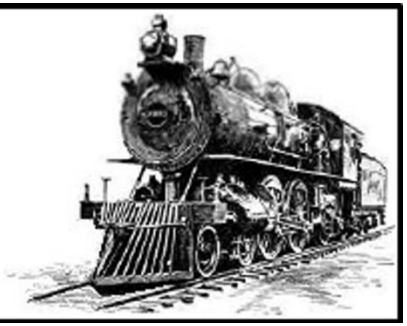
Maricopa Live Steamers
STACK TALK

September, 2021

The official newsletter of the Adobe Mountain Railroad in Phoenix, Arizona.
Operated by the Maricopa Live Steamers Railroad Heritage Preservation Society.



President's Page

Public Equipment Inspection Sept. 11 at 9 AM.
Board meeting Sept. 11 at 1 PM.
Membership meeting Sept. 11 at 2 PM.

The members of this club are the BEST that any club could have. In only three weeks, you donated all the money and then some to get all the parts needed to repair the signal system in a timely manner. Many folks used Paypal. **THANK YOU, THANK YOU ALL!!!** But **. . .** when it rains, it pours. The clubhouse roof is leaking and then a big wind blew the rolled roofing off the patio shade on our container next to the Ford patio. Repair options pending.

Cliff and I have been spraying weeds. Please do not cut the weeds in Adobe Yard or along East Werner. These two places have been sprayed, so the weeds will soon disappear on their own.

Also, we need all members to go online and sign the liability waiver form. Instructions are in the article on page 2. If you don't have access to a computer or the internet, there is a paper form included at the end of this newsletter which can be signed and mailed in to Maricopa Live Steamers, 22822 N. 43rd Ave., Glendale, AZ 85310 or brought to the Park and left on the desk near the washroom where there is a box of additional forms. **THANK YOU** for complying with the County's request.

Covid is not going well these days and I think we need to look long and hard whether we open on Oct. 3. One of our members is in the hospital with Covid as I write this.

The County has NOT lifted the fire ban yet, so NO solid fuels yet. Pottsville is the ONLY Branchline that can be run with a propane steam engine at this time. The Museum area is **UNDER REPAIR**, so **PLEASE** use the "Lowe Bridge" leg of "Not Sure Wye" to return to Adobe Station by way of the "Pottsville Bypass" through the "Teeny Tiny Tunnel," a very worthy, scenic route.

Hank Gallo needs help inspecting the Public Rides equipment on Sept. 11 at 9 am. It's been 1-1/2 years since they had any heavy use. Please come, one and all. I and Larry Messing got 5 of 8 club locos roadworthy, **THANK YOU!** Could a few helpers come early, before 9 am, to assist in spotting all of the cuts of cars in the yard, with the first cut on the steaming bays ready to start at 9 am. The inspection forms are in the maintenance shop along with the grease gun.

Engineers and Conductors need to have a current Engineer card to run the public. Please take the Engineer's exam as soon as possible. For those that signed up to run the public, there will be a SAFETY MEETING after the 2 pm Membership meeting on Sept. 11. For everyone's information, the 2021-2022 Public Rides schedule has new days and times. Public Rides are every Sunday from 11 am until 3 pm between Oct. 3, 2021, and April 24, 2022.

Safety first, stay safe and don't come to the park if you are sick.

Perry

From the Desk of: Hank Gallo, Operations Superintendent

Subject: The Adobe Mountain Railroad / MLS General Liability Waiver Form

It's required by the County . . . need I say more. A copy of the waiver that all members and visitors to the Park must sign is included at the end of this newsletter, if you need it (see below).

We have a 30-day free trial of Smart Waiver. The company suggests that we get all of our members and as many guests as possible to sign up during the 30-day free trial period, after which pricing will start at $15/month for 100 new waivers signed. During the summer, if we are closed and not doing Fireworks Rides (signature link unavailable), the fee drops to $5/month (without losing the County's database of waivers), and can be changed by us month to month.

