

Modern Streetcar Study Transit Technology Comparison



Presented to the
Modern Streetcar Study Committee

By the
Planning and Development Department

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Heavy Rail

Characteristics

Multiple unit married pairs or triples operating over exclusive subway, elevated, or at-grade right-of-way with no at-grade street crossings

Service Type

Regional/Urban

Typical Power Source

Electric with third rail, usually 750 to 1000 volts DC

Stations and Typical Spacing

High level platforms with station structure. Station spacing of 1 to 3 miles.

Peak Service Frequency

3-10 minutes

Maximum Operating Speed

80 mph

Typical Operating Speed

30-80 mph

Route Length

10 to 30 miles

Maximum Grade

4 to 6 percent

Cars or Units per Train (Consist)

2 to 10

Seated Capacity per Car or Unit

60 to 80 seated, 120 to 150 with standees

Capital Cost per Mile (excluding right of way)

\$50 -250 million

Capital Cost per Vehicle

\$2-5 million

Vehicle Life Expectancy

25 to 30 years

Availability

In production

Example Cities

New York, Chicago, Washington, D.C. Atlanta, San Francisco



Commuter Rail

Characteristics

Diesel locomotive pulled, or pushed and pulled, single- or bi-level cars, or electric or diesel multiple unit cars operating on railroad track

Service Type

Regional/Interurban

Typical Power Source

Diesel-electric or electric with overhead catenary

Stations and Typical Spacing

Low or high level platforms with or without shelter or station structure. Spacing of 3 to 5 miles

Peak Service Frequency

20-30 minutes

Maximum Operating Speed

80-90 mph

Typical Operating Speed

30-80 mph

Route Length

20 to 100 miles

Maximum Grade

3 to 4 percent

Cars or Units per Train (Consist)

3 to 12

Seated Capacity per Car or Unit

80 to 170

Capital Cost per Mile (excluding right of way)

\$5-25 million

Capital Cost per Vehicle

\$1-3 million

Vehicle Life Expectancy

25 to 30 years

Availability

In production

Example Cities

Dallas-Fort Worth, Chicago, Nashville, Albuquerque, Los Angeles



Light Rail

Characteristics

Articulated multiple unit cars operating on city streets, at-grade, elevated, or subway alignments

Service Type

Regional/Urban

Typical Power Source

Electric with overhead catenary wire. Usually 600 to 750 volts DC

Stations and Typical Spacing

Low or high-level platforms with or without shelter or station structure. Spacing of ½ to 2 miles

Peak Service Frequency

5-30 minutes

Maximum Operating Speed

55-65 mph

Typical Operating Speed

20-60 mph

Route Length

8 to 25 miles

Maximum Grade

7 percent

Cars or Units per Train (Consist)

1 to 4

Seated Capacity per Car or Unit

32 to 100,
200 with standees

Capital Cost per Mile (excluding right of way)

\$30-70 million

Capital Cost per Vehicle

\$2-5 million

Vehicle Life Expectancy

25 to 30 years

Availability

In production

Example Cities

Dallas, Denver,
Minneapolis, Charlotte,
Phoenix, Houston



Modern Streetcar

Characteristics

Articulated car operating in shared or reserved street lanes, or on dedicated right-of-way.

Service Type

Urban Circulator

Typical Power Source

Overhead Electric Trolley Wire, 600 or 750 volts DC

Stations and Typical Spacing

Level boarding from sidewalk or low platform; sign and/or shelter
2-4 blocks

Peak Service Frequency

8-15 minutes

Maximum Operating Speed

45 mph

Typical Operating Speed

6-12 mph

Route Length

1-8 miles

Maximum Grade

9 percent

Cars or Units per Train (Consist)

1 (US) 1-4 (EU)

Seated Capacity per Car or Unit

29 seated,
115 with standees

Capital Cost per Mile (excluding right of way)

\$20-40 million

Capital Cost per Vehicle

\$2-3.5 million

Vehicle Life Expectancy

25-30 years

Availability

Multiple manufacturers in Europe, beginning production in Oregon

Example Cities

Portland, Seattle, Tacoma



Heritage Streetcar

Characteristics

Non-articulated, high floor single car operating in shared or reserved street lanes, or on dedicated right-of-way.

Service Type

Urban Circulator

Typical Power Source

Overhead Electric Trolley Wire, usually 600 volts DC

Stations and Typical Spacing

Boarding from sidewalk or high platform; sign and/or shelter
2-4 blocks

Peak Service Frequency

8-15 minutes

Maximum Operating Speed

30 mph

Typical Operating Speed

6-12 mph

Route Length

1-7 miles

Maximum Grade

9 percent

Cars or Units per Train (Consist)

1

Seated Capacity per Car or Unit

Varies, 30-45 seats,
70-100 with standees

Capital Cost per Mile (excluding right of way)

\$5-20 million

Capital Cost per Vehicle

\$100 thousand to \$1 million

Vehicle Life Expectancy

Varies

Availability

Vintage streetcars available through restoration, replica streetcars available from US manufacturers

Example Cities

New Orleans, Memphis, Kenosha, Tampa, Little Rock, San Francisco, Charlotte



Bus Rapid Transit

Characteristics

Street bus, articulated bus, or trolley bus operating on an exclusive at-grade, subway, or elevated guideway

Service Type

Regional/Urban

Typical Power Source

Diesel, alternative fuel, or overhead electric trolley wire

Stations and Typical Spacing

Low level with platform area and shelter or building. Spacing of several blocks to several miles

Peak Service Frequency

3-30 minutes

Maximum Operating Speed

65 mph

Typical Operating Speed

8-60

Route Length

2 to 40 miles

Maximum Grade

10 to 13 percent

Cars or Units per Train (Consist)

1 (vehicles cannot be coupled)

Seated Capacity per Car or Unit

44 for street bus
62 for articulated bus

Capital Cost per Mile (excluding right of way)

\$2-25 million

Capital Cost per Vehicle

\$0.3 – 0.7 million

Vehicle Life Expectancy

9 to 12 years

Availability

In production

Example Cities

Los Angeles, Pittsburgh, New York, Eugene



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