

SMOKE & Cinders

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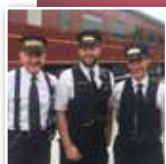


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It All Started with A Birthday Party *Second of a two part series*

- Robert Frye

The 6914's restoration is the first, complete diesel locomotive restoration done at TVRM.

Refurbishing the cab was one of our biggest hurdles. Before TVRM began work on the E8, the cab had been almost completely stripped. There was no floor, no brake equipment, no heaters, no defrosters, no seats, no sand boxes, and no windows. Much of the electrical system had been cannibalized, and we had an abundance of rust. We first removed or covered everything in the cab that could be damaged by sand blasting and then hired a

contractor to blast the cab interior. He worked round the clock and did a great job too. Then we had to learn how to operate a paint sprayer and apply Corlar Epoxy and Emron paints. That gave me a new respect for professional painters!

Next, we ordered marine plywood and installed the floor. This made the cab a much safer work environment because we weren't walking on the narrow steel floor support beams.

In all restoration projects, you have to ask yourself if you want to end up with a display piece, a barely running locomotive, or an every day

Side Panels in progress.



I would like to take this opportunity to compile a list of all the folks that helped. There is no intent to skip anybody, but hey, 15 years is a long time to remember nearly 100 names and faces.

Mike Overlander	Sam Frissell
Andy Hendee	Grady Reagan
Bob Ralph	Mark Regan
Steve Morgan	Chris Smith
Gary Bensman	Drew Reynolds
George Walker	Tyler Chipman
Paul Burch	Evan Johnson
Gary Webb	Brian Hunt
Alan Rider	John Wryick
Mike Barnard	Charlie Walker
Jay Boggs	Jim Olson
Chuck Branham	Dick McBride
John Downing	Don Kimbrel
David Duncan	Jim Robinson
Robert Duncan	Steve Freer
Mark Duve	Kevin Deakens
Gus Frye	Andrew Walker
Shane Rominger	Dana Johannes
Trevor Lanier	Glenn Kitts
Nick Coleman	Sherry Kitts
Charlie Poling	Bill Weidaman
Mike Ray	Jody Johannes
Bob Saxton	Lonnie Farmer
Katie Slider	Pat Powers
Don Smith	Steve Wasiura
Donnie Smith	Chad Thompson
Alan Walker	Jim Snow
Bob Garrett	Jeremy Nolan
Travis Gordon	Pat MacCarroll
Don Graab	Jackson Case
Alan Maples	Adam Moore
Delton Brumlow	Norfolk Southern
Mike Brown	Doug Karhan
Bill Schafer	Butch Raymond
Brandon Tate	Ryan Miller
Shane Meador	John Coniglio
Doyle McCormack	Kevin Miller
Al Phillips – <i>sorry Al, but I have pictures of you helping</i>	Robert Frye
	Bruce Backus
	Jim Miller
	John Wyld
Eric Warren	Mike Little Sr.
Frank Welsh	Brandon Armstrong
Eric Levin	Lynn Cowan
April Frye (<i>my wife</i>) – <i>in so many ways</i>	Ralph Scott
	Chip Hilliard
Bob Soule	John Hilliar
Tim Andrews	Steve Griffith
Mark Ray	Courtney Tyvand

runner? The answer to this question determines the amount of work you do and the solution you chose to solve problems as you move forward. We decided that we wanted a reliable E8 locomotive we could run every day with no fear of breakdowns.

The E8 originally had a #24 brake system, which is obsolete and requires frequent inspection. So, we wouldn't want this in a daily running locomotive. The most common brake system in modern locomotives is the #26 brake system. We initially chose this system for the E8, provided we could find some place near the engineer's seat to locate the brake controls for him to easily manipulate while running the train. After trying out several ideas, we discovered the engineer would have to be a contortionist to use this in the 6914, so we gave up on the #26 brake system.

Then we realized there was another modern brake system called the #30 brake system. The controls are mounted in a desktop panel exactly where the engineer needed them, and it has a five-year maintenance interval. We then had to choose if we wanted to continue with the historical fabric of the locomotive, or make that good, reliable, every day locomotive we wanted. We chose the latter, which meant we had to create a place to mount this new set of controls. We looked at modern locomotive designs using the #30 brake for ideas. Once we were happy with the dimensions, we built it with steel—one more item off the list and another victory for us.

