Vintage Trolleys in Santa Clara County

MALCOLM R. GADDIS

The Santa Clara County Transportation Agency, light rail division, has a 21-mi system operating from the Great America area of the city of Santa Clara to the Santa Teresa area south of San Jose. Vintage trolleys operate over the downtown track for a distance of about 4.5 mi, providing alternate local service from the Civic Center to the downtown mall, serving various shopping and restaurant areas. The historical trolleys used include four early California-type cars constructed primarily of wood that originally served the local area. These cars were all restored from vehicles found nearby. Two international cars are on the roster, one from Melbourne that operates regularly and a Milan car that is still being restored. Trolleys are operated by regular light rail vehicle (LRV) operators who receive additional special training for this service. Special overhead trolley hardware was installed when the original light rail contact wire was put up; this avoided changes at a later date. The transit mall was opened for LRV service on June 17, 1988, and the vintage cars went in service on November 18, 1988. Both trolleys and LRVs use the same stations and connect with various bus routes in the downtown area. The regular fare for vintage trolleys, which operate from 9:30 a.m. to 3:00 p.m., is 50 cents.

Electrified streetcars first appeared in San Jose, California, in the early 1890s. The first electric system was a narrow-gauge line from San Jose to Santa Clara. Various power collection methods were tried, including an underground system that was quickly replaced by overhead wire. First Street was successfully electrified, and service was initiated on February 20, 1891. From this beginning, branches radiated south to the cemetery, east to Alum Rock Park, west to Saratoga, Campbell, and Los Gatos, and then finally north to Palo Alto.

By 1915 there were 126 mi of trolley wire in the Santa Clara Valley, and the streetcars were at the height of their popularity. By this time, two systems were operating, one of which was the Peninsula-San Jose and Palo Alto, Congress Springs, Los Gatos, Saratoga, Campbell, and Alum Rock Park. The most popular ride in this period was the “Blossom Trolley Trip” usually operated with the “Big Palys” series of cars, numbered 105-112, built by Jewett in 1913. These cars were the same as the 1000-series of the Pacific Electric (PE) Railway in Los Angeles, and, after abandonment, they were sent to the PE where they lived out their lives as cars 1050-1057 until they were scrapped in the 1950s.

The other company operating streetcars in the area was the San Jose Railroad. It was related to the Peninsula, with which it sometimes exchanged cars, and the two systems also shared some track. However, the San Jose Railroad operated primarily within the city limits of San Jose, with the exception of a northern extension to the city of Santa Clara.

The Peninsula Railway abandoned all service with the closing of the Mayfield Line in October 1934. The remaining equipment included some city cars, a box motor, wrecker, and line car, along with about 12 mi of track in city streets, which were conveyed to San Jose Railroad. The San Jose Railroad continued to operate until April 10, 1938, at which time all of the South Bay area bade farewell to their once-proud streetcar system.

Following the end of trolley service in San Jose, rails in the street were paved over, car bodies were stripped of all usable metal and the remains sold to farmers for storage sheds, while some went for living quarters. In the late 1950s, the body of Peninsula Railway Car 61 was lifted out of a backyard and taken to Lou’s Village Restaurant, where it was partially restored as a museum piece. It and the body of Car 52 eventually made their way to Rio Vista Junction, where they are now in the Bay Area Electric Museum.

REBIRTH OF THE TROLLEY SYSTEM

With the surge of interest in building a new light rail line in San Jose, a few rail enthusiasts remembered the vintage cars that operated downtown; they hoped to find an old trolley car body that could be restored.

The first car located was actually a Sacramento car, No. 35, which had been in operation until about 1948 when its body was sold for use as a storage shed. This car was picked up by Charles Smallwood, placed on a pair of dummy trucks, and stored at Rio Vista in the trolley museum. It was later donated to the San Jose Trolley Corporation with the stipulation that it be numbered Car 129 and be painted the yellow and red of the San Jose Railroad.

