

Chicago Surface Lines Car 4051

The Laboratory PCC Car and Its Predecessors

By George E. Kanary



Most students of electric street railway transportation are familiar with the story of the PCC car. A genuine American design success story, it revolutionized urban surface rail transit not only in the United States and Canada, but overseas in Europe as well. In a short time the truck design and method of control and propulsion was adapted to rapid transit cars also.

Because of their glamorous appearance and visibility on the streets of North American cities, PCC cars not only influenced increased ridership but also established a new perception of streetcars in the public's mind. PCC cars were a marvelous departure from the typical streetcar with its noisy clatter, moderate speed and marginal comfort.

The new perception was of a sleek, spirited racehorse with a floating ride, gliding along in near silence and enveloped in a stunningly beautiful Art Moderne carbody. In an era when little thought was given to handicap access, the 26-inch diameter wheels of the PCC cars allowed the floor of the car to be lower than all but the most modern of the standard cars preceding them.

A Convocation of Street Railway Executives

The advanced design of the PCC car did not come about easily or inexpensively. The term PCC car, for Presidents' Conference Committee, came from the ERPCC, the Electric Railway Presidents' Conference Committee. This committee was a substantive group of advisors and financial contributors to the development of this completely new technology. The PCC car was designed to effectively com-

pete with the motor bus and the automobile, both of which had taken ridership from the street railways. By the advent of the 1930s streetcars were increasingly thought of as being old and outmoded.

Leading the design team were Dr. Thomas Conway, Jr., Chairman, and Clarence F. Hirshfeld, Chief Engineer. Dr. Conway, formerly a professor at the University of Pennsylvania's Wharton School of Finance, was already well known in Chicago for his reorganization and overhaul of the failing Aurora Elgin & Chicago RR in the 1920s.

Subsequently, Conway and his team were involved in the rebuilding of the Cincinnati & Lake Erie and the Philadelphia & Western. High-speed lightweight interurban cars were introduced on both of these railroads. Mr. Hirshfeld had equally impressive credentials in the field of design for electric railways and there was an entire family tree of staff and assistants, including architects, engineers and attorneys.

Admission to the Conference, which

▲ "Laboratory PCC car 4051" leaves the loop at Milwaukee Avenue and Imlay Street, the city limits with Niles, on August 6, 1940. This was the only PCC car to operate on Milwaukee Avenue. —Edward Frank, Jr. photo, Shore Line Collection

began in 1932, was by payment of an assessment determined by the size of the city concerned and Chicago Surface Lines was levied the largest fee, \$46,000 over three years. The Chicago Rapid Transit Co. fee was the same, but because of the desperate financial condition of the company at the time, it could only pay the initial \$30,000.

Chicago quickly became a leader in its advisory role, knowing full well that the motor bus of the time was inadequate and incapable of carrying the passenger loads on trunk line streets efficiently and safely. However, even Joliet, Illinois, was a contributor to the research, building two thoroughly modern city cars in its own shops. The entire Joliet system was abandoned shortly thereafter, a victim of the Great Depression.

▼ Chicago Surface Lines MU car 3288 is seen with the Timken inside frame, roller bearing, worm gear drive truck, a PCC design predecessor. —Company photo, Author's Collection



Earlier Experiments in Chicago

In 1928, several years before the intensive research of the Committee began, Chicago Surface Lines tested a pair of experimental Timken roller bearing, worm drive, inside frame trucks under car 3288, one of the 1926 Multiple Unit cars. They replaced the conventional Brill 39E2X trucks. Though similar in design to the later PCC car trucks, the Timken trucks did not have resilient wheels, one of the most important factors in the smooth and silent ride of the production PCCs. The trucks were equipped with four GE 298D 40 horsepower motors and the car was equipped with Westinghouse UM2 controls.

This equipment was later transferred to car 3322, a nearly new Front Entrance-Center Exit Peter Witt type 'Sedan' car that had been rebuilt with a single treadle-operated rear exit door. MU cars 3289-3290 were likewise equipped with similar trucks that had been built by Brill with Westinghouse motors and controls. This equipment was later transferred to Sedans 3341-3342. Testing went on further with the 3322 later receiving Brill 90E trucks and still later, Brill 87E1 trucks. Controls were also modified at this time. Sedan 3339 received Standard Steel Car Co. trucks with four fifty-horsepower Westinghouse 1430C compound wound motors and 24-inch wheels. The control system for this car was developed by Mr. Hirshfeld.

