Transit Technologies Worksheet

A Review of Transit Technology Specifications

1. Heavy Rail Transit
2. Commuter Rail Transit
3. Light Rail Transit
4. Modern Streetcar
5. Heritage Trolley
6. Dedicated Lane BRT
7. Express Bus

Photo credits from left to right:
1. answers.com
2. newrecruit.com
3. lightrail.com
4. APTA Heritagetrolley.org
5. APTA Heritagetrolley.org
6. sfcta.org
7. thetransitcoalition.us
8. infilldenver.com
Definition:
The term heavy rail refers to a mode of transportation that is defined less by its vehicle weight than by its complexity and operational rigidity. Heavy rail systems typically consist of steel-wheeled, electric powered vehicles operating in trains of two or more cars on a fully grade-separated right-of-way. (FTA)

Example Cities:
- Washington DC (Metro)
- San Francisco (BART)
- New York (MTA)
- Boston (MBTA)
- Chicago (CTA)

Projected Costs per Mile
$50-$250 Million

High System Cost:
$558 Million (Estimated)
San Francisco Central Subway

Low System Costs:
$73.12 Million (Estimated)
Chicago Blue Line Rebuild

Service Type:
Regional, Urban

Operating Speed:
50-80 MPH

Station Type:
Station, Platform

Distance Between Stations:
Urban Core >1 mile
Periphery 1-5 miles

Service Frequency:
5-10 Minutes (Peak)

Alignment:
Separate Right of Way

Right of Way Width:
25-33 Feet

Turning Radius:
330 Feet

Vehicle Length:
40-70 Feet per car
Up to 10 car trains

Typical Power Source:
Electric

FRA Compliant: (Able to run on tracks with freight trains)
No

Photo: New York City Subway
From: Answers.com
**Commuter Rail Transit**

**Definition:**
Commuter Rail is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs.

**Example Cities:**
- Boston (MBTA)
- New Jersey (NJT)
- New York (Long Island RR)
- Dallas – Fort Worth (TRE)
- San Jose – San Francisco (CalTrain)

**Projected Costs per Mile**
$3-$25 Million*

**High System Cost:**
$16.57 (Estimated)
Chicago Southwest Corridor Commuter Rail

**Low System Costs:**
$1.2 Million
Nashville

**Service Type:**
Regional, Intraurban

**Operating Speed:**
30-60 MPH

**Station Type:**
Station, Platform

**Distance Between Stations:**
2-5 Miles

**Service Frequency:**
20-30 Minutes

**Alignment:**
Generally built on existing tracks at grade street crossings

**Right of Way Width:**
37+ Feet

**Turning Radius:**
140-460 Feet

**Vehicle Length:**
150-500 Feet
Engine and Coaches

**Typical Power Source:**
Diesel

**FRA Compliant:**
Yes

Photo: Caltrain, San Francisco Peninsula
From: newrecruit.com
Stephen DesRoches
**Light Rail Transit**

**Definition:**
The term light rail refers more to this mode’s relative simplicity and operational flexibility than to actual vehicle weight or cost. With an overhead power supply, light rail systems can operate in mixed traffic and widely ranging alignment configurations. (FTA)

**Example Cities:**
Denver  
Minneapolis  
Dallas  
Houston  
Salt Lake City

**Projected Costs per Mile**
$20-$60 Million ($56)^

**High System Cost:**
$65 Million  

**Low System Costs:**
$34 Million  
Houston (2004)

**Service Type:**
Regional, Urban

**Operating Speed:**
20-60 MPH

**Station Type:**
Sidewalk Sign, Station, Platform

**Distance Between Stations:**
~1 Mile

**Service Frequency:**
5-30 Minutes

**Alignment:**
Aligned center or side of street corridor on separate right of way

**Right of Way Width:**
19-33 Feet (Double Track)  
11-13 Feet (Single Track)

**Turning Radius:**
50-100 Feet

**Vehicle Length:**
50-80 Feet per car and up to 4 car trains

**Typical Power Source:**
Electric

**FRA Compliant:**
No

^ This includes estimates and figures for Complete Systems in Final Design, Under Construction, or completed after 2003 that do not include tunneling <http://www.lightrail.com/LRTSystems.htm>

**Photo:** Hudson Bergen LRT  
From: transitpicsgallery.com
**Modern Streetcar**

**Definition:**
The U.S. term streetcar is generic to most forms of common carrier rail transit that runs or has run on streets, providing a local service and picking up and discharging passengers at any street corner, unless otherwise marked.