In the early 1980s, two former San Jose trolley cars were located along Almaden Road. They had been used for farm worker housing and had badly deteriorated over the 40-plus years they had sat on the ground. These car bodies (Peninsular No. 73 and San Jose Railroad No. 124) were moved to the Kelley Park/San Jose Historical Museum in 1982. About the same time, it became apparent that some sort of organization was needed if these cars were going to be properly restored and made suitable for operation.

TROLLEY CORPORATION ESTABLISHED

The San Jose Trolley Corporation was formed in 1982 for the purpose of restoring vintage trolley cars. Restoring trolleys is a very complex operation, starting with an old termite-eaten car body and ending up with a fully operational vehicle that will meet all Public Utilities Commission (PUC) requirements for revenue passenger service. Without an organization, the cars remained in the dirt, and little progress was made to restore them.

Santa Clara County Transportation Agency, 101 W. Younger Avenue, San Jose, Calif. 95110.
Fans took a look; some sanded a little to see what the other colors of paint were that had covered the bodies over the years. It soon became apparent that if these cars were going to be restored, a lot of work had to be done, and a lot of money would be needed. Buildings would be needed where qualified workers could turn axles, weld underframes, wire the high voltage systems, replace the roofs, put the air brakes back on—the list went on and on.

The new San Jose Trolley Corporation included charter members, such as Rod Diridon, a well-known Santa Clara County Supervisor, with a great interest in rail transportation. He was joined by a group of community leaders, including lawyers, businessmen, labor leaders, skilled workers, and numbers of very willing (though not quite so skilled) volunteers.

One of their first projects was to build a trolley barn in Kelley Park in south San Jose. Pacific Gas and Electric (PG&E), along with several building contractors, donated materials and labor to construct this three-track building with several work areas. Old machine shop equipment was donated along with woodworking tools, all of which seemed to find their way to the building along with people who wanted to help.

LEADERSHIP FOR THE TROLLEY SHOP

The next task was to search the country for an experienced master car builder, a full-time position. The person needed to have streetcar restoration experience and also had to be someone who could direct volunteers as woodworkers, painters, electricians, machinists, pattern makers, upholsterers, and glass cutters. At the same time, this person needed to be able to work with high school and college students, make drawings of any part on the car, while knowing how to repair air brakes.

Fred Bennett was hired from the Branford Museum in Connecticut, and for more than 5 years he has patiently overseen the work as the cars have changed from rotted sheds to beautiful works of art—comparable to trolleys just delivered from the American Car Company.

Each of the first trolley cars took more than 3 years to bring back to life. This represents a lot of hand labor, but that is only part of the reconstruction. Each restoration takes a lot of money. For example, the two car bodies recovered from Almaden Valley had been resting on the ground for 50 years. Much of the work body was rotted away or full of termites. Nearly every metal part had been removed before the car body was sold at the San Jose Railroad's scrap yard on San Carlos Street. The wheels and axles were gone, along with the traction motors, air compressor controls, and air brake equipment. When used as houses, sides were removed and bathrooms were installed, holes were cut in the floor, windows were knocked out, and roof lines were changed.

What was left was not much to work with, but with a closer look and a little imagination, an old streetcar could be seen. Looking for new hardware for a car built 90 years ago is a full-time job in itself. New wheels and axles were purchased so that the cars could run on the Santa Clara County Transportation Agency (SCCTA) light rail system and meet railroad standards. K-35 controllers were purchased from Milan, Italy. Air compressors were purchased or traded from other trolley museums. Many wooden patterns were made and taken to the local foundries to get parts for seats, couplers, queen posts, brakes, handles, and numerous other pieces of hardware. New high-voltage wire was purchased along with heavy-duty steel air piping. Trolley poles are still made as well as whistles and bells. But all this adds up, and the cars probably cost about $200,000 each.

