Volume 21, Issue 1

January / February 2002

The Newsletter of the California Trolley & Railroad Corporation

The Clearboard

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Rod Diridon, President http://www.ctrc.org Larry Murchison, Editor

Special points of interest:

- How much money do we have?
- Who is Annette Nellen?
- How to increase the energy in steam.
- What is 180 grit?
- Where are conical seats used?
- It's yearly dues time.

INSIDE THIS ISSUE:

News From The President

From Rod Diridon

What a year we've had with another in the offing! The year began in good form with the Trolley Barn operating at full capacity with the volunteers sorting out the kinks on the Steam Traction Engine, beginning the reconstruction job on the historic water truck, and adding the finishing touches to the Birney Car. The Happy Hollow Rail Line had been graded and laid and PG & E had agreed to install the overhead electric wire as soon as the plans were approved by the City. Unfortunately PG&E has filed bankruptcy and can't complete their pledge though PacBell has now agreed to accept the task but still needs the final plans signed off by a licensed electrical engineer and the City. That electrification effort will be a primary focus for the coming year. The other trolley projects are progressing well.

The massive task for the Locomotive 2479 project has been to move all of the dismantled elements of the Locomotive and the sheds/containers, tools and materials about a quarter of a mile to the new Steam Railroad Museum site on the North West Corner of the County Fairgrounds near the corner of Old Tully Road and Monterey Highway. The 100 ton boiler was moved by Kelly Brothers House Movers, the rolling stock (tender and caboose) were moved by the 2479 volunteers assisted by CalTrain and Industrial Railways Company volunteers. The new site was leveled and almost 1,000 yards of ballast rock was donated, delivered, and graded by donor contractors to allow access to the various pieces of equipment being stored in the temporary location until the Museum is built. The two historic passenger cars were rerailed and and snap-tracked to a location that did not intrude into the Museum construction project. Peninsula Crane and Rigging was especially helpful in donating crane services during this effort as they have so often in the past. Those efforts, in the rain, wind, mud, dust, and aggravation, were Herculean in all respects and took a significant part of the year.

The Locomotive 2479 reconstruction had proceeded to the point beyond which professionals must do much of the work. The huge Manley boiler job is nearly competed, though some disagreement continues to exist on details. The Manley crew, guided by Jack Young and the volunteers, will be back soon to complete the final details and conduct the hydrostatic pressure tests. A professional estimate has been obtained regarding the work remaining to be completed and those tasks, primarily the reconstruction and reinstallation of the running gear and control systems, are being divided into biddable projects. The bid documents and model contract are in the final stages of development and will be let for quote to four contractors in the US that might be able to do this unique work. This effort will be a major objective for the coming year.

To be continued in the March edition of the Clearboard.

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CTRC Board Meeting Minutes

November 15, 2001, from Leslee Hamilton

Empire Broadcasting, 750 Story Road, San Jose

Attendance: Marv Bamburg, David Crosson, Rod Diridon, Mike Kotowski, Kit Menkin, Larry Murchison, Annette Nellen, Pat Restuccia, Gary Ross, Dave Sylva, Charlie Wynn, Jack Ybarra, Jack Young.

Chair Diridon called meeting to order at 7:40 a.m.

Welcome and Introductions: The Chair introduced new board member and Finance Committee Chair, Annette Nellen. Annette is an outstanding accounting professor at the College of Business at SJSU. She attended the most recent CTRC finance committee meeting and will work with Treasurer Pat Restuccia on CTRC financial matters.

Approval of Minutes: M/S/C (Restuccia/Ross) to approve minutes from August 28, 2001.

Chair's Report: Not much has happened on the Museum Project in part because of the Chairs busyness but especially because of the problem with the donors needing to bond and indemnify the County. Rod will meet with the Associated General Contractors to help with a policy regarding donor contracting. Dave Crosson and Annette Nellen are working with Dan Morris (pro bono accountant from Berger Lewis) on an audit of CTRC's finances. The assets are scheduled to be revalued, and the 99/00 and 00/01 statements will be re-done to reflect the true values and bring the financial reports up to date.