The rest of the items in the cab followed along. Old windows were replaced with new federally-required bullet resistant glass. New defrosters were built and connected to run

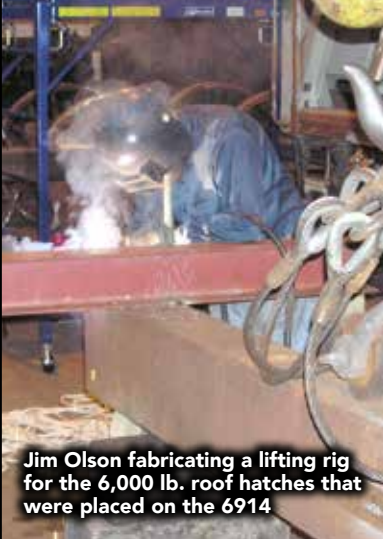
electrically rather than on steam. A new, modern electrical system was designed and installed. Obsolete electrical components were retired and replaced with modern components. A new engineer's seat from a scrapped Canadian Pacific locomotive was installed. Hundreds of feet of copper tubing and fittings were meticulously installed to connect the new #30 brake system to the locomotive. Mike Overlander, our resident contortionist, worked months and months to get all this tubing properly installed under the cab floor.

TVRM shop forces reworked the diesel's two engines within the locomotive. The engines were carefully disassembled, cleaned, lubricated, regasketed, and reassembled. They even pressure tested the engines to ensure they didn't have any water leaks. New injectors in the engines, two rebuilt governors, two rebuilt load regulators, and four rebuilt water pumps were installed. The old, crummy stuff was slowly going away, and a pulse was starting to beat in the locomotive and within the people doing the restoration!

The shop installed new draft gear, which is the "rubber baby buggy bumpers" mounted under the locomotive and between the couplers and the locomotive. They help absorb the shock when the locomotive couples to something else. And speaking of couplers, we installed two new ones!

The fuel tank had old, dead diesel fuel in it—yuck! To clean out the glop, we performed the calculations and decided Steam Engine 630 was perfect for the job. We placed the E8 over the pit and drained the old fuel into drums. We then set up the 630 outside the shop and ran a steam line from a small valve

continued on page 3



Jim Olson fabricating a lifting rig for the 6,000 lb. roof hatches that were placed on the 6914

on the 630's boiler to the E8's fuel tank. Steam condensed in the fuel tank and drained into a container in the pit

under the E8. It only took a few minutes before the E8's fuel tank was scalding hot. We let this run overnight to dissolve the old fuel and gum, and in the morning we had a pristine fuel tank on the E8.

Did you know the E8 made steam when it was working for the Southern Railway? Yep. Remember, the E8 was placed in service while the steam engines were being removed from service. This presented a problem for the passenger cars. They were steam heated, which required diesel-fired, steam boilers in the back of the locomotive. That's the simple part. Maintaining the steam generators and keeping them running are the hard part. The E8 had two steam generators when it was built. Not long after the 6914 arrived at TVRM, the steam generators were removed from the locomotive and sold, but this isn't the end of the story.

Each steam generator weighed 4,000 pounds. Since the steam generators were removed, this meant the E8 was 8,000 pounds light in the rear and would cause lots of

wheel slipping issues. To correct this, we needed to install ballast in a very small space in order to replace that lost weight. We looked at numerous options from using steel plates to using second hand railroad rail, but none seemed to meet our needs. About this time, we obtained a small, 10KW generator to power the heating and air conditioning in the cab and decided it should be part of the ballast. In fact, the generator would sit on top of the ballast. We eventually called and presented our problem to a company that builds counterweights for excavators and cranes. "No big deal," they said. They have all sorts of high density concrete mixes, and they can "dial" any mixture we need. After we designed and fabricated a steel box composed of one-inch and quarter-inch thick plates, we rushed it over to Tennessee Galvanizing to have it zinc plated to avoid rusting.



An ad featuring Chattanooga along with an E8

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SEPTEMBER 7

SEPTEMBER 8 & 9

Do you know?

