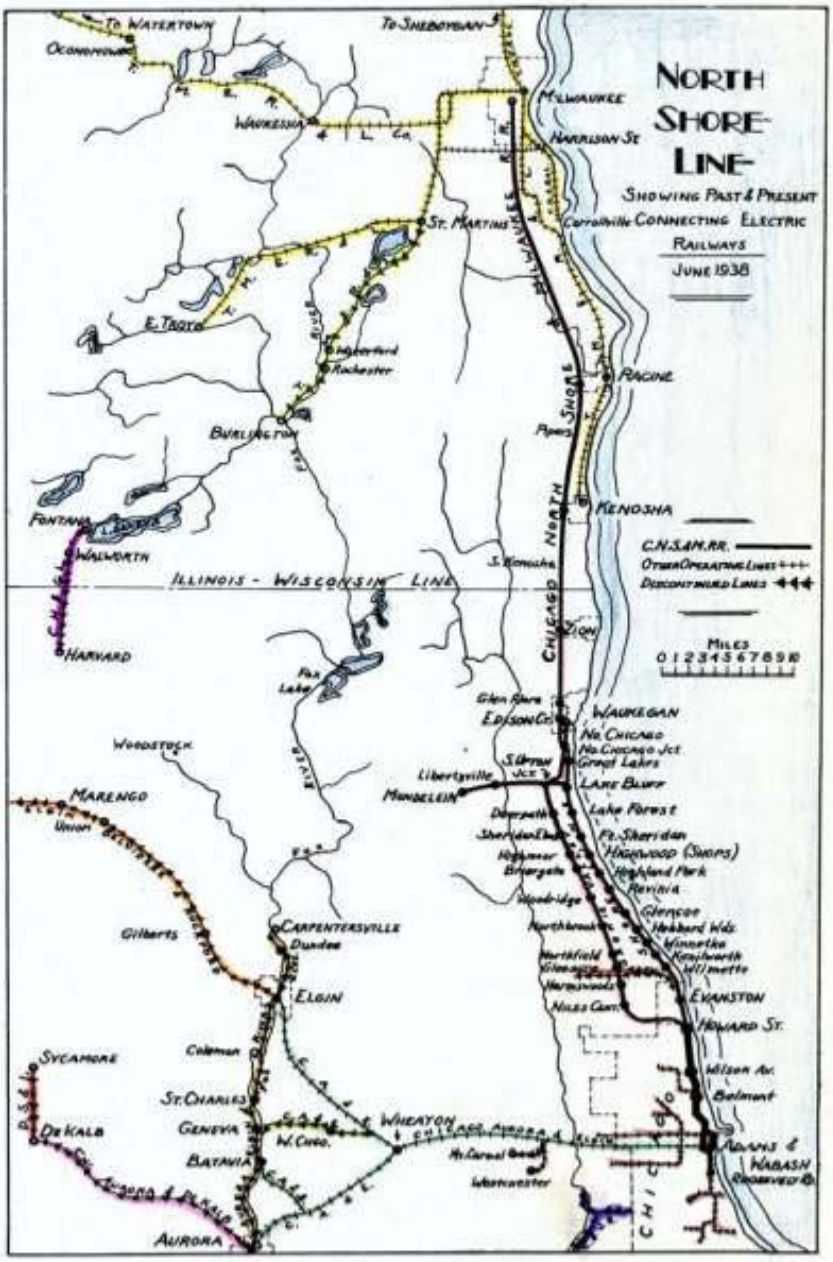
NORTH SHORE LINE

¶ System

¶ Operation



PREPARED BY

CENTRAL ELECTRIC RAILFANS' ASSOCIATION

CHICAGO, ILLINOIS

NOVEMBER 1938

Bulletin Number One of the Central Electric Railfans' Association
(Division of the national Electric Railroaders' Association, N.Y.)
Duplicate copies may be secured at 10¢ each by addressing the club
at 1240 Edison Building, Chicago

NORTH SHORE LINE

CHICAGO NORTH SHORE & MILWAUKEE RAILROAD
A GUIDE TO ITS SYSTEM AND OPERATION

Edited by George Krambles

HISTORICAL: The North Shore Line operates the newest railroad connecting Chicago with Milwaukee, 89 miles to the north, and the intermediate cities of Evanston, Waukegan, Kenosha and Racine. It began as a short street railway in 1894, and was completed for thru operation in 1908. Continual growth of traffic required the construction of the Skokie Valley cut-off, an ideal high speed line skirting the densely populated shore of Lake Michigan, and this was set in operation in 1926, having been built in 10 months. Street railway transit service is still given by the North Shore Line in Milwaukee and Waukegan, and bus lines supplement cars in Waukegan, but the bulk of traffic is now handled on the interurban lines.

