Passenger Rail Service

• Intercity Passenger Rail
  • trains that move passengers between cities
  • long distances, high speeds

• Urban Rail Transit
  • trains that move passengers within a city/urban area
  OR between the suburbs and the central city
  • several types of urban rail transit modes
INTERCITY PASSENGER RAIL
Intercity Passenger Rail Service in U.S.

- operated by Amtrak (National Railroad Passenger Corporation)
  - intercity passenger rail services in 46 states and D.C.
  - provides contract service for several commuter rail agencies
- created by U.S. Congress - Rail Passenger Service Act, 1970
- Amtrak Board of Control sets policy and oversees management – appointed by President
  - Secretary of Transportation in an ex officio member
- Federal Railroad Administration (FRA) administers grants to Amtrak
- www.amtrak.com
Amtrak Rail Network
• Over 27 million annual passengers on Amtrak
• On an average day - 75,000 passengers ride on up to 300 Amtrak trains
• Last year, Amtrak trains in the Northeast corridor (Washington-Boston) carried almost 10 million passengers
• New York City is the busiest station
• 21,000 miles of routes, 19,000 employees
• 70% of miles traveled by Amtrak trains are on tracks owned by other railroads - “host railroads”
  • BNSF is the largest host railroad for Amtrak
• Amtrak pays host railroads for use of their track and resources to operate the trains
Intercity Passenger Rail Service in Canada

• operated by VIA Rail (similar to Amtrak)
High Speed Rail (HSR)

- a rail line and service designed for high speed operation - *cruising speed* of 125+ mph
- Japanese introduced the first high speed trains in the mid 1960s – Shinkansen (Bullet Train)
- today high speed rail lines are common in France, Germany, United Kingdom, China, and many other countries
Japanese Skinkansen (Bullet Train)
French TGV
(Train a Grande Vitesse)
Intercity Express (ICE) - Germany
British Rail High Speed Trains
(HST-125 – diesel powered)
High Speed Rail in the United States

- Amtrak Acela Express – Northeast Corridor, top speed – 135 mph
- several high speed rail corridors studied
- US DOT Federal Railroad Administration
  www.fra.dot.gov
Acela Express
High Speed Rail Design Features

• Ideal:
  • integral trainsets
  • light axle loads
  • exclusive rights-of-way
  • grade separated
  • high design speed – low grades, long horizontal curves
  • sophisticated train control
  • train suspension - tilting trains
  • intensive maintenance
Maglev (Magnetic Levitation)

- cruising speeds of 300+ mph
- development and research in several countries – Germany, Japan, and others
- system in Shangei, China (Transrapid from Germany)
Tourist/Excursion Railroads

• becoming very popular in the U.S. - several operating railroads and museums

• Tourist Railway Association
  www.traininc.org

• Association of Railway Museums
  www.railwaymuseums.org
URBAN RAIL TRANSIT

• rail service in urban applications
• operates in a city OR between the suburbs and the central city
• several types of urban rail transit modes
  • Commuter Rail
  • Heavy Rail Rapid Transit (Metro)
  • Streetcars and Light Rail Transit
Commuter Rail

• a passenger railroad service that operates in metropolitan areas on tracks that are usually part of a railroad network for intercity passenger or freight trains

• service is primarily for commuters traveling between the suburbs and downtown

• also called *Regional Rail* or *Suburban Rail*
Commuter Rail
• Commuter rail service has passenger cars/coaches that are pulled or pushed by one or more locomotives or has self-propelled cars
• Several systems use double-decked cars
• Diesel locomotives or electric powered
• One or two stations in the central business district; automobile parking provided at outlying stations
Commuter Rail Systems in North America

• **U.S.** - Boston, Chicago, Los Angeles, Miami, Minneapolis, New York, Philadelphia, San Francisco, and many others

• **Canada** – Montreal, Toronto (GO Transit), Vancouver

• **Largest systems (ridership)** – New York (Long Island, Metro-North, and NJ Transit), Chicago (Metra)
Chicago Metra
Heavy Rail Rapid Transit