Rod has spoken with representatives from the Moore and HP foundations but found that they aren't interested in historic preservation, though Betty Moore might make a gift. As soon as the audit is completed a standardized grant request will be mailed to several potential grantors.

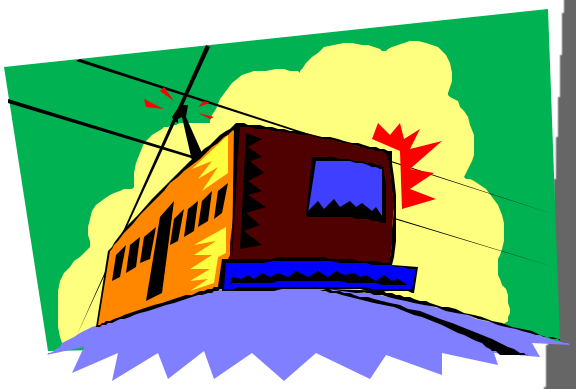
Financial Report: No financial statements were handed out; we'll wait until the statements have been adjusted to reflect the proper asset value and are in the new report format.

Annette reported that an inventory check would be performed on Nov. 30th. She will write up a procedure to guide the future valuing of assets.

Rod mentioned that CTRC has about $360,000 in reserves, has $4-5 million in physical assets, and is owed $116,000 by Santa Clara County.

Current Projects:

A. Trolley Projects - no report (Fred has been delayed).



B. Locomotive 2479 - Jack reported that 10-15 volunteers show up every Saturday for 8 hours. Volunteers on Wednesday nights use their time to prepare for Saturday's activities.

Spring rigging - boring of frames

Lead truck - new pins, bushings, springs, journal bearings, and thrust bearings

Superheaters - convert saturated steam to dry steam. To test, they pump them up to 1000 pounds and let soak for 30 minutes and look for cracks. Of the 40, 5 need repairs. 6 return bends were purchased, but more are needed. (See story page 4.) An ultrasonic thickness tester has been borrowed and will show areas that need to be pad welded. Manley is eager to come back but wants an amended purchase order for $11,000. Jack and Ken recommend paying. Per Rod, on a note from Jack, the Manley invoice will be paid.

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Peninsula Crane and Rigging lifted the last passenger car onto trucks; Rod sent a thank you note to PCR. CTRC received cribbing from Kelly Bros. We need to buy 50 tarps to cover the roundhouse. Rod will try to get them donated from A Tool Shed or Orchard Supply Hardware.

Jack asked that Rod get the wheel bid out. There's $74,000 in funds for the project.

C. SCC Rail Museum - Marv noted that the laundry building at VMC is available; CTRC would need to take it apart, move, and reassemble it. The work could be done next summer, but a pad needs to be constructed first.

D. Happy Hollow Rail Extension - there is a commitment from the phone company to do the poles and wires. The City of San Jose will need to approve the plans. Fred needs to get the plan revised and signed off by an electrical engineer. Dave and Rod will work with Fred to get the plans moving and develop a comprehensive list of material needs.

E. City Projects - Chuck, Fred, and History San Jose developed a revised safety and security manual for Trolley and Trolley Barn operations (Book of Rules).

M/S/P (Crosson/Kotowski) to authorize the president to approve on behalf of the CTRC board (joint with History San Jose) a safety and procedures manual.

The updated book will have a daily check-off for trolley operations' opening and closing records. Machines in the trolley barn have been tagged with safety messages, and more volunteers are now wearing safety glasses while operating them.

Mike mentioned that he could get a copy of Sacramento Shops' procedures manual and that the Sacramento Railroad Museum has dedicated one building to a machine shop with lots of equipment.

Dave talked about the opportunity to partner with History San Jose to bring Thomas the Tank Engine to San Jose as a fundraiser. CTRC has enough trackage, volunteers, and money for upfront costs. The issue was referred to the Fundraising Committee.