TRAIN OPERATION: The train service is of three principal types, and these are earmarked for the information of employees by the train numbers. Trains in the 400 series are limited trains running between Chicago and Milwaukee over the Skokie Valley Route (see Diagram 1), and generally average about 42 m.p.h. between terminals, although trains 407 and 421 north and 420 and 432 south are even faster. It is the 400 class trains which have earned for the North Shore Line the record as America's fastest interurban railroad, and also the record among all railroads for the greatest number of trains averaging over 60 m.p.h. between stations.

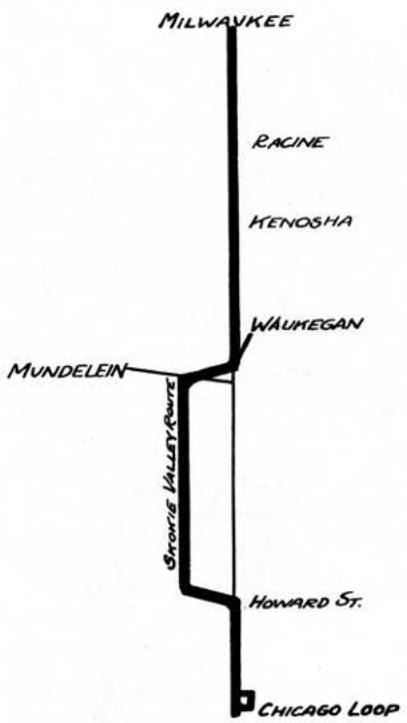


DIAGRAM 1.
Route of the 400s.

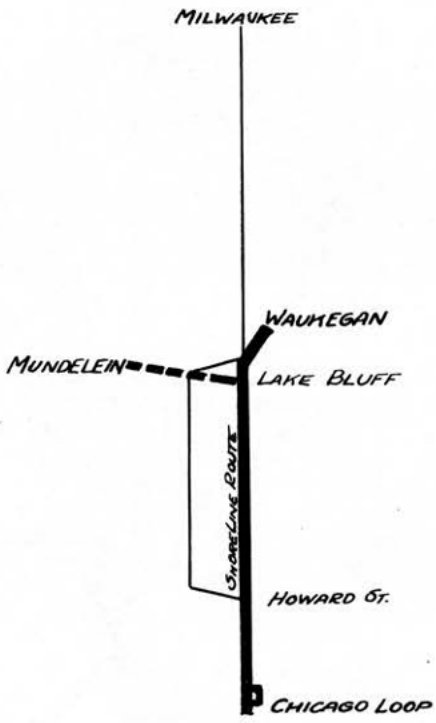


DIAGRAM 2.
Route of the 500s.

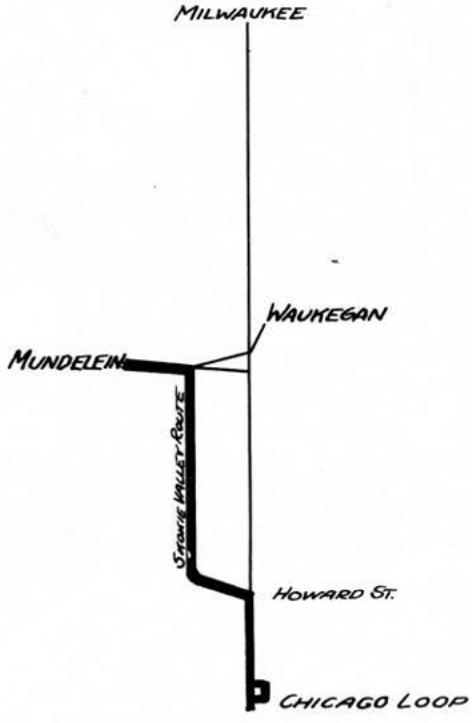


DIAGRAM 3.
Route of the 700s.

