2013 operations recap  
**by Bob Browning**

Our year started off on a poor note. Heavy snow in late April caused several tree limbs to break off and tear down five of our power-pole cross arms. We had excellent support from Jim Thake and Roger Smith in getting the wire restored. Their efforts were enhanced by superb support from the City who provided bucket trucks and crews. What could easily have been a catastrophic season beginning actually turned out quite well. We did lose two charters and the entire opening weekend, but we’re still extremely pleased and proud with how quickly people joined together to make necessary repairs.

So far this year, we’ve run over 25 separate training runs to recertify both conductors and motormen and to train one additional motorman. Thirty two charters have been scheduled so far, with 28 complete, generating over $1035 in revenue for the Society. Our ridership has generated $5000 so far and the sale of souvenirs and donations has netted over $2000 more. The decision to allow the use of credit cards for souvenir purchase, some fares and charters, and donations has netted us just over $650 to date. More importantly, there have been several instances where items were purchased only because we accepted payment by credit cards; insisting on cash-only transactions would have cost us several hundred dollars in sales. Our total receipts from actual streetcar operations are just above $8000.

We know that we’re through the heaviest part of the charter season, but also have several relatively high-cost charters still pending. With the receipts we’ve already collected, and with about 2/3 of the season left, we anticipate a great year financially! We hosted a group from the Electric Railway Association in early May. In addition to our gaining many valuable personal contacts, they were extremely interested in both the car and our souvenirs, creating quite a financial windfall for us.

We also supported the City’s 4th of July parade, with the trolley leading the parade down Mountain Ave. to the Avery House. We carried several of the docents from the Avery House in period costume along with other folks dressed as local historical figures. In August, we’ll support the Human Race, a 5k event along Mountain Ave. supporting various local charities. We anticipate that some runners will want to ‘race the trolley’ and if they’re successful, race organizers will provide them with ‘I Beat the Trolley’ T-shirts. Of course, being the charitable, fun-loving folks that we are, we’ll probably ‘allow’ some of them to be successful!
Finally, we wouldn’t be enjoying our success this season without the efforts of our carshop team who’ve been keeping Car 21 running better than ever in our 29-year history, as reported by seasoned motormen this season.

**Car 25 reconditioning**

We've accomplished a lot so far this season, including:

- Assembling the power truck and beginning to make needed rework and replacing parts. 
- Thanks to many volunteers over the past years, air piping is coming together & being tested. Peter Geornaras built a high-voltage power supply which drives the compressor for testing the system. 
- Controllers are being completely rebuilt. Charlie Rock explains some of the process on pages 3-4. 
- Traction motors have been lubed and spin-tested. 
- Heaters are being cleaned and tested. 
- Controller-cable wiring under car is now complete. 
- Corner sway braces have been repaired and tensioned. 
- Roger Smith has begun rebuilding window sashes and making a pattern for casting new sand traps. 
- We’re researching how to make a pattern for casting replacements for broken resistor-grid elements and replacing damaged/missing controller contact fingers.

**Goals for this year**

- Rebuild and install remaining air appliances, then test the entire system. 
- Finish installing and testing the air system, including plumbing the sanding air reservoir and air lines check valves, and connect the breaker solenoids. 
- Finish under-floor wiring and install remaining sub-floor. 
- Finish one controller and begin rebuilding the other.

**Upcoming major costs need funding**

Besides visiting local hardware stores every week for needed parts to keep the project moving forward, we keep a list of near-term ‘big ticket’ tasks that need funding. Here’s our current list and estimated costs:

- New and replacement parts for controllers, $1,600-2,400. 
- New grid elements, $1,500. 
- New suspension and brake-linkage springs, $2000. 
- New window and door glazing, $4,000. 

- Machining new journal boxes, $600. 
- Cast and finish new sand traps, $600. 
- New sand boxes, $700. 