Dave also mentioned that HSJ's new facilities person thinks he can get someone in for an estimate on what CTRC could get for the missile trailer acquired from Lockheed. CTRC could then use that money to construct a pit for the Trolley Barn or another urgent cost if the City pays for the pit. About $20,000 is needed to build the urgently needed pit. San Jose Council member Cindy Chavez might carry the item as a budget request for CTRC. Rod suggested that we assess whether the trailer is big enough to carry a trolley; if not, we can sell it.

New Business

A. Acquisitions - CTRC is looking for a small steam engine.

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There's one in pieces in Woodland. CTRC has authorized up to for $5,000 to use it as a static display and questions whether it's rebuildable. The curvature of the trolley tracks limits the size. Wayne Yetter will attend UP's excess property auction with an eye out for a mail car that's been retrofitted for personnel use and three-piece track laying equipment that can be acquired for salvage value.

B. HHC Grant Application - The deadline for applying is the end of the month. Chuck and Jack have the files.

C. Fundraising Efforts - We won't be doing a fundraising train ride. Marv will remind Brenda Davis that we want to do a fundraiser in January in honor of Fred Bennett's 80th birthday. **The next quarterly Meeting: February 21st** E R

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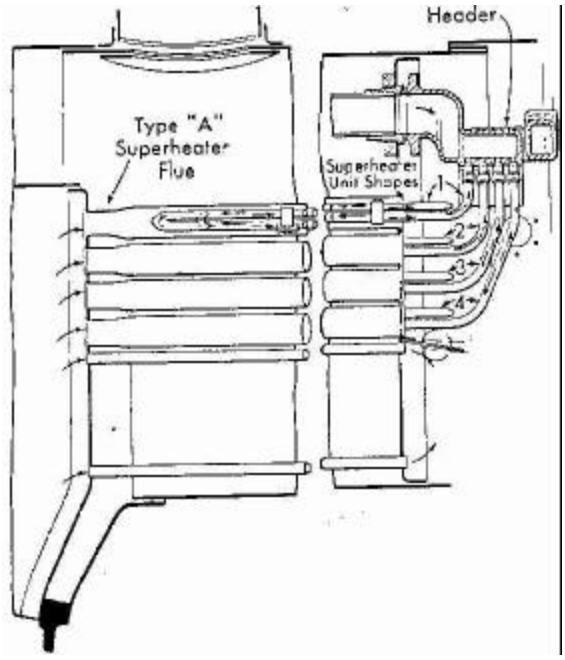
Superheater Progress

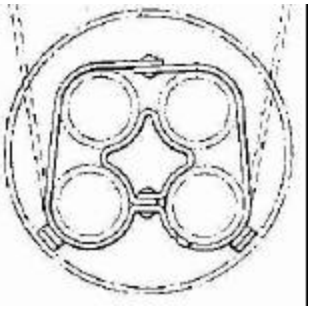
Submitted by John Zielinski

Originally steam engines were designed to operate without superheating. In early engines, water was evaporated in the boiler to create steam above the surface of the water. This steam ran through the throttle valve to the power valve and cylinder. Steam produced by this method is called saturated steam; it holds as much water as possible without condensation. One of the biggest problems in this type system was the condensation that developed from the throttle valve forward in the engine. The slightest drop in temperature after leaving the boiler will cause some water to condense from the vapor. This condensation washes away lubricants from the moving parts and causes a significant energy loss. The engine is forced to burn more fuel and make a greater volume of steam to recover this loss. Condensation can also cause other malfunctions in extreme situations. Since liquid water is not significantly compressible, larger amounts of it trapped in the moving parts of the power valves and cylinders can overstress components designed to deal only with the very compressible vapor.

In order to avoid these problems and increase the power and efficiency of the engine, locomotive builders introduced superheating. To accomplish this, the steam is not routed directly to the valves and cylinders from the throttle valve. Instead, the superheated engine contains an entire network of secondary piping that the steam travels through first. The steam is exposed again to the hot flue gases from the fire in this piping network, and its temperature rises rapidly. (See figure left below.) This increases the energy contained in the steam and thus its capacity for expansive work. Once the steam is superheated, small temperature losses through the piping, valves, and cylinders will not cause any condensation.



