The Trolleyville Times

June 2016

Revenue operation of the Los Angeles to Santa Monica Light Rail Line

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CURRENT EVENTS.....

Kansas City Streetcar Opens!

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Over 57,000 Kansas City residents and people from all around the metro area celebrated the first week of streetcar operation in Kansas City by riding the new modern streetcar. The KC Streetcar officially opened on Friday, May, 6, 2016, with a grand opening celebration at Union Station. City officials, including Mayor Sly James, Senator Kit Bond, City Council members, Jackson County legislators and other officials were on hand to officially launch the KC Streetcar, which offered free rides all weekend. One interesting rider was John Donnell, a former operator of Kansas City PCC streetcars which were abandoned in 1957. 12,230 passengers rode on the opening day alone. All four streetcars were used for most of the first two days of operation.

The current KC Streetcar, runs a north-south two-mile route along Main Street, and connects the River Market to Crown Center and Union Station using a fleet of four C.A.F.-built low floor streetcars. By May 20, the KC Streetcar had carried more than 100,000 passengers.

The KC Streetcar public celebration started at 10:00 a.m. Friday, May 6, outside of Union Station with a grand opening ceremony. The ceremony was followed by an inaugural first ride for those dignitaries and the opening of public streetcar service and community-wide parties and activities. Trolleyville expects to see a lot of these opening type activities for Light Rail and Modern Streetcar lines over the next decade as the country corrects some of the gross mistakes made in the 1940-1960 era.

Public ridership began at 11:00 a.m. on Friday, May 6, and continued until 2:00 a.m. Saturday morning. Streetcar service resumed Saturday morning under regular operational service starting at 7:00 a.m. and continued until 2:00 a.m. on Sunday morning. There were three streetcars operating the full route all weekend. A full operating schedule of the free to ride KC Streetcar service can be found online at www.kcstreetcar.org

In addition to streetcar transportation, there were RideKC Max bus service along the streetcar route May 6 and 7 and the Kansas City Area Transportation Authority (KCATA) offered free RideKC bus service on all local, express and shuttle service that connects to downtown on Friday, May 6.

Starting Thursday, May 5, Main Street was closed to thru traffic between 20th Street and Pershing Road. Buses will be rerouted around that closure and Union Station and Crown Center parking will still be accessible. Main Street north of 20th remained open to traffic, however, no street parking was permitted on Main Street or on the south side of 5th Street between Delaware and Walnut on May 6 and 7.

The KC Streetcar grand opening ceremony kicked off a weekend long celebration along the entire two-mile streetcar route. There were lunch specials, live music and entertainment along the line, parties in the Crossroads District , a movie in City Market Park, Middle of the Map Fest throughout downtown and carnival rides and fireworks at Union Station.

There were, as expected, large crowds during this Grand Opening weekend so residents were asked to set ride expectations accordingly. They asked that when boarding the KC Streetcar, ride it to your destination or take only one loop around, so that others have the chance to ride as there were plenty of activities scheduled along the route to help keep all entertained.

Peter Ehrlich, a retired San Francisco F-line operator, well known to most streetcar fans, was in Kansas City for the first 5 or 6 days of operation to check out the new KC Streetcar. His impressions were that the KC Streetcar is a fantastic hit with the locals! Except in the morning, ridership was really exceeding projections. He reported that he had never seen such a bunch of happy people, enjoying their new attraction. Crush loads are being carried during the lunch hour, as workers have found a new means of getting from Crown Center and the office buildings in downtown Kansas City to River Market, without dealing with the hassles of driving and parking. Even into the evening, full seated loads seemed to be the rule. The residents who live in the River Market area seemed to be just as enthusiastic. One person he spoke to was overjoyed at the prospect of riding the streetcar to work every day.

As can be expected, there are some glitches, which comes with every new system. The principal problem was the signal pre-empt for cars leaving Union Station, which frequently didn't work and required maintenance personnel to resolve the problem. There was one car with one set of doors that was inoperative. Schedule-wise, the problems caused some delays, but not insurmountable. So far, no car was required to be removed from service. The basic method of operation is that all operators take their layover at Union Station. At the River Market end, basically it's a continuous loop with no layover. The lines were long during Opening Day Weekend but he missed that part. So, from his transit professional perspective, KC Streetcar is an unqualified success!

The cars operate Monday through Thursday from 6:00 AM to Midnight; Friday from 6:00 AM to 2:00 AM Saturday morning and then from 7:00 AM to 10:00 the rest of the day. Sunday Service is from 7:00 AM to 10:00 PM.