Sedan 6306 received Brill 85E trucks, and car 3323 was equipped with a pair of Cincinnati arch bar trucks with a unique type of motor mounting. This equipment was later moved to the 3342. Eventually, 3322, 3341, and 3342 received Timken 52B trucks which had a double reduction gear drive rather than a worm drive. Like the trucks used under MU car 3288, most of these had inside frames similar to the later PCC trucks. These all replaced the as-delivered Brill 77E2X conventional trucks under the Sedans.

Car 3322 received a single treadle-operated rear door in June, 1931, in order to improve passenger flow within the car. In that same month this car was shipped to Brooklyn, New York, where the Brooklyn & Queens Transit, also a major participant in the ERPCC, loaned the use of its Ninth Avenue shops as a testing facility. 3322 was joined by Peter Witt car 6002, a modern car from Baltimore, Maryland, as well as



▲ Brooklyn & Queens Transit 5300, a Pullman-built experimental car, ran in service briefly in Chicago, apparently on Southeast Side routes like Windsor Park, South Deering and South Chicago Avenue which could accommodate single-end cars. The route number 3 does not apply to these lines. ▼ The car was posed on the Navy Pier loop. (The streetcar in the background is on the Grand Avenue line.) —Two company photos from the William C. Janssen Collection, East Troy Railroad Museum



two of the latest Peter Witt style cars from Brooklyn.

In 1934 construction was authorized on what became car 5300, the Model B, built for Brooklyn in Chicago by the Pullman Co. It embodied many of the features of the PCCs that would follow. It ran in service for a short while in Chicago on the southeast side of the city.

After exhibition at the 1934 American Transit Association convention in Cleveland, it went on to Brooklyn, where

it was destroyed in an accident involving a truck. The accident showed that the eddy current brakes were ineffective for emergency stopping. The fact that the trolley pole on cars equipped with such brakes had to stay on the wire led to further study.

Also in 1934, CSL accepted delivery of two experimental cars, one from Pullman and one from Brill. Both were highly advanced cars that embodied extreme technical features that required considerable maintenance. Both of these

Streamliners ran in revenue service to the Century of Progress Exhibition and were highly favored by the passengers.

The appearance of the Pullman car, car 4001, built of aluminum, was intended to approximate the style and shape of the new Chicago Burlington & Quincy Railroad Zephyr train and was painted in a Royal Blue and silver color scheme. Specially designed numbers and CSL emblems were applied to this car. Brill car, 7001, built of steel, was styled by Otto Kuhler, a noted industrial designer with considerable railroad experience. It was painted in two shades of green with silver and orange trim.

Car 7001 was nicknamed the *Green Dragon*, while the Pullman car 4001 earned the sobriquet, the *Blue Goose*, for its color and its propensity to fail in service, requiring a “pull in” for repair. The *Dragon* was somewhat more successful in service, running on Madison Street as a school tripper through the years of World War II. The same crew always handled the car, familiar with its characteristics, including the novel air over hydraulic brakes. Subsequently, these two cars were repainted into the colors and style of the new PCC cars delivered in late 1936.

PCC cars come to Chicago

CSL received the first production run of PCC cars from St. Louis Car Co. in November 1936. While it was originally conceived that the PCC car would be standard in all dimensions, Mr. H.H. Adams, Superintendent of the Chicago Surface Lines South Shops, wisely speci-

fied additional width and length for the new Chicago cars. These new cars were equipped with every imaginable accessory for comfort and luxury, including the most exotic fare register ever installed on a transit vehicle.

They were welcomed into service on the evening of Thursday, November 12, 1936, with a torchlight parade along Madison Street. An estimated 10,000 people gathered at the intersection of Madison Street and Pulaski Road on Chicago’s West Side and an estimated 500,000 people lined the route that evening to see CSL’s new *Streamliners*.

