403	8.9
Non-metallic minerals	132,352	6.8	1,749	2.9
Misc. mixed shipments*	120,278	6.2	8,184	13.5
Food & kindred products	105,071	5.4	4,610	7.6
Metallic ores	59,986	3.1	637	1.1
Metals & products	54,420	2.8	2,664	4.4
Waste & scrap materials	48,848	2.5	1,415	2.3
Stone, clay & glass prod.	45,275	2.3	1,636	2.7
Petroleum & coke	44,690	2.3	1,867	3.1
Pulp, paper & allied prod.	34,130	1.8	2,228	3.7
Lumber & wood products	30,856	1.6	1,684	2.8
Motor vehicles & equip.	24,791	1.3	3,623	6.0

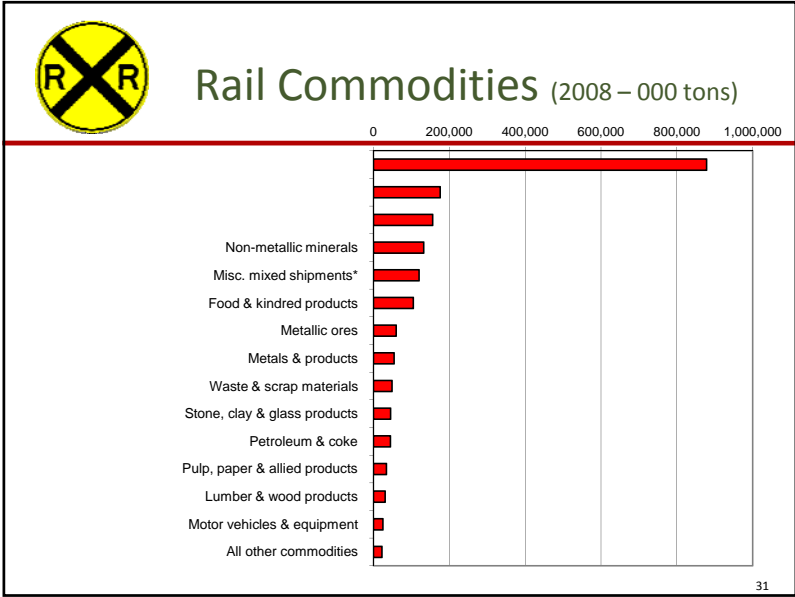
 **2007 Railroad Statistics**

- Coal is still the leading type of freight carried for 2007
- 852,061 tons of coal were moved in 2007 which accounted for 20.6 million in revenue.
- From all the revenue generated from ton miles, Rail accounted for 41.2% of this.
- <http://www.aar.org/PubCommon/Documents/AboutTheIndustry/Statistics.pdf>

 **Demand for Freight Rail Transportation**

- Importance of coal
 - Dominant commodity carried by rail
 - For Class I railroads in 2008 coal accounted for:
 - 45.4% of tons carried
 - 23.5% of revenues
 - Principal source for railroad growth over the past decade





The Big Four (6)











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U.S. Class I Railroads Statistics

	2006	2008
# of employees	167,581	164,439
Average wage	\$68,141	\$72,836
Freight revenue (billion)	\$50.3	\$59.4
Net Income (billion)	\$6.5	\$8.1
Operating ratio	78.6%	77.3%


According to the Association of American Railroads (AAR), Class I railroads had minimum carrier operating revenues of \$346.8 million (USD) in 2006.



Major Railroads 2008 Stats


RR	Revenue (millions)
	18,132
	17,935
	10,661
	10,219
Canadian National Railway (CN)	7,957
Canadian Pacific	4,692
Ferrocarril Mexicano (Ferromex)	1,082
Kansas City Southern Railway	1,030
Kansas City Southern de México	818

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Key Participants

- Railroads
- Customers
- Rail unions
- Drayage companies
- Intermodal marketing companies
- Association of American Railroads
- Federal government
 - Surface Transportation Board
 - Federal Railroad Administration



Hub Group, Inc.


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Types of Carriers


- Common
 - Vast majority of companies
- Contract
- Private
 - Few left except for private cars
- Unique RRs:
 - - National passenger service still government subsidized
 - - Formally owned by government

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Geographic Operations

- Geographic scope
 - Interregional
 - Regional
 - Local / Shortline
- Shipment size
 - Less than carload
 - Carload




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Types of Carriers




- Scheduled service provided
 - Mixed commodity trains
 - Multiple customers, destinations, and car types
 - Unit trains
 - Single commodity, customer, and car type
 - Intermodal service
 - TOFC and COFC
 - Growth area
 - Greater opportunity to increase revenues