For our readers located in the Kansas City metropolitan area, who are interested in specific information about the KC Streetcar, including transit options and parking, please go to www.timetoridekc.org

Santa Monica Service Begins on the Expo Line

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by George Huckaby

Friday, May 20, 2016 saw the resumption of electric transit service from Santa Monica to downtown Los Angeles after 63 years. Last minute preparations were going on throughout the 6.6 mile extension from Culver City to Santa Monica, including preparation of Exposition Boulevard adjacent to the Sepulveda Station. The first part of the line from Los Angeles to Culver City opening in 2012. This story has interest to me since I live right on the line. I get to watch the trains go by at 12 minute intervals all day long. Today, I got to ride them past my own house. We have watched the demolition of the remains of the single track Santa Monica Air Line staring in 2009, the laying of the track, the erection of the catenary line poles and the catenary itself and the first car, NipponSharyo P865 car 126, which passed our home in May 2015 and went as far as Military Avenue.

Despite some utter nonsense in the Los Angeles Times beginning during the weekend of May 14-15 about the lack of parking facilities at some of the new stations that would keep passengers from riding the line, most of the riders will be walking to the line or taking feeder buses to the Expo Line that will now be going to the various stations. On Monday, May 16, we saw the beginning of this with one articulated bus in the new loading area just created during the prior week on Exposition Boulevard west of the Sepulveda Boulevard Station.

In the above photo, a three-pack of the new P3010 KinkiSharyo vehicles, 1017, 1022 and 1019 are shown westbound in test service passing articulated bus 9260 signed for route 734 Sylmar. Sylmar is located a great deal northwest of this location on Interstate 5 toward Bakersfield. The Sepulveda Station is seen at the extreme right of the photo above Sepulveda Boulevard. As you can see, the street has recently been totally repaved and striped. Most recent data shows that the Expo Line so far has sixteen of these new P3010 cars assigned, however, the number actually cleared for passenger service was unknown at this time. But we would see nine of them, three three-car trains in service for a while on May 20. Ten of the new cars are also assigned to the Gold Line (East Los Angeles-Union Station-Azusa). We happened to examine the interior of the bus shown and was surprised at the pleasant interior seen below. The passengers will be riding in style:

Even before the opening, there are also calls for city officials to give signal preemption to Expo trains in downtown Los Angeles as the ride from Santa Monica is projected to take 46 minutes. The statement was made *"... give priority to a three-car train with 250 people on it rather than sitting and waiting for vehicle traffic, which carries 1 or 2 people per car..."*. Such a statement would never have been made publicly years ago in car-centered Los Angeles.

So about 9:15AM on the morning of May 20th, I drove my car around West Los Angeles and Santa Monica looking at the areas where trains should be carrying passengers in just a few hours. I luckily found a parking space on 6th Street one block from the 4th Street Terminal. I walked down the street to the Expo Line on Colorado and took the following two photographs:

Colorado Blvd looking west toward the 4th Street Station. This station has three tracks and three platforms. Each platform will handle a three car train!

Colorado Blvd looking east toward Los Angeles.

Buses were lined up at the Expo/Sepulveda Station in preparation for the trains that would be shortly running. Although three are shown, another had just left.

This was one of the buses at the Expo/Sepulveda Station which was connecting to the San Fernando Valley.

I finally made my way to the huge celebration tent south of the 4th Street Station where they were setting up the music and food for the expected crowds. The food looked awfully good and the band was very nice but it was obvious that this was going to be a mob scene, difficult to get into and more difficult to exit from. So as Peter Ehrlich did on the opening of the Kansas City Streetcar fourteen days earlier, I avoided the crowds but noted the operation.

One of the three trains of the new P3010 KinkiSharyo vehicles being operated that day, led by car 1026, being used for training came into the 4th Street Station while I was there.

A three-car train of the P3010 KinkiSharyo vehicles at 4th Street Station in Santa Monica!

I then drove back to my home, parked my van in the garage and about 11:15 AM walked to the Westwood/Rancho Park platform where I waited for the first train to arrive. According to the Los Angeles County Metropolitan Transportation Authority (LACMTA) representatives on the platform, trains were to leave Santa Monica eastbound and Culver City westbound at noon.

So I estimated that the first train to arrive at Westwood/Rancho Park would come westbound and it did about 12:05PM. A three-car train consisting of cars 107, 100 and 127, all P865s built by NipponSharyo in 1989-1990, arrived packed to the doors. They opened the doors, but absolutely nobody could get in so they closed the doors and proceeded to Santa Monica.