With the same spirit as the crowds that watched the new Burlington Zephyr as it streaked from Denver to Chicago two years earlier, the people of Chicago mobbed Madison Street. Because of the crush of the crowd Chicago’s police force had all they could do to maintain a narrow lane on Madison Street for the *Streamliners* to move toward Downtown. This was still during the Great Depression and it was free entertainment to come out and observe the flight of the *Streamliners*.

CSL was very proud of its new cars and its role in the design of them. While some other cities adopted fancy names for their cars, such as *Magic Carpets* in San Francisco, CSL and its employees only stayed with the prosaic name, *Madison Street Cars*. One of the long gone Chicago newspapers espoused the name *Blue Devils*, likely for their thrilling speed, the name possibly appropriated from the 14-inch gauge steam locomotive of the same name at Riverview Park, the big North Side



▲ B&QT car 5300 appears to be at 92nd and South Chicago Avenue. —Author’s Collection

amusement park that also had a *Red Devil* companion engine.

The cars were faithfully overhauled and repainted on a three-year cycle, but many were more often in the West Shops for body repairs because the east end of Madison Street, being rather narrow, became the scene of many front-end collisions due to motorists not clearly seeing the cars after dark. This led to the front ends receiving the ‘Tiger Stripes’ to increase their visibility, which, in the author’s opinion, definitely enhanced their already attractive appearance. Their blazing acceleration also led to side swipes when an unfortunate motorist thought he could out-accelerate the *Blue Devil* and cut in front of it. Car 4008 received dash illuminators to evaluate their ability to improve the visibility of the car, but they were later removed.

▼ Pullman experimental car 4001 rests in the off-street loop at 80th and Vincennes, circa 1934-1937. Schreiber Street is improperly spelled as Screiber in the sign box. —Edward Frank, Jr. photo, Author’s Collection



▼ Brill experimental car 7001 awaits its departure time at the terminal at 81st and Halsted Streets, circa 1934-1937. —Edward Frank, Jr. photo, Author’s Collection





▲ Car 7002 arrived on a flat car at South Shops on Saturday, October 24, 1936. The assembly rate at the carbuilder, St. Louis Car Co., was two cars per day. New cars were exhibited on State and Adams on Friday, November 13, 1936. This huge parade was organized by the West Side Traffic and Transportation Association, a civic and improvement group. The new cars were preceded by floats showing older type horse-drawn equipment and an early type of electric car. We are looking west from Pulaski Road on Madison Street on Thursday, November 12, 1936. —*Company photo, Author's Collection*

Just as the order for the 100 Sedan type cars was woefully short of the 175 cars required for Clark-Wentworth service, the order for the new PCC cars was limited, for financial reasons, to 83 cars, rather than the 100 cars needed for Madison Street. Ridership on Madison Street grew significantly as people left Chicago Motor Coach's, Washington Boulevard and Jackson Boulevard routes and even the Lake Street elevated. This caused the transfer of 20 Sedans to the Kedzie car house for use as trippers on Madison and Madison-Fifth Avenue. Speedy as the Sedans were, they were still slower than the PCC cars. Big Pullmans replaced the Sedans on Clark-Wentworth

As usual, CSL began tinkering with the new cars, but this time it was not for testing new operational equipment, but, because of an edict that came from the company's auditing department. The auditor's asserted that too many people were leaving the cars without paying their fares.

The front half of the new front-entrance PCC car was "unpaid fare area," the fare not being paid until the passenger passed the conductor who was stationed just forward of the center doors. Apparently passengers who would remain in the "unpaid" front half of the car would slip past the conductor without paying a fare and, when the car stopped, quickly jump off. Passengers sitting near the front doors would also evade paying their fare by quickly exiting when the motorman opened the doors to receive boarding passengers.

The Laboratory PCC Car

This problem led to the rebuilding of car 4051 with triple stream rear-entrance doors replacing the single exit door at that point, and with one of the two doors at the center of the car removed. The rearmost of the three doors at the front was also removed. The conductor's station was relocated to a spot opposite the three rear doors. The fare collection was changed to

the Pay-As-You-Enter system. While this minimized or eliminated the fare cheating, it would have compromised the schedule on Madison Street because PAYE resulted in slower loading as opposed to the crowd swallowing capability of the front entrance, Pay-As-You-Pass format.