**Example Cities:**
- Portland
- Seattle (Design Phase)
- Washington DC (Under Construction)

**Projected Costs per Mile**
- $10-$25 Million

**High System Cost:**
- $23.7 Million
- Portland

**Low System Costs:**
- *

**Service Type:**
- Urban Circulator

**Operating Speed:**
- 8-12 MPH

**Station Type:**
- Sidewalk Sign, Station, Platform

**Distance Between Stations:**
- 0.25 Miles

**Service Frequency:**
- 8-15 Minutes

**Alignment:**
- In Street with traffic, no grade separation

**Right of Way Width:**
- 19-24 (Double Track)
- 11-13 (Single Track)

**Turning Radius:**
- 40-80 Feet

**Vehicle Length:**
- 35-60 Feet

**Typical Power Source:**
- Electric

**FRA Compliant:**
- No

* Modern Streetcar and Light Rail systems are often lumped in with road and utility reconstruction increasing the costs. Low cost systems are viable however there are no examples at the moment.

Photo: Portland Streetcar
From: railwaypreservation.com
**Definition:**
The terms Heritage Trolley and Vintage Trolley are used to describe modern use of trolleys of a design dating from roughly 1900 to 1950. The terms can be used to refer either to a replica car that more or less accurately reproduces a trolley from the first half of the 20th century, or to an original preserved car restored to accurate or nearly accurate standards. (APTA)

**Example Cities:**
New Orleans
Memphis
Little Rock
Kenosha
Galveston

**Projected Costs per Mile**
$2-$12 Million

**High System Cost:**
$12 Million
Charlotte

**Low System Costs:**
$2.5 Million
Kenosha, Wi

**Service Type:**
Urban Circulator

**Operating Speed:**
8-12 MPH

**Station Type:**
Sidewalk Sign, Station, Platform

**Distance Between Stations:**
0.25 Miles

**Service Frequency:**
8-15 Minutes

**Alignment:**
In Street with traffic, no grade separation

**Right of Way Width:**
19-24 (Double Track)
11-13 (Single Track)

**Turning Radius:**
40-50 Feet

**Vehicle Length:**
35-50 Feet

**Typical Power Source:**
Electric

**FRA Compliant:**
No

Photo: San Francisco F Line
From: APTA Heritagetrolley.org
**Dedicated Lane BRT**

**Definition:**
Bus rapid transit (BRT) is a relatively new umbrella term for urban mass transportation services utilizing buses to perform premium services on existing roadways or dedicated rights-of-way.

**Example Cities:**
- Boston
- Pittsburgh
- Cleveland
- Eugene

**Projected Costs per Mile**
- $4-$40 Million

**High System Cost:**
- $55 Million
- Pittsburgh West Busway

**Low System Costs:**
- $6.25 Million
- Los Angeles San Bernadino Freeway HOV Busway

**Service Type:**
- Regional, Urban

**Operating Speed:**
- 8-12 MPH

**Station Type:**
- Sidewalk Sign, Station, Platform

**Distance Between Stations:**
- 0.25-2 Miles

**Service Frequency:**
- 8-20 Minutes

**Alignment:**
- HOV lanes or separated right of way in median or on curb

**Right of Way Width:**
- 12 (Pittsburg Single)
- 28 (Pittsburg Double)

**Turning Radius:**
- 40-70 Feet

**Vehicle Length:**
- 30 -50 Feet

**Typical Power Source:**
- Diesel, Electric

**FRA Compliant:**
- N/A

Photo: Proposed Van Ness BRT
From: sfcta.org
**Definition:**
An Express bus is a bus service that is intended to run faster than normal bus lines. These buses usually run between the downtown sections of cities and the more residential Suburbs or Outer Boroughs.

**Example Cities:**
Any City with a Bus System

**Projected Costs per Mile**
$1-$2 Million

**Service Type:**
Regional, Urban

**Operating Speed:**
15-19 MPH

**Station Type:**
Sidewalk Sign, Platform

**Distance Between Stations:**
Limited stops along normal bus routes

**Service Frequency:**
10-20 Minutes

**Alignment:**
In Street with traffic

**Right of Way Width:**
Street Width

**Turning Radius:**
33-46 Feet

**Vehicle Length:**
30-50 Feet

**Typical Power Source:**
Diesel

**FRA Compliant:**
N/A

Photo: Maple Grove Minnesota Express Bus
From: www.ci.maple-grove.mn.us/administration/transit
Data Sources:

APTA HeritageTrolley.org
TCRP 90 - Bus Rapid Transit
Lightrail.com
DART Technology Review Report
‘Future Transport in Cities’
  - Brian Richards
‘Urban Public Transportation - Systems and Technology’
  - Vukan R. Vuchic