PARTS FOR RESTORATION

Obtaining parts to reconstruct vintage trolleys is an endless task. The first car was delivered with a body in reasonable shape, and it also had a pair of turn-of-the-century Brill 27G trailer trucks. The wheels were worn beyond condemning limits, so it was necessary to purchase new wheels from Standard Steel, Burnham, Pennsylvania. These were bought to match the LRVs with Association of American Railroads (AAR) standard contour, but slightly more clearance back-to-back to allow for operation on down to 80-ft radius curves. With only the set of trailer trucks, it was necessary to obtain matching power trucks. As a result, a pair of Brill 27G American-built power trucks was purchased from a museum in Minnesota. The two trucks differ in some respects, such as wheel base, axle diameter, and hardware; however, only a sharp traction fan would notice the difference.

It was decided to keep two motors in one truck and run the other as trailer truck, rather than one motor in each truck as had been the operation standard in the early days in San Jose. Cars 124 and 129 now operate with mixed Brill trucks and full 5-1/2-in.-wide tires.

The next trucks that were available were two pairs from Melbourne, Australia. These trucks are very similar to American-built M.C.B. types as used in many high-speed cars and locomotives. When these trucks were received from Melbourne, they had narrow transit-type tires and would have dropped through the frogs on the LRV system, so it was necessary to replace the old tires. During a study of the truck frames, it was determined that a wheel set with 5-1/2-in. tires would not fit without contacting the equalizer or other truck hardware.

Early electric interurban cars designed to operate partially over steam railroads had a "compromise" wheel that would operate on street railways as well as steam main line. These cars had tires measuring nearly 4-1/2-in.-wide. Tests were made through the light rail yard and over various switches, and it was determined that the 4-1/2-in.-wide tire would operate safely and had several years of reserve metal to keep it from dropping into No. 4 switch frogs. As a result, four of the vintage cars will have compromise 4-1/2-in. tires. In more than 2 years of regular operation, Car 73 has shown little wear on any of the tire surfaces. This particular car also has composition shoes.

The first vintage streetcar was placed in service in November 1988; to date, no wheel turning on the Hegenscheidt lathe has been required. A few minor slide flat wheels have been experienced; however, they have all been small enough to wear back round or to true up with hand grinding.

All cars are equipped with GE K-35 controllers, whereas all but the Australian car have LB-2 line breaker control handles. The Australian car is equipped with an older ratchet-
type line breaker control that has provided very reliable service.

A slight reverse movement on the operating handle of either controller unlatches the power to the overhead line breaker, immediately dropping the power to the traction motors. This safety provision has been used as a near equivalent to a “dead man” system for nearly a century. In addition to the controller-power off provisions, vintage cars are all equipped with a series of overhead line breaker switches at each end of the car. This allows the conductor in the rear of the car to also cut off power in an emergency.

UPGRADING FROM MUSEUM STANDARDS

Most vintage streetcars are restored to a museum standard that is usually a thing of beauty with much polished wood, bright brass, and glistening paint.

To operate a historical trolley in revenue service, much more work is required. The window glass at the ends of the car must be safety plate, seats and gates must always operate properly, the brakes must pass strict stopping distance tests, steps must have the required clearance, trucks must be completely overhauled and meet operating railroad requirements. The whistle and bells must work at 75 to 85 dB(A), and the hand brakes must be able to hold a full car on the steepest grade.

When operating in revenue service, vintage cars come under the California PUC, and they are subject to the same rules as LRVs.

POWER

Overhead power for Santa Clara County’s light rail system is supplied at 840 volts direct current (dc) to the overhead. Historically, most vintage trolley systems operated from 550 to 600 volts dc. Therefore a voltage dropping device is required to protect the traction motors and other electrical equipment. Several exotic devices were investigated, such as multiple groups of MOSFETS (a semiconductor circuit for dropping voltage and maintaining uniform output with various loading). Reducing de from 900 to 600 volts at 200 amps with electronic circuit has not yet been developed to meet trolley car requirements. Vintage cars in San Jose use a heavy-duty 2 ohm dropping resistor for the power circuit and other combinations of resistors for the compressor and controller latching. The power resistor arrangement is made up of sixteen 0.89 ohm Milwaukee resistor elements, part No. 792. This provides eight even steps of power, five in series parallel and three in straight parallel.