Trains of the 500 class furnish the essential suburban service to the solidly residential shore line stretching from Chicago to Waukegan, and this route is appropriately called the Shore Line Route. At Lake Bluff shuttle cars connect with certain 500 class trains to connect Shore Line stations with Libertyville and Mundelein. (See Diagram 2.)

Mundelein and Libertyville also have direct service to Chicago via the Skokie Valley Route (see Diagram 3) with the 700 class trains, which also serve the communities that have sprung up along the Skokie Valley. Several other classes of passenger trains provide special types of services required by local conditions.

NORTH SHORE LINE

An important phase of North Shore Line service is provided by Merchandise Despatch trains, which handle less-than-carload freight and highway trailers loaded on flat cars on fast schedules between Montrose Avenue, Chicago, and all points on the North Shore Line. These trains are hauled by motorized baggage type cars. Carload freight in long trains is handled with electric locomotives, two or three of which can be run multiple unit (operating simultaneously from a single operator's control position), and two engines are equipped with storage batteries which enable them to run into industrial sidings where local conditions do not permit installation of trolley wire.

EQUIPMENT: Steel cars only are used in passenger trains, and they are all essentially alike, except that those used on the Shore Line Route are better suited for expedient handling of commuter traffic, while the equipment of 400 class trains is fitted out in the deluxe style designed to make a pleasure of the high speed thru ride. Keeping pace with the newest trends in speedstyling, a few "Greenliners" are now on the road. These cars are finished in streamline tones, and will be found on the dining car trains, which thread their way over the road three times daily each way.

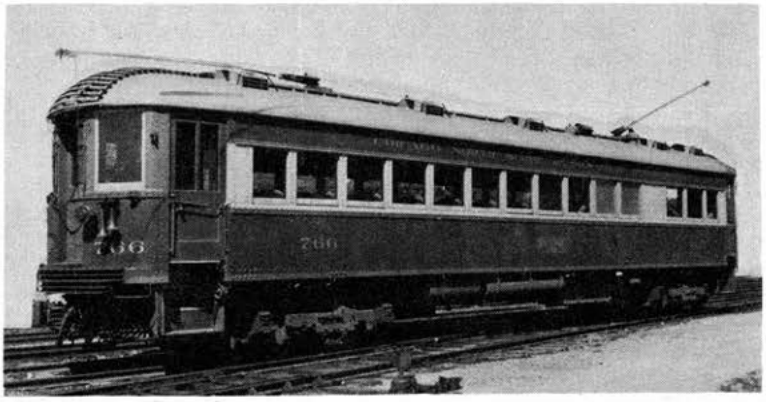


PHOTO BY: JOHN F. HUNISTON, BERWYN

North Shore Line motor cars weigh 52 tons, are 55'-3" long and 8'-8" wide, have four Westinghouse 557-field tap motors of 150 h.p. each; the high speed cars are geared 52/25, and at a normal line voltage of 650 these motors will balance train resistance at a car speed of about 75 m.p.h. The control used is type HLF electropneumatic, using 12 line wires in the train line. The air brake system is type AMU, automatic (only), using type U-4 universal valves and M-23 engineer's valves, with automatic slack adjusters provided to take up the wear on brake shoes as rapidly as it may occur. Car heating is by a combination of hot-water and electric heating, which provides a flexible arrangement for various degrees of heat needed during different seasons.

An important North Shore Line contribution to passenger comfort is the development of the cylindrical wheel tread to replace the former conical tread. Extensive experiments conducted by North Shore Line engineers showed that this change of wheel contour resulted in practical elimination of the rapid nosing motion common in trucks of high speed electric cars before this discovery. This change, plus rigid adherence to regular inspection and overhaul schedules on car equipment and the well-maintained 100 lb. rail of the main line, gives North Shore Line trains riding quality as smooth as given by the heaviest steam road equipment.

Current is collected in the Chicago terminal area by means of third rail shoes. This shoe is a casting suspended by links from a bracket mounted on a wooden third rail beam, which is supported from the spring seat castings on the trucks. Electrical connection is by means of a pigtail shunt joining the shoe with the trolley feed. On its own tracks the North Shore Line makes use of the familiar trolley pole with sliding contact shoe in place of the old fashioned wire wearing wheel.