2018 marks TVRM's 9th Rail Camp.

Over the years, Rail Camp has expanded from one week, high schoolers only, to five weeks with campers aged 7-17. 2018 was our biggest year ever, with virtually every spot filled. TVRM is proud to offer this program building the next generation of preservationists. Rail Camp is critical to the future of museums like TVRM as young people spend more and more time indoors and online. Events like Rail Camp get them outside and up close with the trains they love, teaching them skills and ideas that will keep this history alive for future generations.

- Number of Campers in 2018: 68
- Number of Counselors: 6 plus 1 cook and all around awesome volunteer, and 1 camp nurse
- Number of times camp counselors shout "listen up!": 1,472,383.12597 (seriously)
- Number of Day Camp Sessions: 3
- Number of Overnight/Residential Sessions: 2
- Cost for Day Camp: \$375
- Cost for Overnight Camp: \$1100
- Number of pizzas and hot dogs eaten: immeasurable
- Number of campers that are now adult volunteers: 5
- We have had campers from California, Indiana, Illinois, the Florida Keys, Massachusetts, New York and this year, Japan!



E8 continued from page 3

The next day we took the box over to have it filled with the ballast concrete. Problem solved!

Earlier we talked about preserving the historic fabric of the locomotive. This is always a good idea if you can do it. Occasionally in restoration projects, you look at something the factory designed, and you ask yourself "What were they thinking!?" This was the case with the sides of the locomotive which were put together with battens and thousands of nuts, bolts, and washers. The crazy part of the design is that there are hundreds of places where steel is resting on steel. As the locomotive moves down the railroad, these places will rub all the paint off and start rusting. Also, when the locomotive makes a quick stop, such as when it couples to a string of cars, the side sheets all slam to the front or rear depending on the direction of the locomotive movement. Over time this rubbing causes rusting and rust streaks will run down the side of the locomotive, and eventually, the side sheets will disintegrate. During this whole process, lots of unwanted water enters the locomotive through the poor joint design and further damages the locomotive. I'm sorry EMD, but you guys really blew it with the side sheets.

So we had a choice to reproduce the crummy design or come up with

something better. As we looked at E-units around the country, it was clear most of them had the same problem. The solutions were varied, but a group on the West Coast had used flat steel side sheets supported by Ultra High Molecular Weight plastic otherwise known as UHMW. This appeared to be a fantastic solution, and we chose to proceed with something similar. Briefly, strips of UHMW are cut and formed with grooves and bolted to the locomotive frame. Then the side sheets are installed, and they nestle in the nice, soft grooves in the UHMW so there is no metal-to-metal contact. These joints are then sealed with a high grade caulk and the battens are installed to give us a solid water-tight design with no steel-on-steel rubbing and rusting. The sides we installed should last indefinitely! (Famous last words)

One last word about UHMW. We had a terrible time trying to find something to cut it. Lots of cutters would turn it into a melted gooey mess, but only carbide would cut it or shape it and leave a nice, clean edge.

The frame was a monumental undertaking. Remember, the locomotive is 70 feet long! It seems like everybody at the railroad worked on the frame in one capacity or another. I know I did for sure. The job was so big that we had to



A plywood mock-up of the desktop controls the engineer will use to manipulate the brakes of the 6914

break it up into three basic goals. The first goal was to remove and repair all the rusted-out and damaged structural steel. This would get us back to a whole frame again. The second goal was to clean the frame and remove the grit and grime so the new paint would have a good surface to adhere to. The third objective was to paint the frame.

Damaged and rusted-out steel was to be found in the steam generator room, around the battery boxes, along the floor level, and anywhere water would stand throughout the history of the locomotive. The damage was mostly due to exposure to lots of rain water and battery acid. The first problem we encountered was all the special shapes of steel that were used 65 years ago when industry standards were different. To further complicate the problem, the locomotive and passenger car manufacturers utilized lots of custom shapes and sizes of steel, such as zeels, hat rails, and odd channels to get those smooth lines. Many of these shapes are simply not available today so we had to either make our own or have local companies fabricate the shapes we needed. Cutting-out and replacing dozens and dozens of bad sections was a slow and tedious process. Probably 20 people were involved in this over the years, but we finally completed it.