One of the first westbound trains with SANTA MONICA destination signs to carry passengers! ***(Photo by Fred Gurzeler)***

The first eastbound train arrived at 12:12PM and consisted of cars 1003, 1027 and 1021 all new P3010 Kinki Sharyo cars but in the same loaded condition, packed to the doors. They opened the doors, nobody could get in and they closed the doors and proceeded to Culver City. The Kinki Sharyo cars are being delivered at the rate of once per week and are exhibiting the normal issues with any new group of cars. A second westbound train consisting of cars 234, 244 and 249, all P2000 cars built by Siemens, arrived a few minutes later but it too was crush loaded.

Crowds waiting for free rides to Culver City and Downtown Los Angeles! ***(Photo by Fred Gurzeler)***

I would finally be able to ride the third eastbound train, consisting of cars 160, 109, and 154 which was virtually empty when it arrived so it must have pulled out of the new Expo Division 14 yard at Bergamot without first going to Santa Monica.

Cars 160 and 154 are among the fifteen P2020 cars purchased to open the Green Line (Norwalk to Redondo Beach) in 1995. When they were replaced by the Siemens P2000 cars, they went to the Blue Line to permit operation of three-car trains on that line. I got off at Culver City since I had already rode the line east of that station and boarded a the next westbound train to Santa Monica consisting of cars 153, 149 and 119, all also P865s. I would ride car 153 to Santa Monica and Car 119 back to Westwood/Rancho Park. By now it was 2:00 PM. Here is a summary of the Los Angeles Light Rail Cars at this time.

SERIES	BUILDER	YEARS BUILT	DESIGNATION	LINES SERVED
100-153	Nippon Sharyo	1989-1990	P865	Blue, Expo
154-168	Nippon Sharyo	1994-1995	P2020	Blue, Expo
200-250	Siemens	1996-1999	P2000	Green, Blue, Expo
301-302	Siemens	1996-1999	P2000	Blue, Expo
701-750	AnsaldoBreda	1996-2000	P2550	Gold
1001-1235*	Kinki Sharyo	2014-1017	P3010	Gold, Expo

*1001-1030 delivered so far!

I decided to go back to the Westwood/Rancho Park platform to resume an earlier conversation with the two Deputy sheriffs that were assigned to that station. Trains were coming from Culver City packed as bad as they were earlier in the day. My wife got home from work about 4:00 PM and called me and wanted to ride so she walked to the same Westwood/Rancho Park platform and we decided to make another trip to Santa Monica. We waited an abnormal time for a westbound train only to be told that there was a problem at Culver City. After a while a three car train of P2000s appeared consisting of cars 231, 244 and 249 and we got on board and made the trip to 4th Street. We got out of the train and proceeded to attempt to return by boarding P3010 car 1003, the lead car of the same three car train, 1003-1017-1021, that had burst the banner that morning.

We sat there for what seemed an eternity when told to get off that train and board another train. While we sat there, the train that we arrived on left. Finally we got to leave. We got off at the Sepulveda Station, which is one of the two stations within walking distance form our home.

We felt that LACMTA was unprepared for the number of people that showed up for the free rides as it was reported that **30,000** showed up for the free rides on Friday and **70,000** rode on Saturday. The Community Relations Manager of the LACMTA verified these numbers on May 31, 2016. It also appeared that they may be having some issues with the new P3010 cars but since opening day, plenty of them have been seen operating in service on the line. In our opinion, the best cars on the system seem to be the oldest, the venerable Nippon Sharyo P865 vehicles that opened the Blue Line in 1990. The Siemens cars, P2000, do not seem to be as reliable, although the Siemens cars in San Diego seem to be fine. Judgment is still out on the Kinki Sharyo P3010s, as they are having coupling problems. But it is interesting to note that the LACMTA did not select and buy the P865 cars. They were bought by the Los Angeles County Transportation Commission.

But we all must remember that unlike the positive community support given to the recent extensions of the Gold Line to Azusa, such was not present on the Westside from Cheviot Hills and some of my neighbors, some of whom to which I still have no contact. Politics would only permit a three-track stub-end terminal at 4th & Colorado in Santa Monica instead of the more useful and flowing loop as was done on the Blue Line in Long Beach when it opened in 1990. Changing ends on a light rail trains require operators to walk from one end of a train to another on the platform crowded with passengers, since light rail trains and streetcars do NOT have train doors in the ends.