Your donation to any of these tasks helps ensure that we keep the project moving forward and is greatly appreciated. Please note the task name on your check and send it to: 
FCMRS Car 25 Fund 
P.O. Box 635 
Fort Collins, CO 80522 
Thank You!

**The carshop team**

Thanks to our regular carshop volunteers, Car 21 is running well this season and we’re making real progress on Car 25:

- Asad Aziz – mechanicals 
- Chuck Bade – lead carman 
- Bob Browning – woodwork & finishes 
- Bailey Floyd – enhancing the air-system schematic 
- Peter Geornaras – Car 21 carmen & electricals 
- Harold Mills – Car 21 carmen & mechanicals 
- Brad March – all-around support and rapid procurer 
- Earl Paige – mechanicals 
- Roger Mitchell – power-truck lead, mechanical advisor 
- Earl Paige – mechanicals 
- Charlie Rock – electrical systems 
- Roger Smith – woodwork, mechanicals, chief advisor 
- Jim Thake – woodwork & finishes 
- Al Jackson – mostly just gets in the way

**Missing pieces of the puzzle**

Given that Car 25 has had at least six owners, operated in two cities for 30 years, slept outside in the mountains for over 26 years after leaving Fort Collins in 1952, and had rework done at two cities, it's expected to have a few worn out and missing parts. Here’s an ever-growing list of what was not with the car when delivered to us in May 2008:

- No sandboxes – we’ll make four new ones. 
- Two sand traps (others not usable) – Roger Smith is making a pattern for casting four new ones. 
- Reverser key – we’ll either find one or make one.
• A journal-box cover – of the three received, two were newly cut out and need finishing.
• A controller mounting bracket – Roger Mitchell is making a new one.
• No contact fingers for one controller – CTI did send along new contact tips for both controllers and did some rebuilding on one controller.
• No cables between controllers – we’re installing new #6, 2000 VDC-rated transit cable.
• No destination rollers and mechanisms not complete.
• No fare counter, bracket & linkage – Al will recondition one found on Ebay.
• Reservoir check valve missing guts – we’ll omit it.
• No air gauges – we’ve found used ones via Ebay.
• No brake-return springs and missing hardware – we’ve found or made replacements.
• Cover-plate for a traction motor – make new one.
• Two folding steps to roof – Roger Smith has parts.
• Three brake-shoe keys – make new ones.

If you’d like to see the project or join us, we’re in the Car 25 shop every Saturday morning from about 8 AM thru Noon. The shop is in the original FCMR carbarn at 330 No. Howes St.

Rebuilding Car 25’s K10 controllers
by Charlie Rock

A bit of history: One of the GE K10-AR controllers was approximately 80% restored by the people in Charlotte and the second one had been disassembled but had no work done on it. This is brief explanation of the controller parts (see the following drawing and photos).

The Main Cylinder consists of a steel shaft with three brass sections that are insulated from the steel shaft and each other. The copper contact segments are fastened to the brass sections using screws. Fourteen contact fingers make electrical connection to the segments. This assembly is just a large rotary switch that controllers the speed of the Trolley. The Motorman rotates the Main Cylinder assembly clockwise to accelerate and counter-clockwise to shut off and coast.

An inventory revealed these missing parts:
• Half of the Main Cylinder segments were missing and the others were in bad shape.
• Contact fingers missing or broken.
• Three springs were missing.
• Insulation material missing or damaged.

We decided to replace all the Main Cylinder Segments. So the search for the segments started by searching the Internet and the FCMRS files. In the FCMRS files I found a photocopy of GE parts list from 1927 for the controller and a 1975 parts list from a company in the town of North East, Pennsylvania that makes controller segments. After a number of phone calls and Emails to verify the part numbers I ordered the segments. To my surprise seven of the nine different part numbers were in stock. Two of them had to be manufactured which took a few weeks. A total of 42 segments were ordered which will replace all the segments with spares.

I am still working on locating contact fingers with no success. A lot of time has been spent trying to locate them. I’ve contacted many historic trolley organizations, electrical contact companies and even an outfit in Italy. We may end up making our own. The insulation materials have been identified and will be ordered when needed.