Each motor car must collect its own propulsion energy, but a small bus jumper is available, and is used to supply lighting and heating energy to trailers, which have no collectors.

TRACK FACILITIES AND ROADWAY: The North Shore Line enters Chicago by trackage rights over the Chicago Rapid Transit Company. This gives it the use of an elevated railroad into the heart of the city, bringing it closer to the business and residential centers than possible on any other railroad in Chicago. North Shore Line passengers also are able to reach most outlying sections of the city by means of convenient "L" trains.

The Chicago North Shore and Milwaukee Railroad proper begins on the Skokie Valley Route at Howard Street, the northern city limits of Chicago, heads west as an open cut subway, and then comes to the surface and heads north thru Niles Center, and thence over a route so free of curves as to enable an "on the peg" (controller wide-open) run for 16 miles, and a run averaging better than 60 m.p.h. for 20 miles. The Shore Line Route begins at the terminal of the Chicago Rapid Transit Company at Linden Avenue, Wilmette, and follows close to the shore of Lake Michigan thru the suburban towns, rejoining the high speed line at North Chicago Junction. The two lines diverge at once, however, the east line going to the business center of Waukegan, and the main line going along the west edge of town to the Edison Court station, and then to Milwaukee.

All lines are entirely double tracked, with the exception of about a mile of single track between Austin and Oklahoma Avenues in Milwaukee, which is on a high fill, and includes a bridge over the Milwaukee Road, and a gauntlet (overlap track) on a highway separation bridge at Glencoe on the Shore Line Route. Automatic block signals of the color light type give continuous rear end protection from Howard Street to a point just south of North Chicago Junction on the Skokie Valley Route, and from 22nd Street (just north of North Chicago Junction) to the State Line, and from Austin Avenue to Harrison Street. Double track and block signals help to make possible the high speed of North Shore Line trains with safety.

POWER SUPPLY AND DISTRIBUTION: Power is supplied to the trolley wire from substations operated in Illinois by the Public Service Company of Northern Illinois, and in Wisconsin by the Milwaukee Electric Company. These stations are spaced about 3 to 4 miles apart, and are generally equipped with rotary converters, although three stations have the latest type of mercury arc rectifiers transforming alternating to direct current. Control of these stations is in the hands of the power dispatcher at Highwood. The North Shore Line was a pioneer operator of automatic substations, and today most are of this type with supervisory control placing them under the direction of the power supervisor.

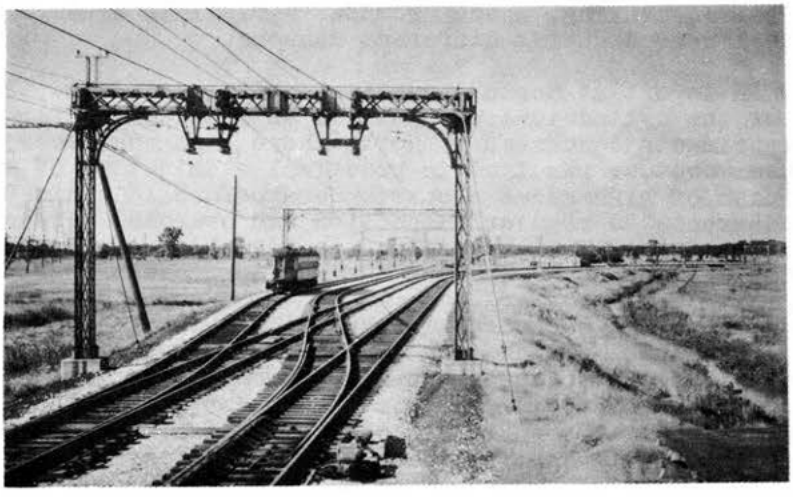


PHOTO: G. KRAMBLES, CHICAGO

NORTH SHORE LINE

On the Skokie Valley Line, the overhead is of the inclined catenary type. This is the most advanced but difficult to design style of overhead, and consists of a main messenger hanging between supporting bridges in a natural sag (or catenary), from which is suspended a secondary messenger hanging with a natural sag between the several messenger hangers in each span, and supporting in turn from closely spaced hangers the contact trolley wire. The frequent points of support make a flexible suspension, but hold the contact wire level and eliminate the hard spots found in simpler types of construction. On curves, this whole assembly is inclined in such a way as to keep the trolley wire near the center of the track, and the frequent hangers form the contact wire to the radius of the curve. This construction allows smooth high speed operation, and at the same time is attractive in appearance.

