Speed RUN

HIGH PERFORMANCE CARS

Monday, October 3, 1955

. . . developed by

GENERAL ELECTRIC COMPANY
WESTINGHOUSE ELECTRIC CORPORATION
CHICAGO TRANSIT AUTHORITY

Speed is our Goal

In This Jet-propelled Age, speed is everyone's goal whether he travels by air, by boat, by train, or by mass transit.

Chicago Transit Authority's concern is greater speed in mass transit. Only by increasing the speed of its service can Chicago Transit Authority —and mass transit generally—compete on more even terms with the private automobile, and better serve the community.

In CTA's surface operations, the prospects for higher speed—and faster service—are gloomy indeed. The private automobile, increasing in numbers and use at an amazing rate, is jamming the city's streets, despite vigorous traffic regulation and control, and the resort to one-way streets and other measures.

Millions have been spent by CTA for flexible, free-wheeling buses and for modern streetcars—all with high speed potentials—but CTA's surface transit is still slowed to a horse-and-buggy pace during rush hours in the areas of heaviest traffic congestion.

Traffic-Free Transit

Off-the-street, grade-separated mass transit, however, is entirely free from street-traffic interferences and delays. It is in this field of operations that greater speed can enable mass transit to compete vigorously and effectively with the private automobile.

CTA has substantially speeded up its rapid transit service, although some sections of the "L"-Subway system operate at street grade where trains are subjected to delays and interferences from street traffic.

This improvement in rapid transit service has been achieved by the introduction of an alternate-stop, express operation, by the elimination of lightly used stations, by the addition of 470 modern, faster, lightweight cars to the rapid transit fleet and by the installation of a line supervisory control system.

Operated from CTA's main offices in the Merchandise Mart, the line supervisory control system enables trained supervisors to keep a close check on trains from terminal to terminal and to take steps promptly to overcome service delays by broadcasting instructions direct to train crews and passengers.

Median Strip Rapid Transit

The City of Chicago is now constructing the West Side Subway in the median strip of the Congress Expressway in right-of-way provided jointly by the City, the County and the State with the aid of federal road funds. This new rapid transit facility will be ready for operation in 1956 or early 1957.

Here CTA will achieve another marked speed-up of its rapid transit service—through the West Side, through the Loop and out Northwest to Logan Square. From end to end, from Des Plaines Avenue, Forest Park, to Logan Square, in the Congress Expressway median strip, in the Dearborn-Milwaukee Avenue subway, and on the "L" structure, the right-of-way will be entirely separated from street traffic and its delays.

Future Transit Ways

From its inception, the Congress Expressway was planned for the operation of rail rapid transit in its median strip. It is, in this respect, a national "first" for Chicago.

The passage of time has obliterated misgivings about the feasibility or practicability—even the necessity—of integrating transit ways with freeways in Chicago and in other metropolitan areas. Traffic-jammed streets daily demonstrate the urgent need for facilities of this type.

Now, a second combination rail-motor expressway is being planned for Chicago—an extension of the Logan Square "L"-Subway in the Northwest Expressway—and there seems to be general agreement among the planners that transit ways will be provided in the expressways scheduled for construction in the future.

Throughout the nation, planners are also advocating construction of facilities of this type as being the most practical, the most economical approach to the solution of large cities' transit and traffic problems.

Preparing for the Future

Anticipating expansion of rail-motor expressway facilities in the Chicago metropolitan area, CTA determined to develop a high-speed, high-performance, lightweight rapid transit car for the rapid transit routes of the future with stations spaced a mile or more apart. Toward this objective CTA had already a running start. With the co-operation of the St. Louis Car Company, it had developed a lightweight rapid transit car, weighing about 50 per cent less than the earlier, all-metal car, yet fully as strong.

To this "first" in the rapid transit equipment field, CTA added another "first" by adapting modern streetcar motors and motor controls to the new, lightweight, multiple-unit rapid transit cars.

This new type of rapid transit car has now been adopted as a national standard, and Cleveland and Boston have purchased and are operating cars of this type. CTA has 470 units in daily service and has bought 80 more for delivery early in 1956.

To assist in development work on the high-performance car, CTA sought and obtained the co-operation of the General Electric Company and the Westinghouse Electric Corporation, manufacturers of electric car motors and motor controls. Each assigned engineers to the project, and each invested $100,000 in the development work. CTA contributed four car bodies and trucks and the necessary high-speed, hypoid gears, as well as the services of its own equipment engineers.

The engineers agreed unanimously that their goal was the development of a high-speed, high-performance, lightweight rapid transit car that would accelerate rapidly from a standing start to 70 miles per hour (perhaps more), and yet flexible enough to be operated in trains with CTA's lightweight cars having less speed potential and lower performance characteristics.

The Experimental Cars

Four experimental, high-speed, high-performance cars have now been developed from a similar number of CTA's standard, lightweight rapid transit cars which were manufactured by the St. Louis Car Company and delivered to CTA in 1951.

It is anticipated that the 4-car unit will attain a top speed of at least 70 miles per hour, reaching a speed of 60 m.p.h. in 38 seconds.

From the exterior, the experimental cars appear identical to CTA's standard, lightweight cars. Actually, the only major differences are the types of motors, motor controls, and trucks. The motors are rated at 100 horsepower compared to the 55 horsepower rating of the standard, lightweight car motor. The motor control equipment on each car has a speed limit relay that may be set to any pre-determined rate of speed less than the maximum. The gear ratio is 6.17 to 1 instead of the standard 7.17 to 1. Rate of acceleration (and deceleration) is approximately 3.5 m.p.h. per second up to 30 m.p.h., as contrasted with the present lightweight equipment, which accelerates at the same rate, but only up to a speed of 15 m.p.h. All four cars are equipped with the conventional system of electric brakes. The motors provide the braking power down to a few miles per hour when a friction brake cuts in automatically to complete the stop. Two of the cars have the standard motor drum brake manufactured by Westinghouse Air Brake Company and the other two are equipped with a disc brake manufactured by the American Steel Foundries. Both have conventional magnetic track brakes. For experimental purposes, fluorescent lights have been contributed and installed in two of the cars by Luminator, Inc., of Chicago.

Advantages of H-P Cars

It is clearly evident in advance of formal testing of the experimental units that a high-speed, high-performance, lightweight rapid transit car is feasible, and that fleets of such cars under proper operating conditions can very materially step up the speed of rapid transit service.

Preliminary calculations indicate that high-performance cars, operating on a 10-mile run in a grade-separated median strip such as is being provided in the Congress Expressway, can save 3.3 minutes compared with the present lightweight rapid transit cars.

CHICAGO TRANSIT AUTHORITY

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SPEED RUN RESULTS

HIGH PERFORMANCE CARS

October 3, 1955

Best Performance

Elapsed Time in Seconds	Speed in Miles per Hour
10	30
20	44
30	50
40	58
50	62
60	64
70	67
80	68
90	70
100	76

Matching Performance Run

Between

High Performance Train and Regular "B" Train

Station to Station Runs	Time Saving by H-P Train	
Lawrence to Berwyn	15-1/2	seconds
Berwyn to Bryn Mawr	9	"
Bryn Mawr to Granville	17-1/2	"
Granville to Loyola	9	"
Total Saved in Two-Mile Run	51	seconds