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Rail Equipment Types

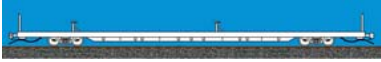
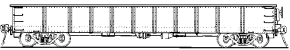
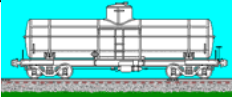
- Box Cars
 - ♦ Handle General Commodities
 - ♦ Plain Or Modified
- Hopper Cars
 - ♦ Handle Bulk Dry Commodities
 - ♦ Load On Top, Discharge Through Bottom Hinged Doors
 - ♦ Covered Or Open


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 **Rail Equipment Types**



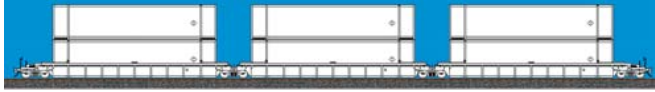
- Flatcars
 - Used for intermodal containers
- Gondolas
 - Fixed sides, flat bottom
 - Used for heavy, long commodities
- Tank cars
 - Used for liquid and gas commodities

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 **Rail Equipment Types**

- Auto Carriers
 - Carrier 12-15 cars each
- Centerbeam Flat
 - Flat car with support
 - Carries lumber
- Doublestacks
 - Used for intermodal containers


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 **Who Owns All Of These Cars?**

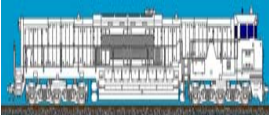





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 **Industry Fleet**

- Equipment statistics
 - 19,684 locomotives
 - 1.2 million freight cars
 - 4.2 million TEU's of containers
- Equipment ownership
 - Carriers own 60% of freight cars
 - Shippers own 40% of freight cars
 - 99% tank cars
 - 46% of covered hoppers




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Demand for Freight Rail Transportation

- Industries that rely on rail
 - Power plants
 - 70% of coal is delivered to U.S. power plants by rail
 - Automobile dealerships
 - 70% of all domestically manufactured vehicles are delivered by rail
 - Food
 - 32% of grain shipments are transported by rail
 - Chemical industry




Performance Measurements

- Operating ratio
- On-time performance
 - Average and variation
- Damage rates
 - Braking methods
- Yard transfer time
- Equipment utilization




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Strengths and Weaknesses

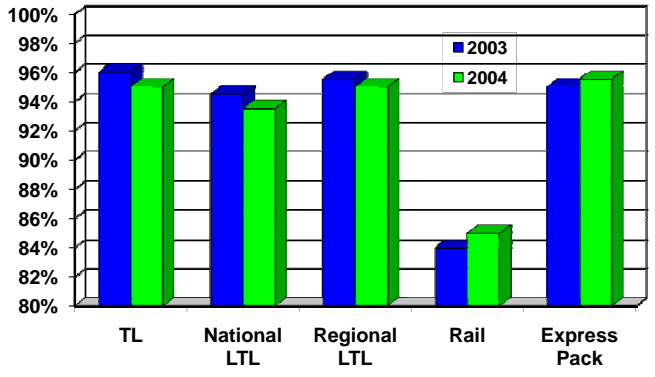
- Advantages
 - Low cost based on volume
 - Large carrying capacity
 -
- Disadvantages
 - Slow transit times
 - Fixed right-of-ways
 -
 - Limited flexibility and accessibility
 - High fixed costs
 - No national network



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CS: On-Time Performance



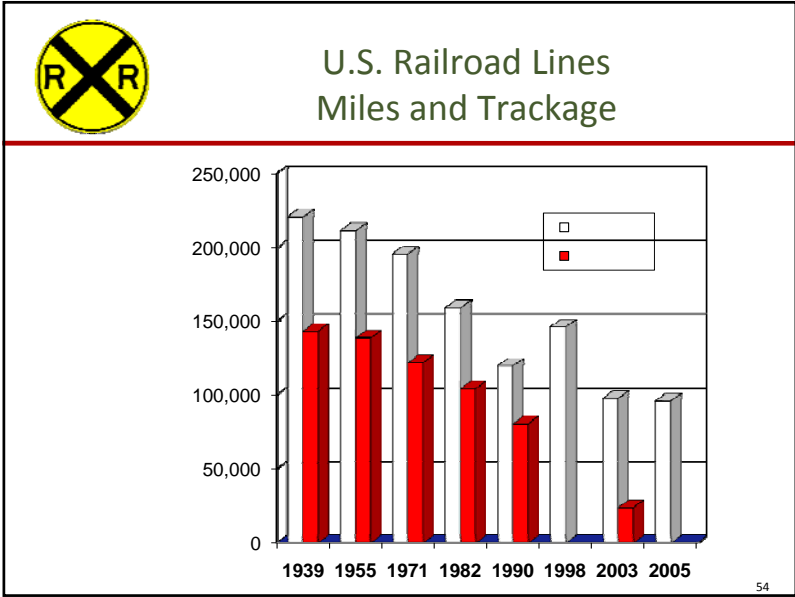
Category	2003 (%)	2004 (%)
TL	~96.5	~95.5
National LTL	~95.0	~94.0
Regional LTL	~96.0	~95.5
Rail	~84.5	~85.5
Express Pack	~95.5	~96.0