Current limiting is handled by a GE DB-986 overhead line breaker set to trip at 200 amps. This setting provides overload protection to the traction motors and will trip if the operator advances the K-35 controller faster than 1 sec per position.

The air compressor (CP-25) has a 90-ohm resistor in series to drop the dc voltage to about 575 volts. Amperage in the circuit is less than 5 amps.

Lighting circuits are made up of two sets of seven GE 56-watt 120-volt street railway lamps in series. A headlight switch directs power either to the headlight or to an overhead lamp above the operator. When the overhead lamp is on, it is an indication that the headlight is off. Each vintage car has a total of sixteen 120-volt lamps, with the location of lamps varying with the style of car. Some have step lights if steps are at the corners and light at night will help passengers.

OVERHEAD WIRE CHANGES

Integrating vintage trolleys with LRVs in the transit mall area of downtown San Jose was considered before the contact wire was strung in that area. Trolley wire frogs were installed as the overhead was being put up; also, additional tie wires were installed and circuit isolators were revamped to accept trolley poles. In the downtown area, all of the Siemens insulator clamps were replaced by Ohio Brass hollow screw clamps so that the trolley car J-type shoes would not contact the large Siemens bolt heads.

Regular routes were established for trolley cars in and out of the shop area so that all the overhead wire involved was equipped with the required trolley frogs. The downtown area is completely equipped with overhead frogs so that vintage cars can continue to loop the mall or pull out of the way of LRVs on the northbound loop off First Street.

SCHEDULING

Vintage cars are scheduled to follow right after LRVs whenever possible. When departing from the shop holdover point, trolleys wait for scheduled LRVs to pass before entering the main line. If an LRV is in sight on the downtown loop heading back north, the trolley will hold up to let it pass, avoiding any possible delay on First Street. Figures 1 and 2 show the route.

Heaviest usage of vintage cars usually occurs between 11:30 a.m. and 1:30 p.m. when office workers take the vehicles downtown for lunch. During the Thanksgiving and Christmas holidays, patronage is high when the cars are running later at night to accommodate shoppers and people who want to visit the downtown holiday displays.

SERVICE HOURS

Normal trolley service hours are from 9:00 A.M. to 3:30 P.M. weekdays and 11:00 A.M. to 6:00 P.M. weekends and holidays. Trolleys run every 20 min between the Civic Center Station and downtown.

FARES

Regular vintage trolley fares are 50 cents for adults (18–64 years) and youth (5–17 years). Seniors (65 and older) and disabled passengers pay 25 cents. Tickets have a 2-hr time limit. Tickets may be purchased from ticket vending machines at the transit mall or Civic Center Light Rail Station. A button on the vending machine is marked Historic Trolley. Valid Santa Clara County Transit District bus and light rail passes
are good on vintage trolleys, but vintage trolley tickets are not valid for travel on LRVs or buses.

PUBLIC ACCEPTANCE

The combination of vintage cars with the streamlined LRVs provides an attractive contrast in transportation. Local residents enjoy taking a step back in history by climbing on the old-fashioned cars that served their city 50 years ago. Tourists enjoy a ride on the San Jose vintage trolleys and make the cars a part of their trip—just like their planned tour on the San Francisco cable cars.

TROLLEY CARS IN SERVICE

Each of the five vintage trolleys in service has an individual history and its own set of distinctive features. Table 1 summarizes this information.

Car 1 was built by the Sacramento Electric, Gas, and Railway Company and ran in Sacramento from 1903 to 1906. It was sold to the new standard-gauge Union Traction Company in Santa Cruz, California, in 1907, going into service after the 1906 earthquake. In 1923 it was taken out of service and used as living quarters behind a laundry on lower Pacific Avenue. The laundry owner donated the deteriorated car body, which was then in two pieces, to the San Jose Trolley Corporation. A new steel underframe replaced the rotten wood floor and the body areas. The car was then reconstructed one board at a time with wood sides and brass hardware. The car body was restored to its original "convertible" configuration. For summertime at the beach, the windows and sides could be removed—making it a completely open car. The interior of the car is solid ash. It was returned to service in San Jose on August 3, 1990.