On the Shore Line Route, and on the main line north of North Chicago, direct suspension is used, in which the trolley wire is supported at intervals of 100 ft. from cross span wires hanging from wooden poles. 4/0 grooved trolley wire is standard.

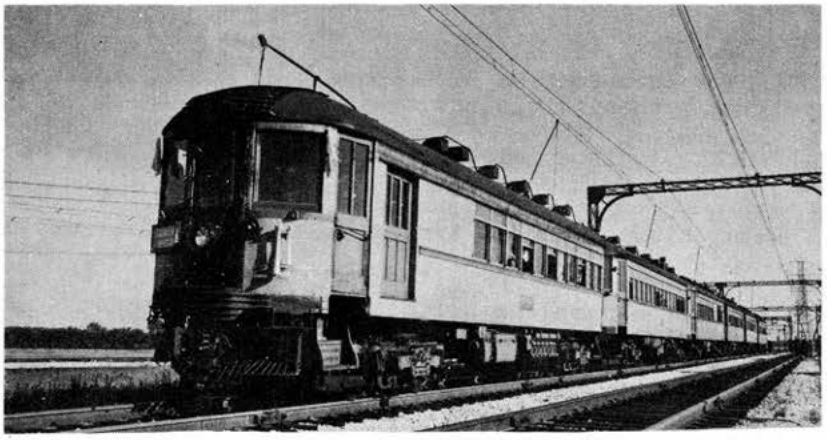


PHOTO: ROBT. V. MEHLENBECK, PEORIA.

NORTH SHORE LINE POINTS OF INTEREST

A GEOGRAPHICAL LIST OF THE CENTERS OF ACTIVITY IN THE OPERATION OF THE RAILROAD AS SEEN FROM A CAR WINDOW.

ROOSEVELT ROAD, CHICAGO - Southern terminal of the line, on the L structure. Cars lay up between runs on the center track; as many as 40 cars can be stored here.

ADAMS & WABASH - Main passenger station in Chicago, located on Chicago Loop. The Loop is noted as the scene of unusually busy railroad operation, a double track elevated line, with trains all operating in a counter-clockwise direction. All Rapid Transit as well as North Shore Line trains pass thru the Loop.

MONTROSE FREIGHT HOUSE - This is on the west side of the tracks after passing Sheridan Road "L" station, and is the railhead of North Shore Line freight service in Chicago. The loading platforms for rail-highway coordinated service, as well as connections with the C.M.St.P.&P. R.R. are here.

NORTH SIDE SHOPS - On the east side of the tracks opposite the Montrose Freight House. Although primarily a shop for elevated railway equipment, North Shore Line cars receive care here when needed. The equipment of dining car trains is stored here between trains, and the commissary is located at the Uptown Station nearby.

HOWARD STREET - Junction point at which Skokie Valley Route trains diverge to the west.

NORTH SHORE LINE

SKOKIE VALLEY ROUTE

DEMPSTER STREET, NILES CENTER - Terminal of Chicago Rapid Transit Niles Center suburban service, operating over North Shore Line tracks, and register point of Skokie Valley trains.

SKOKIE TOWER - High speed crossing with Chicago and North Western Railway line. Notice smoothness of crossing, effected by use of movable point frogs in which the rail ends at the crossovers move like switch points to close the gaps which usually cause pounding.

SOUTH UPTON JUNCTION - Intersection of Skokie Valley Line with Lake Bluff-Mundelein spur line. The track and overhead layout at this wye (see illustration) will prove of interest to the engineer.

LAKE BLUFF TO NORTH CHICAGO JUNCTION - The Chicago and North Western Railway is sandwiched between the Shore Line Route and the Skokie Valley Route, all double track, for 2.5 miles.

PETTIBONE YARD, NORTH CHICAGO JUNCTION - Freight car maintenance centers here, and freight trains are made up (reclassified) here. Spare electric locomotives are stored here between trips.

NORTH CHICAGO JUNCTION - Intersection with Shore Line Route, and transfer point for passengers travelling between divisions.