If you want to clean a locomotive frame, you had better bring your dirty clothes and a respirator. To begin, the shop employees went over the frame with needle scalers to remove all the loose paint. When I say needle scalers, visualize miniature jackhammers used to chip off the paint. Then we rented a high pressure, high temperature, pressure

washer. This effort went on for two days until the frame was clean.

We had hoped to hire a contractor to paint the frame, but it would have been too expensive. We had no choice but to tackle the frame painting ourselves. The official industry term is coating—not paint, but I’ll use the term paint for simplicity. We wanted a paint that was easy to apply, would not set up too quickly like epoxy paints, and would be extremely tough and resist rust. These requirements led us to Rust Bullet which met all our needs. Rust Bullet required a second coat the same day, and we found we could get to the shop early in the morning to apply one quart of paint before lunch. By the time we returned from lunch and put-on our painting clothes, the first coat would be dry enough for the second coat. With this system, we meticulously worked our way through and painted the whole frame ourselves.

Locomotive restoration projects need people. That sounds like a trivial statement, but I assure you it’s not. I once heard someone say if they had 200 people on a project but they didn’t have a skill such as electrician, welder, machinist, engineer, pipe fitter, etc., he couldn’t use most of them. So, the key is to have the right people at the right time on a project to fulfill its needs. As I look back over the 15 years of restoration, we had dozens of people helping. Some were working from the very beginning, some joined along the way, and some only worked a day or two. We even had a few contribute by making a suggestion, writing an email, or simply perking us up when we were down. ☒

Elsewhere in steam preservation:

Three Rivers Rambler

(Knoxville, Tennessee) – Gulf & Ohio Railways owner Pete

Claussen is a businessman with a number of shortline properties, as well as a preservationist of history



- especially railroad-related. He started his Three Rivers Rambler tourist service on a portion of G&O’s Knoxville & Holston River Railroad in 2001. Steam power has included Washington & Lincolnton 2-8-0 #203 (Baldwin 1925), and Southern Railway 2-8-0 #154 (Schenectady Locomotive Works). Number 154 was built for the ETV&G as their #866 in 1890, and most likely operated on the line through Missionary Ridge Tunnel on occasion. After being displayed in Knoxville’s Chilhowee Park for over 50 years, it was retrieved and restored to service by G&O in 2010. 3RR is in the process of restoring San Antonio & Aransas Pass (Southern Pacific subsidiary) 4-4-0 #60 (Baldwin 1922) and Natches & Hamburg Railroad 0-4-0 “Mississippi” #1. Number 60 received notoriety by spending many years encircling Stone Mountain in Georgia as the “Texas II” (reference to “The Great Locomotive Chase” involving locomotives “General” and “Texas”). The “Mississippi” was built in 1836 by H.R. Dunham & Company, possibly using some imported components from England, and is considered a “pioneer locomotive of the South”.
www.threeriversrambler.com

Highlights of the collection

Recent Donation

TVRM recently received a donation with a special connection to Chattanooga's railroads. This live-steam locomotive model was built by Jake Dobbins between 1904-1905. Jake would assemble a long piece of track running the length of his residential block and let the locomotive run its length while he ran alongside monitoring it. He also brought it to special events such as the parade shown in the photograph. Notice the wisp of steam rising from the engine.

Jake was an employee of the Southern Railway in Chattanooga and his model locomotive features green

paint with gold trim, just like the real engines around which he worked. Jake's nephew Steve and his wife Janice, who live in Colorado, offered to donate the engine to TVRM in order to return it to home territory and allow others to enjoy this unique piece of Chattanooga's railroading past. The engine will be on display in our Grand Junction depot soon!. ☒



In the Gift Shop

Available in our gift shop located in Grand Junction (4119 Cromwell Road, Chattanooga, TN 37421) or call 423.894.8028 to order by phone.