In the #2479, this superheating is accomplished as follows: The boiler contains many flues through which the hot combustion gases flow between the firebox and the smoke box. Most flues are only 2-1/4" in diameter, designed to pass only the hot gas, but forty of them are 5-1/2" diameter. The larger flues can hold the four-pass heat exchanger inside while allowing the hot gasses to flow around it. This heat exchanger is the basic superheater element. Each unit is a set of 1-1/2" diameter steel tubing that passes roughly four times the distance between the tube sheets of the boiler. The tubing is fabricated by cutting and bending four pieces of tubing to the appropriate shape. The three places where the piping must turn 180 degrees are forged together in a die to permanently join the four pieces into a single unit. This bundle of four tubes is fitted with internal spacers to keep the tubes separated from one another and banded on the outside to keep them from rattling around and hitting the flue walls. (See figure at right.) The ends of the unit are fitted with a swaged fitting containing a spherical surface. This spherical surface mates with a conical seat on the manifold in the smoke box. High force supplied by a 1" diameter tee bolt and nut holds the spherical shape against the conical one to form a seal.



Typical manifold clamp

Long after the superheaters were removed from the #2479, I made my initial contact. It had been a significant job to remove the nuts from the 1" tee bolts that attached each unit to the boiler at the top of the smoke box. One indication of the size of that effort was that

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Typical T-bolt

one of the fasteners broke rather than loosening. After removal from the engine, the tube units were stored on a specially constructed, wooden rack. Primarily Mike Demma, one of the volunteers, built this rack. Visual inspection of the superheater units showed lots of superficial rust, some gouges and dings, and lots of missing and broken bands. In addition, since the spherical sealing surfaces had been covered with grease to protect them they could not be assessed until they were thoroughly cleaned.

Testing the superheater tubes with pressure

I talked to several of our group's volunteers and also visited the Pacific Locomotive Ass'n team which restored the superheaters on the #2467. Mike Russell from that group was generous enough to lend us a hydrostatic pump system plus the spherical and conical lapping tools used to refinish the #2467's superheater joint surfaces. He has also been generous with good advice and answers to questions I asked as we tried to begin the testing process.

Then Scott Lindsay made his trip to survey the #2479 and added his input for the superheaters. At his instruction, the volunteers cut three returns from the ends of superheater units for further sectioning and visual inspection. Based on lack of internal erosion and general cleanliness, we did not cut any additional units apart, but rather set out to hydrostatically test the remaining 37 units.

Hydrostatic testing is not rocket science but as with other restoration activities on the engine, the team had to develop the detailed sequence of operations as they worked. First, the grease was cleaned off the spherical joint surface of the superheater, then it was lapped with successively finer grits starting with about 180 grit and proceeding to about 260 in two or three steps. The test manifold was attached to the tube unit and the 1" nut was torqued to the maximum value that our largest impact wrench can produce at full air pressure. The test pump was then attached to the unit and water was run through to clear all the dirt, scale, and as much air as possible. After the unit was filled completely with water, it was pressurized to 1000 psi. The team members then looked for leaks.

In order to pass the test, a unit had to seal with no visible water bubbles and hold pressure above 1000 psi for 10 minutes. This value is several times the pressure the unit will see in service. The rationale for using such a high pressure is that access to the units in the boiler is poor. They are oriented in an array of 5 rows and 8 columns. To access the top row units requires removing the four units in the column below it. Thus, finding a leak in the engine is not a pleasing prospect and testing to about five times boiler pressure will expose weak points long before they might cause problems on the road. The pressure capability of the tubing is far above the 1000 psi so the risk of damaging a good tube with this process is minimal.

After many false starts and a long interruption last winter to move everything to the new museum site, all the remaining units were tested. Five of the units did not hold pressure due to a defect somewhere in the piping. Most of these problems were in or near one of the three 180 degree bends that are included in each unit. This is a known weak spot of the design and several of our passing units show evidence of SP patches over the ends of these returns. CTRC was able to buy three, investment cast returns from the St. Louis Steam Train Association to use in repairing the units that were sliced up for inspection. They did not have enough extras in their inventory to sell us any more to cover the hydrostatic test failures. We continue to work on locating other potential sources of these repair parts.