Moving forward to today's environment with a much more positive view of public transit, some of the things that Metro was "forced" to do to just get the line built in the first place are now conveniently forgotten. So before we jump all over Metro we must remember some of handicaps that well-meaning but ignorant-as-hell people placed on the building of the line in the first place. Many intelligent people tried to tell our predecessors that total reliance on more freeways would not work after a time but they did not want to listen. While most people were still enjoying the free rides, the local newspaper starting complaining that the ride from Santa Monica to Los Angeles took the same time that the Pacific Electric did 60 years ago. Considering the change in the population in the area over the last sixty years, that in itself is a **fantastic achievement.** We listened to more people complaining about the fact that the line should have been elevated or underground even though the at grade Westwood/Rancho Park station is perfect for the nearby residents who might find the line useful. When public rail transit was initially proposed they formed organizations with seemingly progressive names like **"Neighbors for Smart Rail"** even though the amount of collective knowledge about rail transit from the entire group would have not been able to fill the head of a pin. Several of these "knowledgeable" peoples had a signs on their front lawns with statements like **"Kids and Trains Don't Mix".** Most of them only wanted any transit built out of their sight so the "*common people*" would use it and free up room on the freeways for their cars. Most of them had no intention of ever using any public transit including the Expo line but guess what.....some of them are getting older and the traffic is now much worse and they are finding out that the line might be useful. One of my neighbors who was overly concerned about the possible "noise" from "the train" has ridden the line seven times in five days.

Of course the LACMTA curse was present on the first Monday, May 23, 2016, that the line was in operation just as it was on the first day that the Azusa Gold Line extension opened in March. Some idiot driver, reported to be intoxicated, managed to get his car on both tracks in the USC area at 5:00 AM forcing a disruption for two hours. Why can't some lawyer come up with the idea to sue the driver of that car for all the delays to all the passengers on all the trains for two hours? There would be a useful lawsuit instead of some of the nonsense we see all the time.

It might be interesting for some of these people to note that not only Los Angeles, but all across the United States cities are turning and in some cases returning to light rail, modern streetcars and bus traffic rather than automobiles. Some of those cities include Tucson, Phoenix, Sacramento, Denver, Seattle, Portland, Kansas City and others.

A survey from the National Association of Realtors and Portland State University found that People aged 18 to 34 also have a stronger preference for expanding public transportation and driving alternatives than other generations.

It's also interesting to note also that in some communities, they are experiencing a positive change in real-estate values on properties within close proximity near the rail systems. Thee are also positive changes on how property is being used for both commercial and housing. This seems to be drawing young professionals as well as empty-nester individuals. Property values in those areas for the most part have increased. As to whether or not this trend will continue remains to be seen. Rail systems that have the most success in boosting ridership are ones where jobs and population are concentrated near stations, according to a team of UC Berkeley researchers.

In one study by USC Professor Marlon Boarnet, he said "the new extension won't immediately reduce congestion between downtown and Santa Monica - but it wouldn't be fair to judge the extension in isolation. The new track is part of a rail renaissance in Los Angeles which soon will boast 100 stations, and that ongoing expansion has made a big difference to how people get around the region.

"Every line that opens begins to transform the nature of the city," Boarnet said. "it makes a difference bit by bit".

While Los Angeles has for about 50 some years, increased in automobiles and population, something that may or may not have been anticipated, when the rail system was closed down in the 50's and 60's, it was interesting to hear and then read the following quote -

"...Los Angeles can't be nostalgic about a short 30 to 40 year period that has come and gone..." as stated by Major Eric Garcetti, current Mayor of Los Angeles, when speaking of the city's car culture. "We should have growth occur in the right places, rather than have it spread inefficiently."

The Trolleyville staff feels it has been a long time in coming and feel it is the future for this and most other urban areas. Others may not feel that way, but we believe that is the direction the country is going and will continue to go. We admit that change is hard for some, but sometime change is very necessary.

As we go to press, this line extension seems to be a real success until some idiot gets in the way!

Light Rail / Modern Streetcar News!

Virginia Beach, a seaside resort city east of Norfolk, plans to extend "Tide" light rail across city line to Town Center shopping plaza a short distance into the suburban community using former Norfolk Southern rail freight right of way. The Virginian-Pilot newspaper reported on May 13 that only three instead of four LRVs will be needed for the LRT extension. That followed a detailed engineering analysis. A $19.8 million contract would be negotiated with Siemens for the LRVs with the state picking up the tab. A judge earlier in the week approved an anti-LRT referendum for the Virginia Beach November ballot but it's non-binding on the City Council.

The Washington Post in an op-ed May 13 by an Arlington County planner who blogs on transit issues reported that the District of Columbia's 1.9-mile H Street-Benning Road streetcar line carried an average of 2,285 weekday passengers during April. Based on riders per mile that was slightly above average but "neither horrible nor spectacular," Dan Malouff wrote.