Newest Magnets:



Plaque:



Baby Gifts



Soule Shops: Preserving History

Springtime was a busy time at Soule Shops as we prepared our two steam locomotives for the upcoming year. This year the annual inspection of #630 took place in February. This inspection is a requirement of the Federal Railroad Administration's regulations for steam locomotives. Each inspection includes a visit from a regional FRA inspector, inspection of the interior of the boiler and tender, a hydrostatic pressure test of the boiler 25% over the operating pressure and a visual inspection for defects. Repairs are made to any issues from the previous season of service.

Also in the shop this spring is locomotive 5044, a former Southern Railway EMD GP38-

2. It is receiving repairs to its 645E engine components as well as installation of an auxiliary heating system. An air conditioner has been installed on the roof to improve crew comfort and other cosmetic repairs before receiving a fresh coat of paint.

News from the coach repair department includes body repairs to Southern Railway Dining Car 3164, leased from Southern Appalachia Railway Museum. Shop personnel along with the track department have assisted the Dining Car Department with the installation of a new Dining Car Commissary building at Grand Junction. This allows faster resupply and on site storage of the many items required to make our dining car operation a success. ☒



A visiting summer camp enjoys an extended Back Shop Tour



Wilson Reefer freshly painted and prepped for display at Grand Junction.

This Quarter in History: 1971

The reported items in Smoke & Cinders during the 2nd Quarter of 1971 focused mainly on activities at the North Chamberlain Avenue site (TVRM's permanent museum property was only dedicated in November 1970). Periodic tours were being given to schoolchildren of

Shay #35 and two coaches, which represented the balance of equipment that had been relocated to the property from temporary locations around Chattanooga. In preparation of steam operation at TVRM, 0-4-0 #3 (3 Spot) was in process of being rebuilt including installation of flues, pipe fittings, throttle, lagging, jacketing, grates, and more. Members

marked the passing of the last regularly-scheduled passenger train from Chattanooga on April 30. Late in the evening, L&N's "Georgian" departed for Nashville for the final time. On the eve of Amtrak (or "Railpax" as it was described), Chattanooga was now "train-less" except for TVRM. Even so, plans were in place for a TAG Special in August from

Chattanooga to Gadsden, Alabama, and return. Motive power would be doubleheaded steam with Southern 2-8-0 #722 and Savannah & Atlanta 4-6-2 #750. June 1971 marked the 10th Anniversary of National Railway Historical Society's Tennessee Valley Chapter, which was shortly-thereafter incorporated into the Tennessee Valley Railroad Museum.



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The Mission of The Tennessee Valley Railroad Museum is to collect for preservation, operation, interpretation, and display railroad artifacts in an authentic setting to educate the public concerning the role of railroads in the history and development of our region.

SMOKE & Cinders

From the President's Desk

Last issue I touched on the changes that occurred in late 2017 and the beginning of this year. I can now say that things haven't slowed down even as we settled into the regular rhythm of seasonal train operations. As a result of some contract work to wrap up for other people's steam restoration projects, 610 was delayed moving into the shop. It will still happen soon.

Next on the list would be an exciting development on our archival facility. With the Southern Railway Historical Association looking for a new home - a plan was quickly developed to construct a stand alone building on TVRM property at Grand Junction to share space for both SRHA and TVRM (and any other Southeast Railroad material

for that matter) collections. When an adjoining property and building became available (look out for "for sale by owner" signs) TVRM moved quickly to secure a lease purchase and a key donation (and others since) was received to provide the down payment. With modifications to the building SRHA and TVRM will shortly announce the creation of a joint research facility on the TVRM campus.

So, the changes of direction keep happening, like a sail boat tacking back and forth to best use the wind, the final goal is still the same; follow the course we have set out upon. ☒

Come see us.

Meet the TVRM team:

JoAnn Smith has been a staple at Grand Junction Station since 1996. She had been working with Peggy Moore in the cafeteria at Red Bank Junior High and found out there was a "part time" opening at TVRM. Originally, JoAnn was pricing gift shop merchandise and applying patches to railroad caps, but soon thereafter she moved into the delicatessen and has been making sandwiches ever since. JoAnn enjoys meeting visitors from around the country and all over the world. She especially likes watching the children's eyes light up when they visit to see Thomas the Tank Engine or ride North Pole Limited trains. JoAnn has four of her own grandchildren who like to eat at the Deli on special occasions.

