

Roadway.

The elevated structure was designed and built under the direction of Mr. George A. Kimball, Chief Engineer, being completed in the summer of 1901. Road opened to traffic June 10, 1901. Was a little over two years in building and cost approximately \$400,000 per mile outside of stations.

The Subway was built and is owned by the City of Boston, being built under the direction of the Boston Transit Commission. First surface car was run into subway and completed on Saturday, September 1, 1897. Subway used by elevated trains is 1.33 miles long and cost approximately \$1,000,000 per mile exclusive of stations. Length of track in subway is 2.66 miles.

Distance from Sullivan Sq. to Dudley St. via Atlantic Ave. 5.4 miles; via subway 5.2 miles.

Longest distance between stations 1.06 miles or 5605 ft. (Sullivan Sq. to Thompson Sq.)

Shortest distance between stations .189 miles or 988 ft. (State St. to Rowe's Wharf.)

Length of track—main line	6.644 miles.
“ “ “—second track	6.468 “
“ “ “—sidings, etc.	2.903 “
	Total 16,015 miles

Lowest point of running rail on structure is 20 feet above level of street. (Dudley St.)

Highest point of running rail on structure is 39 feet 6 inches above level of street. (Main and Bunker Hill Sts.)

On the structure, tracks are laid 24 ft. apart on centres except in Charlestown and a portion of the Roxbury section, where they are 12 ft. apart.

Inside wooden guard is four inches from gauge side of running rail.

Outside wooden guard is 10½ inches from gauge side of running rail.

Centre of third rail is 1½ in. from centre of running rail.

The elevated structure crosses Charles River over a swinging drawbridge 240 ft. long and 100 ft. wide, with rim bearing turn-table 54 ft. in diameter. Weighs about 1200 tons. Draw is opened at eight stated times daily if there is anything to go through—average opening seven minutes. Not opened during morning or evening rush hours.

Running rail is standard A. S. C. E. section, 85 lbs. per yard. Third rail the same, with exceptions in subway station pits, where a special rail is used.

Guard rail, Pennsylvania R. R. section, 100 pounds per yard.

Ties are hard pine on structure and chestnut in the subway—laid 16 inches on centres on structure.

Rail lies on Goldie tie plates and is fastened by Goldie spikes having the N. Y. C. head.

There is one down grade of 8 per cent. and two up and two down of 5 per cent.

Eighteen curves of less than 100 ft. radius and 16 others of less than 150 ft.

Longest radius is about 5000 ft. (Washington and Brookline Sts.)

Shortest radius is 82 ft. (Entering Park St. Station south-bound.)

Ordinary commercial steel rail wore out on above named Park St. curve in 44 days.

Manganese steel has been used on this and other sharp curves to the amount of 475 ft. with good results.

On the average 3000 ft. of rail is renewed each month. About 50 per cent. of rail renewals are occasioned by wavy rail.

In making a round trip from Sullivan Sq. to Sullivan Sq., via the subway, a train makes the equivalent of 9.43 complete circuits.

Trains are protected by the Union Switch & Signal Co.'s electro-pneumatic block signal system with direct current track circuit. Longest block is 1994 ft. and shortest block is 297 ft.

Five electric interlocking towers and two mechanical towers.

Two hundred and two signals and fifty-five switches comprised in the system.

Maintained by eleven signalmen and a like number of interlocking men—at least one of each being stationed at the four principal towers during all hours of operation.

Two complete telegraph lines and one telephone cable extend the entire length of the system, connecting all stations, towers, etc. Telephone switch board is located in Train Dispatcher's office at Sullivan Sq.

Operation.

Trains are run from terminal to terminal via the subway, from each terminal into the subway and return via Atlantic Ave., and from each terminal onto Atlantic Ave. and return via the subway. This arrangement of routes permits of reaching any station on the system direct from any other station.

Shortest headway between trains from terminals is three trains in six minutes, or a train every two minutes. Ten trains pass Towers C and D every six minutes during the shortest headway. During rush hours thirty, five-car trains

are in service at a time without causing delays at terminals or junctions. Trains consist of three cars during light hours, and four and five cars during heavy hours, the rear car always being reserved for smokers. The average daily car mileage is 20,900.

Free bodily transfer is made at Sullivan Sq. terminal to mileage in all other cities and towns, at Dudley St., surface cars for five different cities and towns, at Dudley St., north and south, and at Park St., south-bound, or Boylston St., north for two, and at Park St., north-bound, or Boylston St., south-bound, for seven; thus a population of approximately one million is served, aside from the numerous suburbs connecting inter-urban lines, connecting practically the whole of the State of Massachusetts. At each of the twenty-two stations free transfer is made to and from surface cars.

An average of over 115,000 passengers are handled at each terminal every day, and about 60,000 each at Boylston St. and Park St. stations. During the evening rush hour an average of over 9,500 passengers per hour arrive at each terminal by train. Twenty-six thousand passengers have been admitted at an island station in one day, the station being attended by two ticket sellers and two ticket choppers at a time.

Station stops average twelve seconds on the structure and twenty in the subway.

The division is in charge of a Superintendent and is divided into three departments, Train Service, Road Dept. and Repair Shops. The supervision of train service is in charge of a Train Master, three Train Dispatchers and two District Supervisors; maintenance of track, structure, signals, and buildings in charge of a Road Master, and repair and equipment of cars in charge of a General Foreman of Shops.

About 625 men are required to man the trains, stations, towers, yards, etc.; 100 in Road Dept., and 150 in repair shops, making a total of about 875 men employed in all departments.

Motormen are paid 25 cts. per hour for the first year, 24 cts. per hour for second year, and 25 cts. per hour thereafter; guards, 21 cts. per hour; brakemen 18½ cts. per hour, and Station Masters, \$2.35 per day.

Work is laid out on the basis of ten hours' work in twelve hours. Increased compensation of five cts. per day for each service stripe worn up to and including three. Stripes are given for each five years' continuous service.

All applicants for employment are examined for defective color perception, vision and hearing, and about 10 per cent are rejected; 6 per cent. for defective vision and four per cent for color blindness. All motormen, guards, brakemen, and towmen are yearly subjected to re-examination.

Car Equipment.

174 passenger cars.	Passenger car bodies built by	
1 wrecking car.	Wason Manufacturing Co.	53
1 construction car.	St. Louis Car Co.	99
1 tool car.	Osgood Bradley Car Co.	22
3 flat cars.		

180 Total number of cars.