Another interesting discovery was made when removing the segments from the Main Cylinder. The screws that attach them are flathead slotted screws but the slots are in bad shape. So I thought I would replace them. Not as easy as I thought since they are ¼-24 (NCS) 60°-head screws, which are no-longer in general use. Easy to get ¼-20 or ¼-28 screws but not ¼-24 and 60° is not standard. I checked local and web-based screw companies and hardware stores; found one place that had ¼-24 82° flathead screws used in 1930-era Harley-Davidson motorcycles. I ordered some thinking I could have them machined to from 82° to 60°. No problem but it was going to cost $3.00 per screw and there are 32 per controller, for a total of 64 screws. Being frugal, I decided to clean up the original screws and use them.

Charlie Rock cleaning insulators for one of Car 25’s controllers.
**Restoration Main Cylinders**

The Main Cylinders were quite dirty with paint, dirt, grease and carbon, and one of the insulators between the brass sections was broken. They were carefully cleaned paying attention not to damage the insulators. The broken insulator was repaired using structural epoxy. The insulators were painted to protect them using red high-temperature enamel.

The final thing to do was to test the insulation. This is done by applying a voltage that is 2 times the working voltage plus 1000 VDC between the steel shaft and three brass sections and between each brass sections for one minute, while checking of leakage current. That's:

\[
660 \text{ VDC} \times 2 + 1000 \text{ VDC} = 2,320 \text{ VDC}
\]

Both Main Cylinders passed.

**New members**

We welcome these members who’ve joined us this year:

- Raoul Bates (conductor)
- Betty Brown (conductor)
- Joe & Jan Carroll
- Copco's Honey
- Raymond DeGroote, Chicago, Il
- Stacy & William Ferdinads
- Robert George (conductor)
- Peter Geornaras, Car 21 & 25 carman
- Arthur Glover (conductor)
- John & Debra Mol
- Dave Montanari (conductor)
- Nancy Nichols (conductor)
- Russell Roy (conductor)
- Ron Zias

**Please sign up for email news**

Seventy one members and staff are getting color copies of Trolley Fare via email rather than black & white ones via snail-mail. To get on the email list please send us your email address to: fcmrs@netzero.com

**Mountain Ave. carbarn gets a water tower**

One of our daily chores readying Car 21 for service has been connecting and stringing a 60-foot garden hose and fill the water tank on the car. The water is used at the Roosevelt St. curve to lessen wheel wear. Last year the carshop team experimented with keeping a 50-gallon barrel filled with water to lessen the need of stringing hose for each fill-up. Since that clearly saved motormen time and hassle, the team coerced Al into making a platform for the tank and mounting it on the east wall of the barn this spring. We wonder what other trolley has a water tank affixed to it’s barn or uses water to prevent wheels squeal on curves?

**A few things still need to be done on the first controller show above:**

- Install the new contact segments.
- Make and install new contact fingers and springs.
- Make and install new insulation materials.
- Mechanical and electrical testing to make sure everything is ok.

Then I’ll start on the second controller.

Thanks to Jim Thake and Bob Browning, the controller brass cover plates and wooden covers have been cleaned and refinished. They look as sharp as those on Car 21!
Interior of Car 25 in July showing almost-complete air piping to the K-1 valve (at right).

Want more trolley?
To view more pictures of us and see what our riders and fans are saying about us, point your browser or phone to: www.facebook.com/fortcollins.trolley

Motorman on Car 25 between 1946-51. Note the extra heater on the floor. Photo from the Poudre Libraries History Collection.

Richmond Car 1522 (sister to our Car 25) passing the carbarn sometime before operations ended in 1949. Photo thanks to birney-trolley.org

Trolley Fare is published for members and friends of the Fort Collins Municipal Railway Society.

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Jim Thake (right) working with volunteer from City Utilities repairing downed overhead hangers near the barn in early May.