Car 73 was built by the Jewett Car Company in Newark, Ohio. It ran in San Jose for the San Jose Railroad from 1913 to 1934. Then it was sold for use as housing on Old Almaden Road. Car 73's exterior is bright yellow (similar to Car 129's) that contrasts with a rich mahogany interior that is almost identical to Car 124's. Car 73 returned to service on May 12, 1989.

Car 124 was built for the San Jose Railroad by the American Car Company in St. Louis, Missouri. It ran in San Jose from 1912 to 1934. Then it was sold with Car 73 for use as housing. In 1920 its original red paint scheme was changed to yellow and windows were added to the open sections. Car 124 was
restored and returned to service in San Jose on November 18, 1988.

Car 129 was built by the American Car Company for Sacramento Gas and Electric. It operated in Sacramento as Car 35 from 1913 to 1948 and is identical to cars that ran in Santa Clara County. After 1948 the car was used as a storage shed before being acquired by Charles Smallwood and leased to the San Jose Trolley Corporation for restoration. Before his death in 1986, Mr. Smallwood requested the corporation renumber 35 to Car 129 and paint it the yellow San Jose Railroad colors. It returned to service on November 18, 1988.

Car 531 was built in 1928 by the workshops of the Melbourne and Metropolitan Tramways Board (M&MTB) in Melbourne, Australia, and ran on the Melbourne trolley system from 1928 to the mid-1980's. It was retired from service during an upgrade of M&MTB's trolley fleet. The San Jose Trolley Corporation bought the vintage trolley in 1986. Restored to its original factory-fresh chocolate-and-cream paint scheme, Car 531 features Tasmanian mahogany and polished chrome accents. It began service in San Jose on January 26, 1990.

Car 2001 was obtained from Milan, Italy, and was part of the group numbered 1993 to 2002 built for Azienda Transporti Municipal. The car was built for single-end operation and had three doors on the right side, unlike all of the other vintage trolley equipment in San Jose, which is equipped for double-end operation with doors on both sides.

The underframe appeared to be weak at the ends, and it was desirable to rebuild this car into a special charter car for possible service north to Santa Clara. The reconstruction of this car involves extensive steel work, the exchange of ends from Car 1943, new doors on the blind side along with heavy collision posts, and removal of many old and rusted structural parts. When completed, it will resemble a double end Peterwitt.

**OPERATING FIXED COSTS**

Operating costs for the vintage trolleys are shown on Table 2. In 1991, they totalled $641,500. Fixed costs, such as the initial cost for construction of maintenance and storage facility for six vintage trolleys and necessary improvements for their operation including powered switches, trolley pole provisions, and transponders, total $1.9 million.

**LEASE AGREEMENT FOR SIX TROLLEY CARS**

The Santa Clara County Transit District board of supervisors leases completed trolley cars from the San Jose Trolley Corporation at a nominal $1 per year. The district is also responsible for all operations and maintenance. Trolleys run on the San Jose transit mall and other such sections of the Guadalupe Corridor light rail system as permitted by the district. All operations of the trolleys are solely under the direction of the district, including, but not limited to, general purpose
TABLE 2 Approximate Annual Trolley Operating Costs, 1991

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and function; method of operation; fare structure and method of collection; and charter usage. Although the district is unable to alter the appearance of any vintage trolley in any way without approval by the San Jose Trolley Corporation, the collection of fares, operational procedures, and security measures are the responsibility of the district. The district is also encouraged to implement programs to discourage the use of the trolley vehicles for any purpose other than public transportation.

If a vintage trolley should be totally destroyed, the insurance payment covering the necessary parts, components, wheels, body, motor frame, and brake system is to be remitted to the San Jose Trolley Corporation. It will be their decision whether to obtain and rehabilitate another similar vintage trolley.

FINANCING

The cost for all materials and parts needed to equip a car body probably rounds out to about $200,000. To this is added a few thousand hours of volunteer labor and supervision. After the vintage car is assembled at Kelley Park Trolley Barn, it is moved on a flatbed trailer and taken to the light rail maintenance facility where the shop crew usually spends 3 or 4 weeks completing detail work and checking safety appliances. Lengthy tests are made to ensure that the car is ready for revenue service.