Car 4051 was placed in service on Milwaukee Avenue, it being a heavily traveled rear-entrance car line with a downtown loop using Washington, Dearborn and Madison Streets, and an off street loop nine miles to the northwest at Imlay Street, just north of Devon. The car ran there successfully from July to November, 1940, and apparently proved to the auditors that fare cheating could be eliminated.

After the test on Milwaukee Avenue, the CSL was not yet finished remodeling the car as the craftsmen at the West Shops rebuilt it yet again. Once again this work was authorized by the Surface Lines Design Committee. The car was released for serv-

▶ This new fare register, made of plastic, will allow the passenger to see their fare being processed. The top piece has a series of lights and a specific tone to indicate the amount of fare being paid. The three-cent children's fare was announced by a red light and a three-tone chord. —From the November 1936 issue of *Surface Service Magazine*, Author's Collection

ice on Madison Street in December, 1940, just in time for the heaviest riding season and it maintained the schedule.

The front doors remained as they were in the first rebuilding. The forward set of the center doors was reinstated and the single rear door was also reinstated, but moved forward one window space with a curved window installed behind it, similar to the blind side of the car. The conductor's station was placed halfway back in the front half of the car, on the blind side. This change was supposedly to enhance passenger flow through the car.

After several months of service on Madison Street, the car was restored to its as-built configuration. Over a period of time, small changes were made in all of the cars, such as a vent window installed in the rearmost curved pane of glass on the blind side. Some of the cars, including car 4051, received additional cowling with an air intake around the trolley pole base, providing more ventilation to the car.

1945 saw six of the cars painted in a variety of color schemes and a poll was taken among the riders to determine the most favored. A combination of Mercury Green and Croyden Cream with Swamp Holly Orange accent stripes was the winner and all of the postwar PCC street and elevated cars were delivered in those colors.

The success of the car in its Milwaukee Avenue version became evident when the postwar PCC cars began to arrive in 1946. The door configuration was identical to the laboratory car 4051. This is probably one of the few occasions in that era when the auditors drove a change in the car design.

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PCC The car that fought back
SURFACE SERVICE magazine
James J. Buckley technical notes

▶ Car 4051 and a Big Pullman pass on Milwaukee Avenue at Thomas Street. The former cable car power house, then a substation, is in the background. —Edward Frank, Jr. photo, Author's Collection



▲ Signed Milwaukee-Devon, car 4051 is at the west end of the Kedzie carhouse at Jackson and Spaulding. This was a former cable car barn that was used by Milwaukee Avenue cars. 4051 had to travel to the Kedzie car house for maintenance as that is where the Madison Street cars were serviced. —Company photo, Author's Collection