Here is the link our members and guests will use to sign the MLS, AMRS and Sahuaro Central Train Park General Liability Waiver Form that will be on the MLS website and Facebook page.
PLEASE SIGN HERE: **https://waiver.smartwaiver.com/v/trainride/**

Here is a 12-minute training video on their web site that everyone should watch.
PLEASE CLICK HERE: **https://www.smartwaiver.com/overview**

We need to get as many Public Rides volunteers trained to use the app before we open to the public on 10/3/21. Anyone can download the app to their phone or tablet, and I can create their unique login and password to allow them to use their phones for Public Ride guests to sign waivers, if they hadn't yet done so through the link on Facebook. Guests that sign on our phones or tablets will not be required to enter their email address.

I emailed the Smart Waiver link to Stephen David (AMRS), Jerry Oyler and Larry Allen after the last BoD meeting asking for them to join us in using this one system for the entire Park, but no response as of yet from anyone. It would be for the County's benefit to have one point of access to waivers. I would imagine the water park and go carts need to do waivers also**?**

Side Note**:** We were chatting about waivers at the Park yesterday and the question came up as to what action to take when a guest declines to sign and enters the park anyway. None of us are risking an altercation by trying to chase them out. We are not County Park Police. We'll make note of riders, how many declined and left, and how many declined and stayed and participated. If the County would like to hire a security guard, that would be their choice.

2021 Board of Directors and Adjunct Staff

Perry McCully — President
Joe Schnyder — Vice President
Mick Janzen — Secretary
Bob Douglas — Treasurer
Bill Cobb **Mike Grant** **Tom Harrington** — Members at Large

Cliff Fought — Superintendent Construction
Hank Gallo — Superintendent Operations
Dave Kulman — Maintenance of Way Superintendent
Matt Rockwell — Sawmill Superintendent
Terry Liesegang — Road Signal Superintendent
Dakota Clemens — Tower Signal Superintendent
Bill Pardee — Boiler Inspector
Joe Fego — 1-inch Operations Superintendent
Joe Schnyder — Safety
Jim Zimmerman — Engineer Test Administrator
Pete Pennarts — Facility Administrator
John Broughman — Public Run Crew Coordinator
John Draftz — Advertising
Donna Hohm — Membership Committee Chairman
Matt Rockwell — Holiday Lights Committee
John Bergt **Timothy Freeman** — Web Masters
Ken Giordano — Stack Talk Editor

Send emails / photos to:
MLSnewsroom@Gmail.com

Vice President's Pages

My inbox is full of incorrect information that various people have repeated to me as being passed around the club. The Covid-19 restrictions initiated by Maricopa County have been lifted and you can have your family, friends and neighbors come to the Park for a ride on your train, if you can bear the 100 plus degree heat. We still need to social distance and, if I am around a group, I just might have a mask on, but I believe the mask mandate is no longer in effect for the county parks, especially outdoors. If it is, I will post it at the clubhouse and will put out a Blast to all members.

We will be having a Fall Meet and there will be a registration form on the website that you can fill out and send back. There will be **NO FEE** this year to attend the Meet. Anyone who wants to attend the Meet **CAN** by filling out and mailing in a registration form. Attendance **IS NOT RESTRICTED!! YOU DO NOT HAVE TO BE A MEMBER OF MLS TO ATTEND A MEET**. The MLS has **ALWAYS** hosted railroaders from all over the Country and from other clubs at our Meets. We welcome them all to enjoy our track. I **REPEAT**, you do not have to be a member to attend MLS Meets. Arizona relaxed their Covid restrictions and opened the state months ago. They would not have granted our application to have the Fall Meet or the Public Rides if the general public was not allowed entry into the Park system. I understand how out-of-the-ordinary and confusing the year of 2020 was for everyone, and we all hope that it won't be repeated. But, going forward, the Board is the official communications link with the County. The Board members are responsible for the club's ByLaws, Operating Rules and the County's regulations. They stay current with the rules, so if you haven't heard the latest news for awhile, just call up a Board member and ask.