Money to purchase wheels, motors, controllers, air brake equipment, and all the other required hardware is obtained from various sources. Many local business people have contributed generous sums, including The Fairmont Hotel, San Jose Mercury News, Heritage Cablevision, Hugh Stuart Center Charitable Trust, Collishaw Corporation, Pacific Gas and Electric, California Engineering, UTDC, Peninsula Crane and Rigging, and Kearny Pattern Works, along with many donations from the volunteer workers who developed more of an interest as they worked restoring the cars.

DOWNTOWN OPERATION

Operating vintage streetcars on downtown streets has generated a great deal of public pride by providing visible ties to the community's past. With a mixture of old and new building styles in the downtown, the combination of old and new transit cars presents a compatible blend of styles (Figures 3 and 4).

The pleasant attitude of the regular vintage car operators gives old and new passengers a warm feeling as they board and ride through the downtown area. Both types of cars make the same stops, with maximum speed in the mall held to 15 mph. Trolleys tend to stay at 15 mph; however, in separated center sections of track on North First Street, vintage trolleys may increase their speed to 25 mph or more.

Rail fans and tourists find riding on and photographing the vintage cars a great pastime, but the largest share of the riders are locals. At noontime several large surges of working people ride downtown for lunch. Many shoppers just ride a stop or two and then later catch an LRV or a bus home. At nearly any time of the day, families, school groups, business people, and others can be found just taking a ride or two for the pleasure of the trip. During the Christmas season, with the increased shopping push, two cars are usually operated continuously, and the cars remain generally full.

FIGURE 3 Modern light rail vehicle at a station.
The vintage cars have been involved in two minor accidents with automobiles. No one was hurt in either accident. All vintage cars have a standard-height anticlimb bumper that also locks with an LRV if bumped together on the end. The anticlimber holds the cars together and prevents them from climbing over each other and wiping out the end of the car. All the trolleys have reinforced ends to protect the passengers and operators. Vintage cars are not designed for high-speed, main-line service; the only exception to this is the Milan car now being converted from single-end to double-end operation. When this steel car is completed, it will have heavy collision posts at both ends with reinforced end platforms and a pantograph. It will then be able to operate north to Santa Clara in the median of First Street and Tasman. Here, trolley speed will be governed by the trucks and low gear ratio of the traction motors, probably not exceeding 25 mph. When operational, this car will be available for charters in addition to regular downtown service.

**TRAINING**

Prior to running a vintage trolley at SCCTA, an operator must have a Class B commercial driver’s license, must have taken the necessary bus operation training to get that license, and completed LRV operator training. The 1-week “Historic Trolley Training Course,” which starts with a special “Book of Rules” section and test, includes a review of car equipment and operating procedures. A hands-on examination is given, including use of air brakes, the controller, trolley pole power pickup, running lights, transponder, and emergency stops without air brakes. All this is followed by an operation qualification test. Scores on portions of the examination must be 100 percent correct or the course must be taken over.

**INCLEMENT WEATHER**

During inclement weather, ridership on the vintage trolleys usually drops. In addition, four of the trolleys are California Cars and have open ends with much exposed finished wood and rattan seats, so these cars are kept inside during the rainy season. However, Car 531 is totally enclosed and has windshield wipers and is usually operated during the rainy season. When completed, the Milan Car 2001 will also be enclosed and have windshield wipers.

**CONCLUSION**

Vintage trolley supplements to LRV systems should be encouraged. These cars add so much personality to the system, especially if the cars are authentic to the area. If not, one or two of the cars should be similar to former system cars. These can then be supplemented with authentic streetcars from other countries—especially those countries with cultural or economic ties to the community.

The cost of such a system may sound high. But when the civic pride that these pieces of transportation history bring is considered, and the way a trolley program can strengthen visible ties to the community’s past, it is well worth the cost. Local dollars can usually be found for an investment in living history.