In the meantime, the project can move forward by re-banding the units that passed the hydrostatic testing. These units need to have the remnants of the three steel bands removed from them. The spacers

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and bands need to be replaced with new ones and the two bands furthest away from the manifold connections need to have supports added to them. We were fortunate to receive the extra bands and spacers that the PLA volunteers made for the #2467. These parts will finish almost half the superheaters in our engine.

Our resident welder, John Blaine, has already banded three of the units and they are ready to be placed back in the boiler whenever that is appropriate. Phil Ruhle and John Blaine collaborated to obtain bar stock for the band supports needed. Our boiler requires 160 of these parts so we decided to use some of our more productive machine tools to build them. Most of the stock was cut to length, four pieces at a time on the large, metal-cutting band saw that John Blaine keeps at the site. Phil Ruhle started chamfering the ends of these pieces using the wall-mounted grinder. This was very hard on the hands and back and also very time-consuming. The author consulted Art Randall about possible setups for the Bridgeport mill donated last year by Bill Hewlett. Art constructed a marvelous little fixture for holding 6 pieces at a time. Using the new tool, Phil Ruhle and I were able to chamfer both ends of all the remaining supports in one Saturday. With this part complete we have moved on to the spacers and bands.

The spacers for the #2467 were formed from 2" sections of used 2-1/4" boiler flues. We expect to use the same technique so some of the flues removed from the #2479 will supply material for the rest of these spacers. I cut about 20 spacer blanks last Saturday and by the publication of this article, the rest should be finished. The bands were formed from sheet steel that can be readily purchased. We hope to borrow the tooling used by the PLA to form the bands and spacers. When we have a sufficient supply of all these parts, we should be able to make all the superheaters ready for reinstallation.

Before any superheaters can be installed, the conical seats in the manifold will need to be cleaned and lapped. This process will be time consuming but relatively straightforward. When the manifold is ready, we will load the units back in the boiler, tighten them to the manifold and leak test the connections.

We've come a long way since we sliced open the first return bend but there is no shortage of work yet to be done. If you can spare a Saturday, please consider joining us at the Fairgrounds Museum site. We welcome all skill levels and are happy to share what we've learned with everyone who would like to join us.

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Letters To the Editor

Since there are no letters to the editor, at least this editor, here is Ken Middlebrook's letter to the editor of the San Jose Mercury News dated Dec 14,2001

Recycled Roundhouse

Congratulations on your support (Opinion, Dec. 10) of the compromises between the neighborhood association, the city council and Caltrain over the proposed railroad maintenance facility at Lenzen Avenue. The community has been actively involved in the development of this site. Although the maintenance facility will be a new development for the site, it will not be a new use for the site as you have suggested.

Long before the Internet, semiconductors and the airport, the Southern Pacific Railroad chose the same Lenzen location for a railroad maintenance yard to support the transportation needs of a then-growing agriculture-based economy. On June 11, 1899, the San Jose Mercury described the construction of the "new" roundhouse at the site. The roundhouse continued to serve our community until technology advances phased out many of the labor-intensive requirements of railroad equipment maintenance. The structure was abandoned due to damage sustained from the 1989 Loma Prieta earthquake.

The historic roundhouse structure has been dismantled for reuse as a railroad museum at the Santa Clara County Fairgrounds. Ironically, the same Lenzen location will be used to support our commuter rail transportation requirements into the new century.

History does repeat itself.

Ken Middlebrook, Campbell

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Information

Membership Meetings: First Monday of each month at 7:00pm at the Santa Clara Train Depot.

Work Schedule: Saturday and Wednesday after work of each week.

CTRC Office: 1600 Senter Road, San Jose, CA 95112.

Mailing Address: California Trolley & Railroad Corp, P. O. Box 403, Campbell, CA 95009.

Membership: $25.00 regular, $10.00 Seniors. All memberships expire December 31 yearly. To join please send dues, name, address, phone number, and e-mail address if available to CTRC, P. O. Box 403, Campbell, CA 95009.