Remember, NO ONE but a Board member has the authority OR responsibility to enforce any rules against anyone in the Park, whether it's another member or a public visitor. If you see someone breaking a rule, your ONLY course of action is to bring it to the attention of a Board member. **Please follow this rule**, because we have had this conversation far too many times in the recent past. By the way, if <u>everyone</u> was this conscientious about following the rules themselves, there would be no need for vigilante enforcers to interfere in anyone's pursuit of happiness.

Recently, a Board member's son and grandchildren were told that they could not be in the Park. The Board member was putting his train away after taking his grandkids for a ride and did not see who the person was that told his family that they had to leave. This inexcusable confrontation forced the son to defend himself and his children, because this person had parked his truck behind them and blocked them in. Since his father is a member of the club, the son chose not to escalate the situation and just asked him to move his truck, then left with his children before the Board member got back to the clubhouse. This unlawful restraint borders on criminal behavior and is definitely a violation of Article II Section 3 of the MLS ByLaws, which could result in the Board terminating that person's membership. Before making decisions like this based on possibly outdated information, check your facts. But most importantly, you are NEVER the cop, judge, jury or executioner of anything around you at any time -- <u>just a witness</u>. As such, your ONLY duty is to report violators to higher authorities.

Getting back to the use of MLS track, MLS members must always have a valid and current engineer's certification card (after taking the engineer's exam and renewing it annually) to engineer any train at any time. Non-members may not engineer any trains on MLS track except during a Meet. Their Meet registration form allows them legal access to our track for the duration of the Meet. These non-members may only engineer their own equipment, which assumes that they at least understand the safety issues involved with this size of equipment and possibly are also certified as an engineer with their local Live Steam club. As stated in the safety rules, the MLS must provide visiting engineers with an engineer's safety briefing, which we do during the Meets, just in case our operating rules are different from those at their local club. We ask people to become members because it is revenue for our club, but they are never obligated to join, and can just be a visitor and have fun.

I was sent a Facebook posting that was another example of incorrect information. We have the liability waiver approved by the county for our members and visitors to sign, but there is NO Covid waiver, as the Facebook posting states. You will not be asked to sign a Covid waiver to be at the park unless the County Parks Department changes their mind. I do not see that happening.

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VICE PRESIDENT'S PAGE (cont'd)

The board has voted to use the liability waiver form that the County Parks Dept. requires of each program. The form is online via the link described in the article on page 2 of this newsletter and will be on the MLS website and Facebook page. Each adult participant (plus minors) needs to complete one waiver. All of the waivers signed online by the members and general public are automatically kept in the SmartWaiver database, accessible to the County and clubs. If you have completed the signing and confirmation process from a home computer, a copy of your completed waiver is available for 3 days at the link shown in your confirmation email, if you choose to print it for your own reference.
I will not be asking anyone if they have signed a waiver. This is a County requirement, so just do it. A person came to me and said they did not agree with taking pictures of each person that signed the waivers. I believe this is another example of a misunderstanding of what was said, because I believe it was meant for the person to take a picture of their filled out waiver form and keep it on their phone for future reference, not a picture of the person. This issue is rendered moot since the waivers will be accessible at the Park for easy look-up by name via the phones and tablets of the Public Rides staff.

Another issue is that the County has NOT lifted the fire ban as of August 28th, but I expect it to come down soon. After the rain we had last week, we now have a crop of weeds that you would not believe. I will have to rethink the routes that will be open to steam engines once the fire ban has been lifted. We will have to see how many routes we can get cleared. I will send a Blast to keep you informed of the routes available to either propane or solid fuel steam engines as time goes on. Mother Nature has the upper hand here now. Sorry. We will do our best to get this cleaned up. I can continue track repairs if some of you can handle the weeds**?**

South Arntchoo and Serpentine branches are temporarily closed due to storm damage, but will be back open ASAP. Now, that brings me to the route board by Adobe Station where we indicate the closed routes while under repair or where something has happened to make the track unsafe. Please watch the route board for closures and watch out for our red flags displayed to the right for approaching trains. We always try to get problems repaired as quickly as possible and we try not to have more than one route closed for work at a time, but things happen.