AUSTIN AVENUE, MILWAUKEE - Only single track stretch on road, protected by absolute block signals.

OKLAHOMA AVENUE - Resumption of double track; end of street railway city service in Milwaukee.

HARRISON STREET - Inspection shop for North Shore Line equipment, and storage yard. Also trailer loading station.

6TH & MICHIGAN - Milwaukee passenger and L. C. L. freight station, a short walk from the principal business intersections and connecting railroad stations of the Milwaukee Road and the Milwaukee Electric Lines.

SHORE LINE ROUTE

LINDEN AVENUE, WILMETTE - Chicago North Shore and Milwaukee Railroad diverges at Rapid Transit terminal.

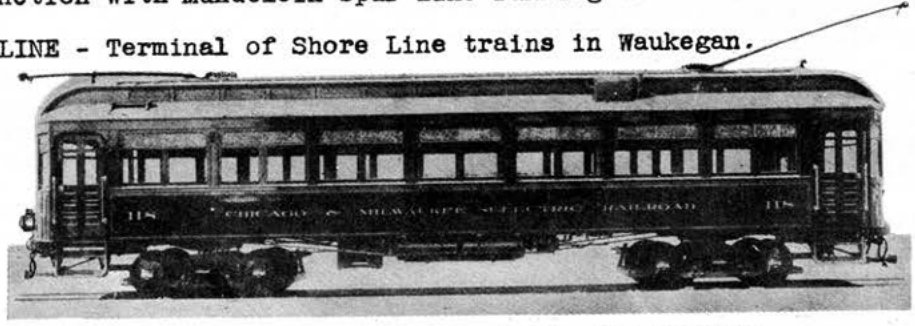
HIGHWOOD - Main offices and shops of the company. Maintenance and operation activity centers here, and certain surplus rolling stock is stored here between trips.

NORTH CHICAGO JUNCTION - With Skokie Valley Route.

GREAT LAKES - Southern terminal of Waukegan city service.

LAKE BLUFF - Junction with Mundelein spur line running to west.

WAUKEGAN, EAST LINE - Terminal of Shore Line trains in Waukegan.