Kansas City held a ceremonial public service launch May 6 for its 2.2-mile, $100 million modern streetcar line using C.A.F. rolling stock that was tagged onto the Cincinnati order with the U.S. subsidiary of the Spain-based firm. Streetcar Authority officials predict 2,700 average weekday riders. During the first three days of introductory service, the Kansas City Star reported that 32,000 rides were recorded. The same newspaper reported on May 27 that higher-than-predicted ridership on the downtown River Market to Union Station $100 million modern streetcar line has prompted the city to add additional weekend service. The 2.2-mile car line opened May 6 and now averages 6,400 daily riders. That tops the forecast of 2,700 and so the Streetcar Authority will investigate buying a fifth streetcar. Weekday trips averaged 4,615 but weekend ridership has exceeded 9,110 not counting the grand opening weekend.

Seattle-based Sound Transit has until June 23 to finalize a $50 billion sales tax package for the November 2016 ballot to finance an expansion of its light rail network and the agency's board May 26 agreed to speed up the timeline for completion of LRT projects, the Seattle Post-Intelligencer online reported. That includes reaching Everett, home of the Boeing aircraft factory in 2036, five years sooner than planned, and building to downtown Redmond and Federal Way in 2024, four years sooner for both lines. Redmond is the Microsoft international headquarters.

Cincinnati Business Courier reported May 6 that that the first C.A.F. streetcar delivered to the city passed its "burn-in" testing period, logging 311 miles successfully on the 3.6-mile line expected to open in early September. On May 11, WCPO-TV reported the car line has sold nearly half of available advertising space on the streetcars including a deal with a local jeweler. On the same date, the Business Courier reported C.A.F. owes the city $507,400 for late delivery of streetcars from its Elmira Heights, NY assembly plant.

The city of Tucson in southern Arizona is cutting back streetcar operating time by eight hours per week to save $143,000 for the new municipal budget, television station KVOA reported May 5. Thursday nights service will end at 10 p.m. instead of 2 a.m. Cars will stop running at midnight on Fridays and Saturdays instead of 2 a.m., Arizona's bar closing hour. Fourth Avenue Merchants Association is distressed by the change.

Massachusetts state transportation officials have approved a slimmed down version of the "west of Lechmere" Green Line Massachusetts Bay Transportation Authority [MBTA] light rail network extension to Somerville and Medford, The Boston Globe reported May 11. The 4.7-mile line has been trimmed to $2.3 billion eliminating fancy stations and escalators in favor of open-air stops and building a smaller car house. The state and federal governments already have pledged $996 million each to the project, which had been stalled for a year because of ballooning costs.

Denver's second electric multiple-unit commuter rail line will open July 25 to Westminster northwest of Union Station downtown, KDVR-TV reported May 5. The Colorado city opened first line from Union Station to Denver International Airport April 22 using EMU coaches built by Hyundai Rotem, the same consortium that built the Philadelphia SEPTA Silverliner V cars.

New Orleans Regional Transit Authority [RTA] plans to seek $26.7 million in federal funds to extend the Rampart-St. Claude streetcar line now under construction adjacent to the French Quarter tourist destination, The Times-Picayune reported May 6. The 1.6-mile line would be extended from Elysian Fields to Press Street where railroad tracks block any further expansion. A federal "TIGER" grant will be sought but competition for that economic recovery funding is stiff nationwide.

On the sadder side, the Atlanta Journal-Constitution reported on May 26th that the Georgia Department of Transportation has given Atlanta until June 14 to respond to 60 problems it found with the city's $98 million modern streetcar or it will shut down the 2.7-mile downtown car line. Cited were poor maintenance and inadequate staffing. Federal investigators last year found issues with the overhead trolley wire, management, staffing and safety problems and failure to comply with accident reporting.

.....MODELING NEWS.....

Southern California Traction Club Investigates N scale!