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 **Key Issues and Trends**

- Continued concentration of industry to improve profitability
- Accidents and safety
- Competitive impact of mergers
- Need for continuous improvement
- Impact of intermodal traffic
- System innovations


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 **Key Issues and Trends**

- Industry wide focus on continuous improvement
- Growth of intermodal traffic
 - Equipment pressures
 - System priority
- System innovations
 - Outsourcing yard functions
 - Developing multimodal capability
 - Developing new equipment

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 **Railroads**


Additional Types of cars:

- Frog - A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other.
- Hi-Cube Car - A term used to describe any of a series of boxcars whose inside dimensions are such as to produce a cubic capacity of approximately 10,000 cu. Ft., as opposed to the cube of conventional cars, which is usually in the range of 4,000 to 6,000 cu. Ft.


Additional Information:

- U.S. Class I railroads are line haul freight railroads with operating revenue in excess of \$319 million. In 2007, the seven U.S. Class I railroads were: BNSF Railway, CSX Transportation, Grand Trunk Corporation (owned by Canadian National Railroad), Kansas City Southern Railway, Norfolk Southern Railroad, Soo Line Railroad (owned by Canadian Pacific Railroad), and Union Pacific Railroad. The Class I railroads account for about 71 percent of industry road miles operated and 93 percent of the total rail freight revenues.
- Each year, about 1.7 million carloads of hazardous materials (hazmat) are transported by rail in the United States. Rail is by far the safest way to move hazardous materials. In 2007, 99.996 percent of rail hazmat shipments arrived at their destination safely. Rail hazmat accident rates are down 88 percent since 1980 and down 39 percent since 1990.

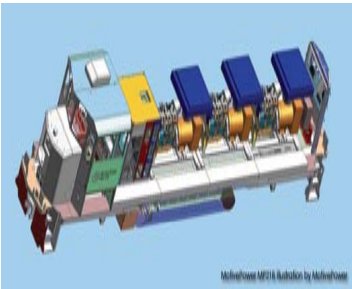




 Association of American Railroads: Carbon Calculator

- Freight rail is most environmentally sound way to transport goods
- Carbon Calculator
 - Calculates the amount of carbon emissions saved by using rail
 - Picks number of cars, origin and destination, commodity shipped
 - Calculates amount of emissions saved
 - Even shows number of plants needed to have the same effect
- Not all costs are considered!
 - Just covers the rail movement, not the total shipment

 Union Pacific Goes Green


- 2002- UP began testing of the prototype Genset switcher locomotive
- Currently has 159 working units
- Powered by three 667 horsepower ultra-low-emission off road tier 3 certified diesel engines.
- Six traction motors allow the switchers to efficiently sort rail cars and build trains
- New switcher is projected to cut nitrous oxide emissions by 80% and particulate matter by 90%
- When compared with older locomotive systems the Genset switcher used 30% less fuel, which translates into a 30% reduction in greenhouse gases




 Current Issues

- Service innovations
 - Customer service improvements
 - Intermodal increasing
 - Cooperation with other modes
 - Leading towards mega-carriers
- - End to end service
 - Consolidation continues
 - Abandonments result

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 Current Issues

- Labor situation
 - Outdated rules
 - Indian pay
 - 100 mile rules
 - “Right-sizing” continues
 - 20+ unions remain
- Technology
 - Computers and sensors increasing
 - New equipment
 - highway
 - Larger capacity



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Advancing U.S. High Speed Rail

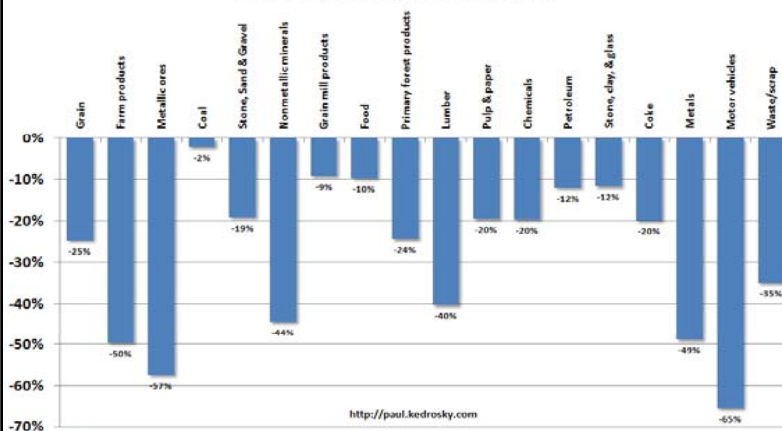
- President Obama Pledged \$8 billion of Stimulus toward development in April 2009
- There are ten corridors that his administration has proposed based on connecting geographical regions