Right now I have Serpentine and South Arntchoo closed due to storm damage, and I hope to have them back in service by the Fall Meet. To ensure that this happens, I need some help with the cleanup. What you would need is motive power and a riding car so that you could carry a shovel and rake, then pick up a ballast car from the ballast pit and start down South Arntchoo cleaning off the rails from all of the mud from the flooding. Then on Serpentine, there are a few places where ballast is needed to fill in where a washout has occurred. Some are just two ties, and some are at approaches to a bridge where you might need about half a carload of ballast. The other thing you would need is something to clear the weeds and flowers growing in the middle of the track. I use a shovel to do this, but other tools are available in front of the switch barn hanging on the wall next to the door. All the tools are available for your use, but just **PLEASE** return them for the next person who needs a tool to work with. The weeds and flowers have come up in just one week of hot temperatures and high humidity, germinating all those seeds that were just waiting for the rain. Cliff and Perry have sprayed East Werner and almost all of the yard tracks. They are stopped now because of a possible rain event approaching Phoenix. They do not want to waste spray that would be washed off before it could be effective. They hope to start back spraying by September 3rd.

We are slowly getting things updated on the website now that Charlotte Hughes has been working on it. She is retired and has the time to devote to updating the information and doing entries. Like myself, when you are retired, you have the time to spend on projects that you choose to devote time to. When my spouse passed away back in 2005, I joined this club to keep myself occupied with a hobby, which grew into somewhat more. Charlotte is doing the same thing by keeping herself busy after the passing of her husband Ray Hughes. This club has been a welcome distraction to many people after the passing of a spouse or companion, and will continue to be the saving grace for some of us for many years to come, or at least I hope many more years, GOD willing. Please try to remember that, when you are talking to another member of the club or a visitor to the Park. They might be going through a rough time, something we could not even imagine happening to ourselves, so please talk with respect to our visitors, and try to see their side of the fence and what their shoes may be walking through at this moment.

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VICE PRESIDENT'S PAGE (cont'd)

Please do not get too hot, and have water with you at the park so as to not have a hydration problem. If you wait until you are thirsty to drink water, you have waited too long. Please keep yourself hydrated. Lastly I would like to give a big **THANK YOU** to all the people who donated to restore the signal system. We have the funds to "GIT ER DONE" now, and Terry has already started putting things together. He is setting up so that next year, at the end of the run season, he will disconnect all wires to the track until the summer storms are over, and then reconnect them for the Fall Meet, or just before public runs resume. We are hoping this will limit our exposure to another summer time lightning strike to the system. Again, **THANK YOU ALL!!!** **— Joe**

LADDER SAFETY

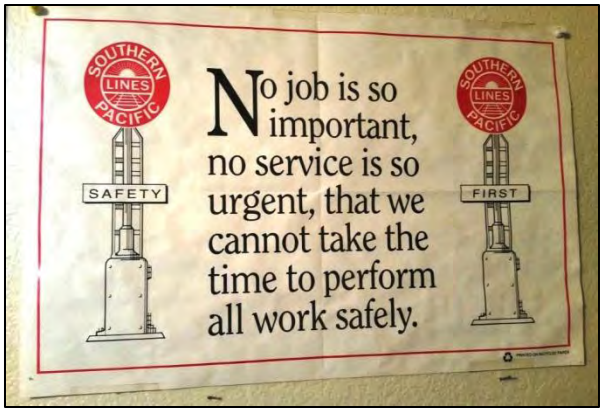
story and photos by Joe Schnyder

This is not a new type of toilet for outdoor use. This is what a member used for a ladder, and ended up falling through and breaking two ribs and leaving a very large bruise on his back, which I imagine caused quite a bit of pain. We are in the process of removing from the property these plastic chairs that are brittle and can break under a person's weight. As you know, the Arizona sun can make plastic very dry and brittle when exposed to the sunlight for extended periods of time. In this case, the member fell on a pipe that was facing up and, fortunately, it did not impale him. As we know, usually when you fall on something and it enters the body under the force of a person's own weight, it has a tendency to inflict fatal injuries when the victims die from blood loss.