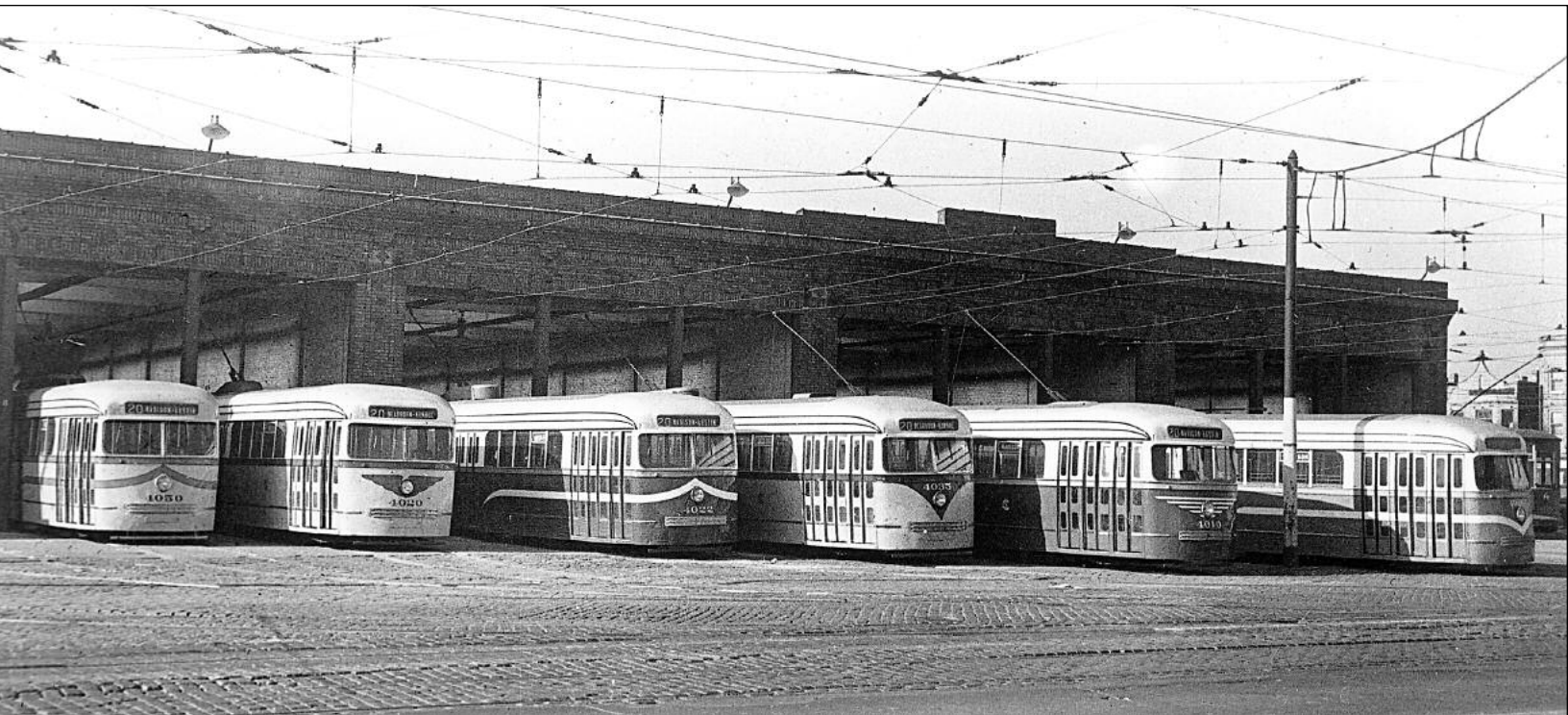




▲ Interior of Laboratory PCC car 4051 as configured for rear entrance operation. —*Company photo, Author's Collection*



▲ 4051, as rebuilt back to original door layout, prepares for a trip from the west city limits at Madison Street and Austin Avenue to Downtown Chicago. The "tiger stripes" were applied to the car in 1945. —*Joe L. Diaz photo, Author's Collection*



▲ All six of the 1945 experimental paint jobs on the 1936 PCCs are lined up in review at the Kedzie car house in 1945. Public input for the most desirable color picked the 4018, in Mercury Green, Croyden Cream and Swamp Holly Orange. These colors were then applied to the post-war cars delivered to the Chicago Surface Lines. —Company photo, Author's Collection

To our knowledge, no color still photographs of these experimental paint schemes exist. Some eight millimeter color movies exist. So we will try to describe color schemes of the cars in the order they appear in the photograph from left to right as well as the date the cars were released from the paint shop. All of the cars had Croyden Crème roofs except car 4050 and 4018. See page MEC 12 in the MORE EARLY COLOR section of the Winter 2005 issue of *First & Fastest* for a color photo taken of O-Scale models.

Car 4050 – Coronado Tan with orange accent stripes December 1, 1945

Car 4020 – Marigold Yellow with maroon trim October 24, 1945

Car 4022 – Clipper Blue (a medium blue) with red belt rail and roof accents November 26, 1945

Car 4035 – Orange with maroon belt rail and “v” front November 6, 1945

Car 4010 – Venetian Red (burgundy) body and roof accent stripes October 29, 1945

Car 4018 – Mercury Green with orange accent stripes and body stripe November 14, 1945

► Post-war PCC car 4065 arrives at the South Shops in 1946, bearing the door configuration created for the 4051, the Laboratory PCC. Some of the first cars received in 1946 were not delivered with the green stripe through the standee windows. —Joe L. Diaz photo, Author's Collection