• high speed, high capacity trains
• multi-car trains operate on short headways (some can operate at 2 minutes or less)
• electric power taken from a third rail
• exclusive right-of-way – underground, elevated, at-grade
• sophisticated signaling
• variety of other names – *Metro, Subway, Underground*
Heavy Rail Rapid Transit
Heavy Rail Rapid Transit Systems in North America

- **U.S.** – Atlanta, Baltimore, Boston, Chicago, Cleveland, Los Angeles, Miami, New York, Philadelphia, San Francisco (BART), Washington

- **Largest systems (ridership)** – New York, Chicago, Washington

- **Canada** – Montreal, Toronto

- **Mexico** – Mexico City
Washington Metro
The Tokyo Subway (Loading)
Streetcars

• electrically powered vehicles that share the road with other traffic - power is from an overhead wire (trolley or pantograph)
• first demonstrated at expositions in Chicago and Toronto – late 1800s
• several developers/inventors (including Thomas Edison)
• also called *Tram, Trolley, Street Railway*
Streetcars were common in cities throughout North America and the world
Streetcars were used to link small communities – called “Interurbans”
Streetcars (Toronto)
Light Rail Transit (LRT)

- a new name for the streetcar
- electrically powered vehicles, but may link two or more vehicles to form a train
- a variety of operating strategies:
  - share the road
  - transit only street – *Transitway, Transit Mall*
  - on a separate right-of-way – on the surface, underground, or an elevated structure
- typically have honor fare collection
REES Module #5 - Transit, Commuter and Intercity Passenger Rail
LRT Systems in North America

• **U.S.** – Boston, Buffalo, Dallas, Denver, Los Angeles, Minneapolis, Portland, Pittsburgh, Sacramento, St. Louis, Salt Lake City, San Diego, San Francisco, and many others

• **Largest systems (ridership)** – San Francisco, Boston, San Diego, Portland, Los Angeles

• **Canada** – Calgary, Edmonton, Ottawa, Toronto
Minneapolis Hiawatha Line
Houston LRT
Heritage/Vintage Trolleys

• Light rail systems that use vehicles built before 1960 or modern replicas – downtown circulator or tourist service
U.S. Transit Passengers

• over **10 billion transit trips** in the U.S. last year (53% on buses, 34% on heavy rail rapid transit, 5% on commuter rail, 4% on LRT)

• average trip length:
  - Bus – 3.9 miles
  - LRT – 4.6 miles
  - Heavy Rail rapid transit – 4.8 miles
  - Commuter rail – 23.4 miles

• **Largest transit agencies (ridership)** – New York, Chicago, LA, Washington
Other Rail Transit Modes

• a variety of other special or unique passenger transportation modes that use many of the principles of railroad engineering
  • Cable Systems
  • Monorails
  • Automated Guideway (Guided) Transit
  • others
Cable Systems
(funiculars, aerial/gondalas, and others)
San Francisco Cable Cars
Incline Railroad (Pittsburgh)
Cog Railroad
Monorails

- Several types
  - Bottom supported or suspended
  - High performance
  - Lower performance (Minirail) – used in zoos and expositions

- www.monorails.org
Las Vegas Monorail
Automated Guideway (Guided) Transit - AGT

- unmanned, automated vehicles operating on fixed, exclusive guideways
- several manufacturers/suppliers
- major activity centers, like airports, have become an important application for AGT
- APM – Automated People Mover
- DPM – Downtown People Mover
- PRT – Personal Rapid Transit
Automated People Mover (APM)
Downtown People Mover (DPM)

- AGT system operating in the downtown area
- several research initiatives in the 1980s
- three systems built
  - Jacksonville
  - Miami
  - Detroit
Detroit DPM
Personal Rapid Transit (PRT)
Automated Rapid Transit
(Vancouver Skytrain)
Reference Books


Reference Materials

• Web Sites:
  • US DOT Federal Railroad Administration
    www.fra.dot.gov
  • US DOT Federal Transit Administration
    www.fta.dot.gov
  • American Public Transportation Association
    www.apta.com
    Public Transportation Fact Book
The End
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