The CTRC is a California 501(c)(3) not for profit educational corporation established in 1982. The organization is the official support group for the Trolley Barn at History San Jose and the Santa Clara County Railroad Museum currently in the early stages of development.

MISSION STATEMENT

The mission of the California Trolley and Railroad Corporation (CTRC) is to restore, preserve and interpret railroad, trolley, and related equipment as it was used to serve the people in Santa Clara Valley, California.

CTRC BOARD OF DIRECTORS

Rod Diridon, President; Charles Aldrich, Fred Bennett, David Crosson, Jack Ybarra, Marvin Bamburg, Peter Cipolla, Mac Gaddis, Charlie Wynn, Executive Committee; Dick Campisi, Carl Cookson, Sr., Brenda Davis, Mignon Gibson, Robert Kieve, Mike Kotowski, Kit Menkin, Greg Mitchell, David Niederauer, David Sylva, Chuck Toeniskoetter, Larry Pederson, Beth Wyman, Tim Starbird, Tom Collins, John Davis, Jerry Estruth, Marshall Hall, Rick Kitson, Art Lloyd, Ken Middlebrook, John Neece, Gary Ross, Steve Tedesco, Leigh Weimers, Glen Simpson, Pat Restuccia, Jack Young Board Members.

CTRC Staff:

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Technical Assistance: Art Randall <arandall@earthlink.net>
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Treasurer: Pat Restuccia
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Acquisitions: Mac Gaddis
Public Relations:
Ken Middlebrook <middlebrookk@kaisere.com>
Web Site: Karl Auerback <karl@cavebear.com>

From the Editor's Mind

Welcome to the first edition of the year 2002 Clearboard. As you can probably tell I'm new at this and as with all editorial responsibilities this undertaking requires a great amount of skill and that is the reason the amount of pay I receive for doing this is so generous. :-)

Hopefully all grammatical errors and misspelled words have been flagged by MS Word and corrected but if you ever find one please let me know. I'm really interested in how to construct the English language. (I should have paid more attention in school.) If you have any corrections or additions to this newsletter please let me know

I hope to put out one of these newsletters every two months but that will require the diligent cooperation of a lot of good folks. There are probably even one or two that hate writing.

What's different and what will be different? First, the main header font is a generic font used by many of the railroads and is called Railroad Roman. It was used extensively by SP. Second, Rod Diridon is committed to creating a front page story for each issue. Third. I would like to include the treasurer's report every quarter. Fourth, have various knowledgeable individuals contribute progress reports for their area of involvement. Fifth, as you can see above this heading, I've listed the various hands-on individuals that are involved in helping to make this project a success. Sixth, every once in a while there may be some technical information to increase your knowledge of steam locomotives and the 2479 history in particular.

This is the next-to-the-last page and if you have read this far here is what I want from each of you—**your e-mail address.** This is so I can communicate with you instantly when necessary. I'm Larry Murchison <larrymurchison@attbi.com>

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Restoring Your Transportation Past

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California Trolley & Railroad Corporation Is a non-profit tax exempt organization dedicated to the restoration and preservation of historic transportation equipment. Membership is open to all. Yearly dues help finance the Corporation goals. All donations to the corporation are tax deductible. IRS #23510C(3)

Coming Events

>Remember the Saturday workdays and the Wednesday work evenings. All very important events. See you there.

>And the first Monday of the month 7:00pm CTRC meeting at the Santa Clara train depot.

>The trolley barn is open from 8 to 5 except Tue & Wed.

Special Thanks To:

Peninsula Crane & Rigging (Art Alger & Joe Bauer) for helping us lift things that mere mortals would be strained to do; **Reg Holloway** for donation of the large planer and heavy duty lathe; **Industrial Rail**: and **A-Tool Shed** for always providing equipment when needed.

Don't forget to re-enlist in the CTRC. Annual dues are due. See the last issue for a sign-up form.

Who's idea was it to cover this stuff with biodegradable materials? Before and after . . .