U.S. Rail-Carried Trade with Canada and Mexico

- Canada
 - U.S. trade increased 84 percent from \$49.7 billion in 1998 to \$91.5 billion in 2007
 - Port Huron, MI is the biggest port with \$29 billion in trade by rail
 - Transportation equipment is the largest commodity group for exports and imports
- Mexico
 - U.S. trade more than doubled from \$18.2 billion in 1998 to \$46.4 billion in 2007
 - Laredo, TX is the biggest port with 59 percent of all rail traffic
 - Transportation equipment is the largest commodity group for exports and imports

Traffic on Major U.S. Railroads:
Three weeks ending Jan 24, 2009 (y-o-y)




Source: AAR
 According to the latest American Association of Railroads data for the three weeks ending Jan 24, 2009, commercial rail traffic continues to crash in the U.S. Leading the list is railcar loads of motor vehicles, which are off an incredible 65% year-over-year.



Railroad Trends 2008-2009

- Freight traffic across North America slumped 24.2 percent in the week ended April 11, 2009 from the same week a year ago, including a 23.3 percent drop in U.S. rail freight


 **Recent Issues**

- In a recent lawsuit, the rail industries were charged with “illegally benefitting from fuel surcharges”

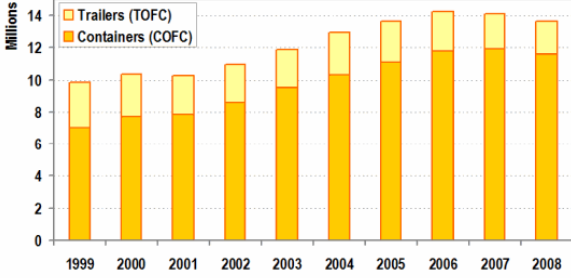
Percent of 2006 Rail Profits as from Alleged Fuel Surcharge Over-Recovery


Carrier	2006 Profit	Alleged Fuel Surcharge Over-Recovery	Percent of 2006 Profits from Alleged Over-Recovery
Burlington Northern	\$1.87 billion	\$925 million	49%
CSX	\$1.31 billion	\$842 million	64%
Norfolk Southern	\$1.48 billion	\$890 million	60%
Union Pacific	\$1.6 billion	\$1.169 billion	73%
Kansas City Southern	\$108 million	\$79 million	73%

- The Railroad Antitrust Enforcement Act of 2007- repeal anti-trust exemption and allows suits for anti-competitive conduct


 **Recent Rail Trends**

- Decline in TOFC
- Increase in containerized freight



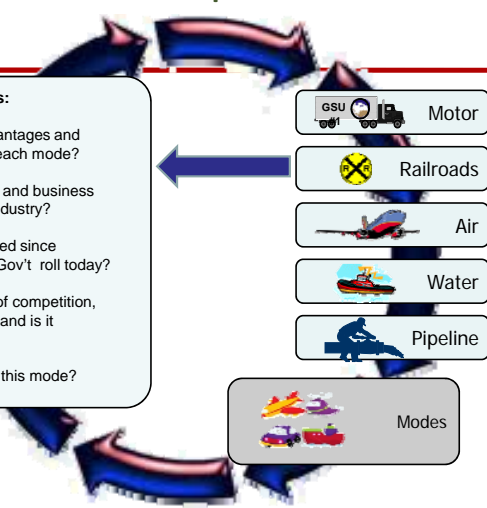
 **Top 4 Reasons To Work The Railroad**

1. Average pay is \$70,000
2. Benefits, cost around \$110 per paycheck
3. Retirement, is paid into the Railroad Retirement Board instead of Social Security
4. You are not typically cooped up in an office and get to travel

 **Road Map to Success**

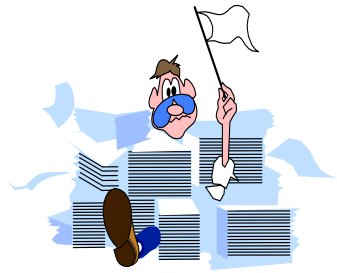
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- What is unique to this mode?





End Here for Exam #2



- Exam 2 will cover material to this point
- Study guide will be posted on the Internet
- Exam will be approx. 35-40 multiple choice
- Remember page 2 of the *Language of Logistics*