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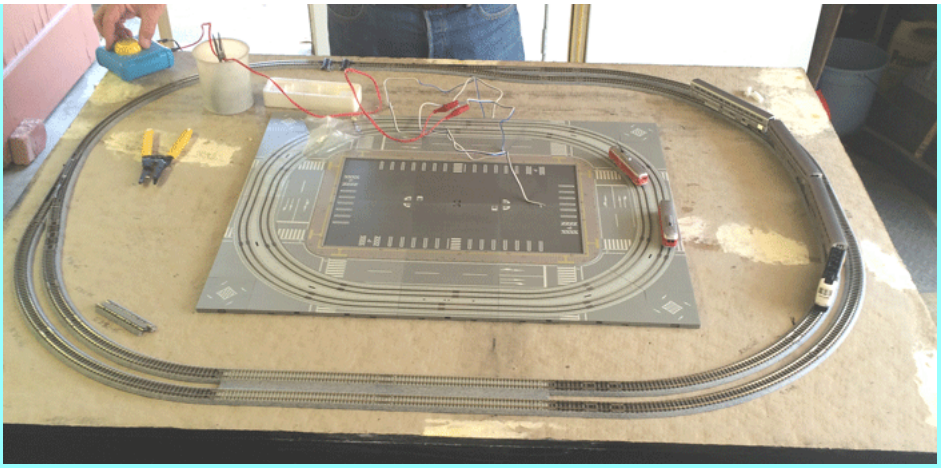
Almost every model railroad club today is concerned with continuing operations. The aging process of the members has continued and newer members are still hard to find. As the pool of hobbyists continues to dwindle, thought has been to broadening the outlook of the club. First, as the Southern California Traction Club (SCTC) is located in the greater Los Angeles area, several events have taken place since the club was founded in 1995.

The major railroads have consolidated reducing the visibility of the number of freight and passenger trains visible in the area. On the other hand there has been a dramatic increase in both light rail lines operating in the area and the commuter trains, Metrolink, operating from Union Station. The prospect of operating push-pull commuter trains requires pushing long passenger commuter cars with a locomotive and keeping them on the tracks. To successfully do this would require larger than normal traction type radius curves such as 28" to 30" radius in HO scale. This would all but eliminate the normal four-foot wide module and result in huge transportation problems. After thinking about this issue, the club decided to investigate the use of N scale.

The club took two older unused trapezoid shaped 1999 era modules and joined them to form a 3' by 4' module and proceed to investigate the Kato and Tomix lines of sectional railway and tram track that make the use of such a smaller scale practical and enjoyable. By the end of May, the commuter line (shown as the outer circle of track in the next photo) was completed and tested using an Athearn F59PHI and three Amtrak coaches borrowed from one of the club's Emembers.



Work is in process with the downtown streetcar line that will use modern streetcars. The club decided to add this since no one in the HO scale model railway manufacturers group has seen fit to offer a United States prototype Light Rail Vehicle or Modern Streetcar at this time. Meanwhile several such models are made in Japan by Kato and other non-U.S. manufacturers. The club also acquired a Kato Portram streetcar for testing as shown in the next photograph. The club was still experimenting with the Tomix and Kato tram track as the month ended.

Accordingly, the SCTC decided a few years ago to concentrate on displaying models of currently operating urban electric vehicles. The club is also actively working with Custom Traxx and Volkmar Meier to use the 3D printing process to produce HO scale models of the Siemens S70 Ultrashort (Atlanta, Salt Lake City and San Diego versions) and the United Streetcar model 100/200 (Tucson and Washington D.C. versions). Custom Traxx has been testing various models of the S70 and will begin testing the first HO scale model of the United Streetcar model 100/200 in August. Plans are to revise the drawings for possible models in N scale as soon as an appropriate power drive can be found, tested and adapted. Trolleyville is starting to receive a lot of good information from N scale electric railway modelers and some of this will be shown in later issues of the Trolleyville Times.

TECHNICAL INFO .....

How Often Have You Heard This?

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by John McWhirter

I've heard it more than a few times from other modelers that the operation of non-DCC equipped motors will result in them burning up if left standing in place for any length of time.

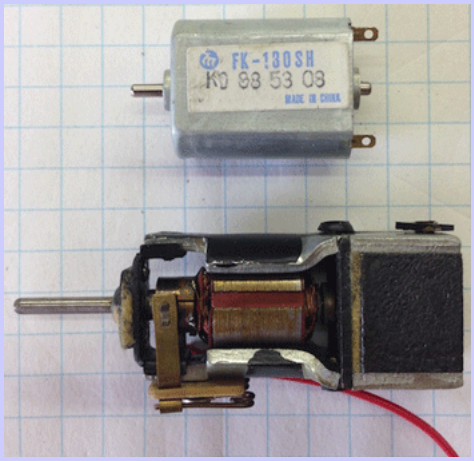
When the Southern California Traction Club began working with DCC about 10 years ago, Digitrax seemed like the most common system used by other clubs. They had great exposure in the hobby shops at that time. One of the features of their system is to allow operation of non-decoder equipped locos using address zero (00). The process is known as zero stretching.