QUEEN OF THE RAILS IN 1906, NOW RETIRED

ROSTER OF ROLLING STOCK

Numbers	Type of Car		Built	Builder
	EARLY EQUIPMENT NOW RETIRED (EXCEPT 20-22)			
1	Line Car	Motor	1903	
2	Rotary Plow	"	1899	
2	Sprinkler	Trail		
3	Passenger, made sweeper	Motor	1899	McGuire Cummings
4	Line Car	"		
5	Express	"	1902	Brill
6	Express	"	1902	"
7	Passenger, rebuilt to work	"	1898	St.Louis
8	Passenger	"	1898	"
9	Passenger	Trail	1899	Pullman
10	Passenger	Motor	1899	"
11	Semi-convertible combination	"	1902	Brill
12	Express	"	1902	"
13-17	Passenger, rebuilt to work	"	1900	Pullman
18	Express	"	1910	McGuire Cummings
19	Combination passenger baggage	"	1900	Pullman
20	Express, became #602	"	1900	"
21	Sweeper	"	1907	McGuire Cummings
22	Sweeper, became #603	"	1904	Jewett
23-28	Passenger	"	1904	"
29-38	"	"	1905	St. Louis
46-55	14 Bench Open	Trail		
56	14 Bench Open	Motor		
57	14 Bench Open	Trail	1900	Pullman
58-61	14 Bench Open	"		
62-67	14 Bench Open Control	Trail	1904	Stephenson
75-82	Passenger "	"	1910	American
117-127	Passenger	Motor	1906	Jewett
400	Passenger, parlor buffet	"	1909	"
	OTHER WOODEN EQUIPMENT NOW STORED			
131	Passenger, used as plow	Motor	1907	Jewett
300-305	Passenger, used as sleet cutters	Motor	1909-10	"
	EQUIPMENT LEASED TO C.A.& E. RR			
129,130,133,134,137	Passenger	Motor	1907	Jewett
138-141	Passenger	"	1910	American
401-402	Passenger	"	1909	Jewett
403	Parlor-Buffet, made coach 1918,	Motor	1910	American
	MERCHANDISE DESPATCH EQUIPMENT			
200-202	Passenger-Baggage rebuilt to M.D.,	Motor	1909	Jewett
203-214	Merchandise Despatch	Motor	1919	Cincinnati
215-229	Merchandise Despatch	"	1922	"
230-239	Merchandise Despatch	"	1923	"
240-244	Refrigerator	Trail	1924	"
	INTERURBAN PASSENGER EQUIPMENT			
150-164	Passenger	Motor	1915	Brill
165-169	Passenger	"	1916	Jewett
170-184	Passenger	"	1919	Cincinnati
185-197	Passenger	Trail	1919	"
250-256	Passenger-Baggage	Motor	1917	Jewett
700-706	Passenger	"	1922	Cincinnati
707-713	Passenger	"	1923	"
714-733	Passenger	"	1926	"
734-736	Passenger (Formerly 404-406)	"	1927	"
737-751	Passenger	"	1928	Pullman
752-776	Passenger	"	1929	Standard
404-406	Parlor Buffet (became 734-736)	"	1917	Jewett
407	Diner	Trail	1919	Cincinnati
408	Diner	Motor	1919	"
409	Diner	"	1922	"
410-413	Parlor Observation	Trail	1923	"
414	Diner	"	1923	"
415-417	Diner	"	1926	"
418-419	Diner	"	1928	Pullman
420	Parlor Observation	"	1928	"
510-511	Libertyville Passenger(now stored)	Motor	1922	Cincinnati
	ELECTRIC LOCOMOTIVES			
450-451	35 Ton Engine		1907	General Electric
452-453	50 Ton Engine		1918	" "
454	50 Ton Engine		1923	" "
455-456	53 Ton Engine, Battery or Line powered		1927	" "
	WORK EQUIPMENT			
70	Sweeper	Motor	1909	McGuire Cummings
601	Snow Plow	Trail		
602	Line Car	Motor		
603	Sprinkler	Trail		
604	Line Car	Motor		C.N.S.& M. RR.
605	Russell Snow Plow	Trail		
606	Line Car	Motor	1923	Cincinnati
607	Crane Car	"	1923	"
608	Sweeper	"		
609	Steam Shovel	Trail		
610-612	Tower Cars	"		
1420	Derrick	"		
2001	Lidgerwood Unloader	"		
1000,1002-1006	Caboose	"		
3003,2056	Tool Car	"		
	FREIGHT TRAIL CARS			
	There are 181 freight trail cars of various types.			
	CITY PASSENGER CARS			
313-315	Double Truck Arch Roof Car		1916	St. Louis
316-325	Single Truck Safety Car		1919	Cincinnati
326-337	Single Truck Safety Car		1922	"
351-360	Double Truck Safety Car		1927	St. Louis
500-509	Double Truck Monitor Roof Car		1909	"

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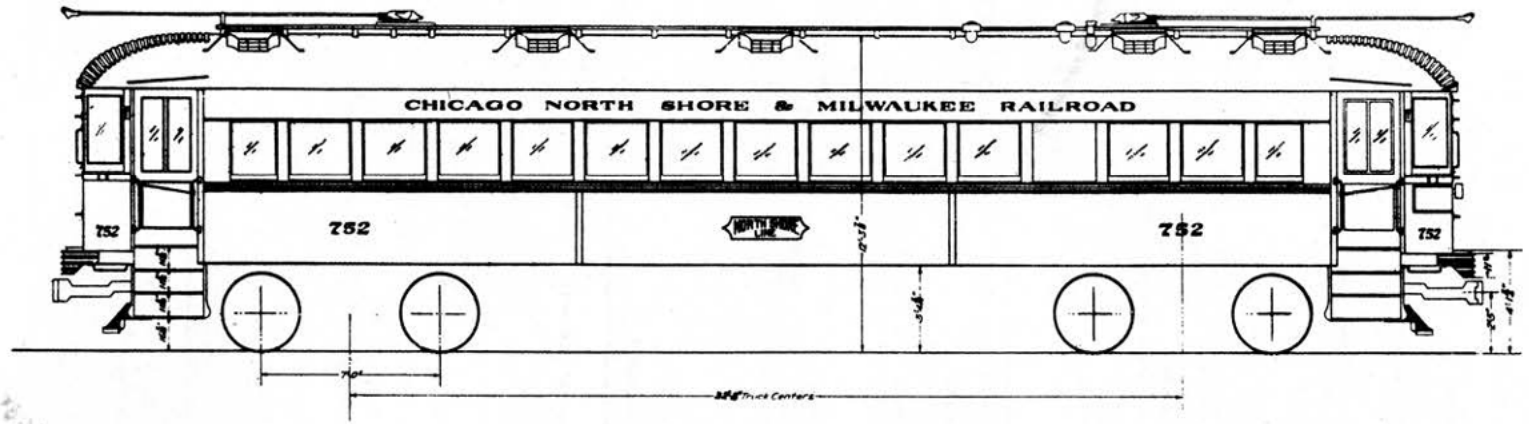

