

Definition of Heavy Rail (Rapid Rail Transit or Metro), Light Metro and Light Rail Transit Systems as distinct Fixed Guideway Transit Modes

There has been a tendency in some circles – sometimes amongst amateurs; sometimes by manufacturers for commercial purposes; sometimes by advocates or public bodies to promote a specific project without revealing what it really is about – to use the term “Light Rail,” without defining precisely what these terms mean. The following terminology distinctions between the Heavy Rail, Light Metro, Light Rail Transit modes, all forms of Fixed Guideway Transit Systems, have been defined by organizations and engineers with national and international repute:

- Heavy Rail (Rapid Rail Transit)

The American Public Transportation Association (APTA) defines heavy rail as follows:

Heavy rail (metro, subway, rapid transit, or rapid rail) is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails; separate rights-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling, and high platform loading. If the service were converted to full automation with no on-board personnel, the service would be considered an automated guideway.

The Transportation Research Board (TRB) defines Heavy Metro as follows:

Heavy Metro: A transit mode that operates on a fully grade separated (separated from street level) ‘rights-of-ways.’ Unlike generic LRT, many metros, including monorail, are proprietary transit systems and cannot share their ROW with other transit modes including other metros!

- Light Metro

The Transportation Research Board (TRB) defines light metro as follows:

Light Metro: A transit mode that operates on a fully grade separated (separated from street level) ‘rights-of-ways.’ Unlike generic LRT, many metros, including monorail, are proprietary transit systems and cannot share their ROW with other transit modes including other metros!

Light rail [systems] that operate on grade separated ROWs are more commonly referred to as Light Metros.

The American Public Transportation Association (APTA) defines light metro as follows:

Automated guideway transit (personal rapid transit, group rapid transit, people mover) is an electric railway (single or multi-car trains) of guided transit vehicles

operating without an onboard crew. Service may be on a fixed schedule or in response to a passenger activated call button. The places with automated guideways are Detroit, MI, Indianapolis, IN, Jacksonville, FL, Las Colinas, TX,

Miami, FL, and Morgantown, WV. Automated guideways in non-transit settings such as airports and hospital campuses are more common.

- Light Rail Transit

The Transportation Research Board (TRB) defines light rail transit as follows:

Light Rail Transit (LRT, also called trams or trolleys) systems provide convenient local public transit service on busy urban corridors, connecting major destinations such as central business districts, medical centers, campuses and entertainment centers. LRT vehicles tend to have relatively smooth and comfortable operation, easy boarding, attractive station areas, and easy-to-understand routes and schedules. Many rail systems have quick loading and Transit Priority features (grade separation and traffic signal preemption) to maximize travel speeds and minimize congestion delay. They are often supported with convenient user information (many city maps show rail transit routes and stations) and other Transit Encouragement strategies to increase ridership.

There is some confusion about the definitions of different types of urban rail services. It is not vehicle that defines the transit mode, but the quality of rights-of-way (ROW).

The Transportation Research Board (TRB) Light Rail Committee offers these definitions:

Streetcar: A steel wheel on rail transit mode, operating on-street, sharing the pavement with other vehicles, with little or no priority signaling at intersections.

Light Rail Transit: A streetcar system that has extensive priority signaling at intersections and at least 30% of its route operating on 'reserved rights-of-ways.' LRT may be grade separated but must retain the ability to operate in mixed traffic. Light rail systems that operate on grade separated ROWs [rights-of-way] are more commonly referred to as Light Metros.

Russell E. Jackson, Consulting Engineer, an expert in railway technology and systems integration, defines light rail transit as:

Light Rail Transit is a form of public transportation developed to serve urban and suburban portions of metropolitan areas that uses passenger-carrying vehicles equipped with flanged wheels guided by steel rails and which can operate safely in mixed traffic lanes of public roadways at the speed limits posted for motor vehicle

traffic, as well as on private rights-of-way of all types (underground, elevated or surface alignments, the latter either with level crossings of intersecting streets for motor vehicle and/or pedestrian traffic, including pedestrian malls or precincts, or on exclusive rights-of-way).

It follows from the above that a public transport mode using vehicles (whether electrically-powered or fossil-fuel powered) that can operate safely in all of the alignment possibilities described above is a light rail transit line or system. In contrast, a fixed guideway technology that cannot co-exist safely in mixed traffic lanes with motor vehicles while operating at the posted speed limits or with pedestrians under controlled circumstances is not light rail transit but another public transport mode even if it uses the same or similar guidance technology.

The American Public Transportation Association (APTA) defines light rail as follows:

Light rail (streetcar, tramway, or trolley) is lightweight passenger rail cars operating singly (or in short, usually two-car, trains) on fixed rails in right-of-way that is not separated from other traffic for much of the way. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line via a trolley or a pantograph.

The International Association of Public Transport (UITP) offers the following information concerning light rail transit:

What is light rail? Light rail transit (LRT) is an electric rail-borne form of transport which can be developed in stages from a tramway to a rapid transit system operated partially on its own right-of-way.

The general term 'light transit' covers those systems whose role and performance lie between a conventional bus service running on the highway at one extreme and an urban heavy rail or underground metropolitan railway at the other. Light rail systems are thus flexible and expandable.

Developments and trends Trams started in the second half of the 19th century as horse-driven carts. With the advent of electricity, tramways became very popular and virtually every city in the Western world (and some in the colonies) had tram systems. After World War II, trams were removed from many cities, as city planners dreamt of automobile-oriented cities.

Some however, realizing that they could not afford a genuine metro system, decided to keep their trams and modernize them. The major element of this strategy was to free the vehicles from congestion. **The compromise principle of the founding fathers was “to get 80% of the performance attributes of metro for**

20% of its costs”.

These pioneering cities were so successful in improving the quality of service and the image of the system at affordable costs that they triggered an unprecedented wave of interest and emulation.

Over the last 20 years, many cities on all continents have (re)-introduced urban rail systems with some level of street running, especially since the advent of low-floor technology in the 1990s, allowing easy use without requiring high platforms.

Other key innovations include:

- Modularity
- Diversification of power supply: on-board energy storage, ground current collection

Light rail in figures Today, there are some 400 systems in operation worldwide, with constructions [underway] in some 60 more and plans in well above 200.

Europe is the densest LRT continent with 170 systems in operation and nearly 100 more in construction or planning, but North America (30 in operation, 10 in construction) and Asia are also very active in opening new systems.

The next emerging LRT region is the Middle East where the post-oil age is being actively anticipated.