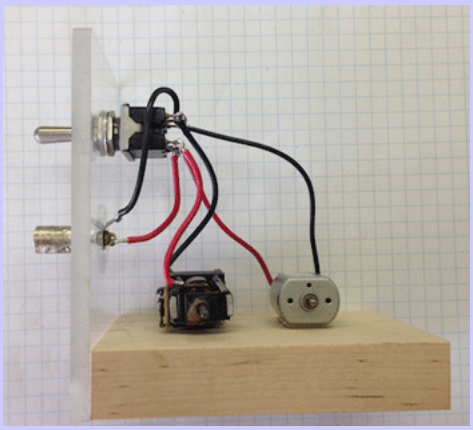
Let's explore this a little further.

The output voltage from the DCC system to the track is in the form of a bipolar DC signal. This results in a form of alternating current. The command station quickly changes the direction of the DC voltage, resulting in a modulated pulse wave. The length of time the voltage is applied in each direction provides the method for encoding data. A binary "one" is nominally 58 microseconds and a "zero" is longer at about 100 microseconds. The data is streaming at up to 200 packets of 36 bits each per second. Doing the math will result in a frequency of about 8 kHz. To allow address zero operation, either the high or the low pulse of the zero data bit can be extended or stretched to make the average voltage (and thus the current) either forward or reverse. However, because the raw power contains a heavy AC component, DC motors can heat up more quickly than they would on DC power, and some types may even be damaged by the DCC signal.

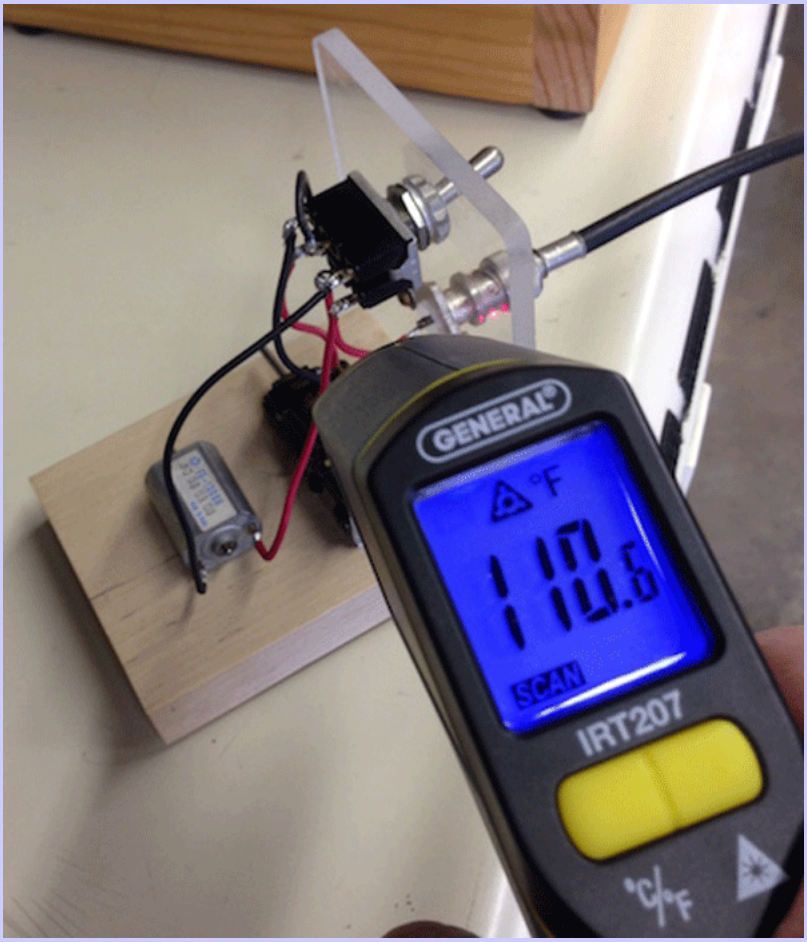
I've tried this mode of operation many times. There is a high-pitched buzz or whine in the motor when running or stopped which does not change much in volume. The buzz is due to the high frequency pulse modulated wave form of the DCC signal present on the track. To set the record straight on the mater, or at least to add to the wealth of empirical data on the subject, I proposed to a fellow club member, a simple test. Lets try to "burn up a motor with a DCC signal".

Up to the challenge, I offered two motors to test. One is a vintage open frame motor commonly used in imported brass trolleys from 50 years ago. The other is a modern can motor often seen in today's ready to run models. Here's a photo of the candidates:





I built a test stand to allow connecting the motors to our SCTC standard BNC cable hardware. A DPDT switch allows powering each motor independently. To provide some degree of quantitative results I employed a remote reading infrared thermal detector to monitor the expected rise in temperature.