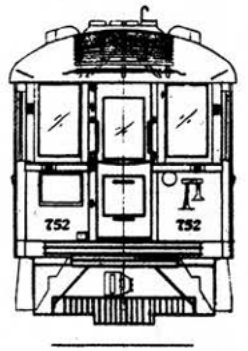

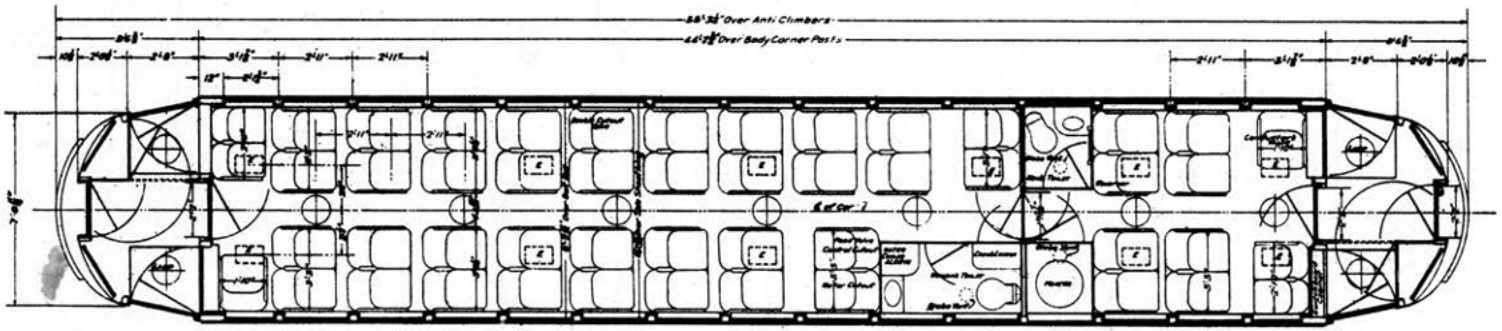

GENERAL INFORMATION

LENGTH OVER ALL	55'-3 1/4"
LENGTH OVER BODY	44'-2 3/4"
LENGTH OF PLATFORM	5'-6 3/8"
EXTREME WIDTH	9'-0"
RAIL TO TOP OF TROLLEY BOARDS	12'-7 7/8"
RAIL TO BOTTOM OF SIDE SILL	3'-4 3/16"
RAIL TO FIRST STEP	1'-4 3/16"
WIDTH OVER SIDE SHEATHING	8'-8"
VESTIBULE DOOR OPENING	2'-5"
TRAIN DOOR OPENING	2'-2"
BULKHEAD DOOR OPENING	2'-2"
TYPE OF DOOR	MANUALLY OPERATED

SEATING CAPACITY	50
TRUCK CENTERS	32'-8"
WHEEL BASE	7'-0"
WHEEL DIAMETERS	3'-0"
POST CENTERS	2'-11"
TYPE OF ROOF	ARCHED
INTERIOR FINISH	MAHOGANY
TYPE OF HEATER	ELECTRIC & HOT WATER
TYPE OF VENTILATORS	GARLAND
TYPE OF SEATS	BUCKET
WEIGHT	103,800
CAR BUILDER	STANDARD STEEL CAR CO.

MOTOR PASSENGER CARS

NUMBERS 752-776

BUILT IN 1930

NORTH SHORE LINE

TYPICAL PASSENGER CARS USED ON LIMITED TRAINS

PART OF C.E.R.A. BULLETIN NO. 1

DRAWING COURTESY C.N.S.&M.R.R. 11-38