In order to establish a base line for the results, I first determined that the motors functioned properly with a pure DC input. The motors were run with a constant 7 VDC for 30 minutes beginning at room temperature. The temperatures were measured and recorded every 5 minutes. The second test phase involved running the motors with a Digitrax Zephyr Xtra using address 00 at a speed setting of 2 on the throttle for 30 minutes. The temperatures were recorded as before. The final stage was to reduce the throttle setting to 0, stopping the motor, and leaving it powered by the pulse modulated wave form. During this final step, I applied the throttle momentarily to check the motor function. It was my intention to let this condition remain until I could no longer get the motor to run at throttle setting 2. The temperatures were taken as before. If the motor failed to operate, I would conclude that it had burned up. Following this final stage, I shut off the DCC system and let the motors cool down to room temperature. I then attempted to run each with 7 VDC again. A table of the results is shown below:

TIME/TEMP (F°) for Can Motor and Open Frame Motor on DC and DCC

Min	Can DC	Can DCC-2	Can DCC-0	Open DC	Open DCC-2	Open DCC-0
0	72	78	78	71	76	82
5	76	86	84	87	121	106
10	75	94	87	109	123	113
15	80	99	84	108	145	118
20	81	101	86	109	149	118
25	84	103	86	110	152	121
30	84	103	86	114	153	121

35			86			120
40			87			121
45			88			120
50			87			119
55			87			120
60			87			121

Let's look at the results. I never expected the motors to actually catch fire, throw off a shower of sparks, or otherwise meltdown. Failure of the motors would be demonstrated by their inability to spin. This result could be the result of a short or open in the winding or a loss of magnetism. Without going into the science of it, (I remember the experiment in materials science lab with the BBs, a magnet, and an oven) as the temperature of a permanent magnet is increased, the field strength decreases. The first test showed that each motor heated up running on a straight DC signal. This is what we all experience running our trolleys for a period of time.

As expected, the can motor ran cooler than the open frame motor. The real increase in temperatures came when running with DCC address 00 at throttle setting 2. The can motor seemed to stabilize after 30 minutes while the temps in the open frame continued to rise slowly. The final test phase is where I had hypothesized that excessive heating would occur. The test data clearly shows otherwise. I cut short the testing time on the motors powered by the DCC signal with a 0 throttle setting (standing still). In each case there was some heat generated, but the tempera-tues stabilized after an hour without failure of either motor. It's likely that more heat would have been generated had the motors been under the type of loading expected in real operation. That would have given higher numbers but I believe the same trends would emerge. Of course, the test with the shaft not turning would not be influenced by any connected load. The temperatures encountered were not in the range to cause any significant decrease in the field strength of the permanent magnets involved.

Any conclusions?

While the results were not as dramatic as I had expected, it is clear that actually running a non-DCC equipped loco on address 00 is more likely to result in motor failure than leaving it sit on the track idle. These motors will heat up to a point where the heat dissipated matches that generated. This occurs at a lower temperature in a can motor than in an open frame motor. I did not have a coreless DC motor to test. There would be a higher risk of failure using one of these motors, which lack the iron core and the ability to easily dissipate heat. These precision motors are expensive and not often found in model railroading however.

So, why address 00? Short address 00 on the track is actually a reserved NMRA locomotive address per DCC Standard S-9.2. Per DCC RP-9.2.1, this address is used as a global decoder address to talk to ALL DCC locomotives at the same time. It's called the Broadcast Address. Commands like Emergency Stop can be sent to the track at address 00 and every locomotive on the layout will stop with this one command! A problem occurs when you enter 00 into the throttle. All locos will respond together to functions and throttle settings. To solve this problem, most manufactures simply decided NOT to support DC locomotives. Address 00 can't be entered into the throttle or into the loco parameters. NCE is one manufacturer that has chosen this approach. Others like Digitrax and older Lenz systems came up with a solution that allows for access and control of a DC locomotive. Thus, short address 00 becomes a very special command that ONLY the command station recognizes as a throttle command to stretch the zero in the DCC signal/waveform to conform to the protocol needed to run an analog locomotive. It does not change any DCC command packet information but only slows down how fast they can be sent. At a time when most modelers were converting from DC to DCC operation there was interest in allowing for operation of older non-decoder equipped locos on DCC powered track. The address 00 capability can be seen as a marketing tool to ease the transition for some modelers. This capability comes at a price however, motor heating is an issue that has to be understood and managed to avoid failure.

Note: John McWhirter is on the Board of Directors of the Southern California Traction Club and is the DCC guru for the club. He attempts to maintain currency on the latest technology and was first in the SCTC to obtain a smart phone. He also has investigated some of the more sophisticated DCC systems now used in Europe such as the Roco z21 and the PIKO Smart Controller.