This is an instance where a ladder would have been the proper tool for the job. We have had some pretty serious injuries on the property over the last few years, and here is an instance of where we just might have missed an injury that might have been a lot more than just a few broken ribs.

There is a pyramid that shows where you have so many incidents on the bottom line, followed by so many injuries on the next line, followed by so many serious injuries on the next, followed by so many critical injuries, and then the top of the pyramid is a fatal injury. This club is working its way up the pyramid with what I have seen over the last 15 years. In this case, not using the correct tool for the job is the root cause of the injury. That has been the case in many of the injuries at the park – not taking the time to search out the proper tool for the task to be accomplished. The poster in my office at home came out of my workshop at the railroad and it says "No job is so important or service so urgent that we cannot take the time to perform all work safely." I would encourage all members to live long by this suggestion.

An injury at the railroad park is more than just an incident to discuss at lunch. We could be talking about a person who can no longer support their family because they are disabled or just temporarily kept from working that would cause them to lose the income needed to support the family. As we get older, we have the tendency to try to take short cuts to get a job done, but that is not a safe practice. We need to work smarter, not harder. Getting labor saving machines is one way to work smarter. There is a large supply of tools and machines at the park that can help get a job done safely and more efficiently with less effort expended physically. These are called labor saving devices, and I have a whole container full of these things to make my work easier. There are many of these things around the park for everyone's use, and all you have to do is ask around for them. There are many safe ladders of different sizes at the park. **PLEASE**, just don't use the ones behind the Wobbly and Bentt Ladder Company behind the sawmill, as they are there as bad examples only. **— Joe**



2 CARTS FOR AUCTION

The club is selling two battery operated carts. Money is needed to repair the signal system.

Sealed bids should be sent to**:** Maricopa Live Steamers, 22822 N. 43rd Ave., Glendale, AZ 85310.

Sealed bids must be received no later than Sept. 9, 2021. They will be opened at the BoD meeting on Sat., Sept. 11, 2021.

THANK YOU for your bids and your donations.

Perry Questions: pmccully3@cox.net

The white golf cart comes with a cover.
It runs, but needs batteries. Starting bid is 500.00 dollars.

The brown cart is also in need of battery's and tires, also.
Starting bid is 500.00 dollars.

MEMBER CONTRIBUTIONS!

photo by Joe Schnyder

Here is a view of MLS' new Railroad Car Ferry loading dock. Haven't seen the official Ferry schedule, but the boat may not be back until the next monsoon.

PLEASE CLICK

MLS Safety and Operating Rules (printable PDF format)

MLS Online Engineer's Test (online entry, auto-submission)

newspaper link by John Draftz

Detroit News | Page C003 Thursday, 5 August 2021

The Everett Railroad brings back the magic of the steam engine

Hollidaysburg, Pa. -

If you were the president of a railroad 100 years ago, you were kind of a big deal. Yet when Alan Maples became president of the Everett Railroad Company in 1983, a purchase that made him the youngest person in the history of the industry to hold that title, the Alabama native knew full well he would not wield the prominence, power and influence the title once held. Maples shrugs, smiles and admits that a few people, including his parents, thought he was a bit daft when he said his career goal was to run a railroad - at the very time the industry was on its knees.

In fairness, lots of children want to run railroads when they first catch sight of a train chugging along the highway and hear the long-long-short-long rhythm of the whistle in the distance.

"I grew up in Bethesda, Maryland," Maples said. "There was a railroad track a few blocks from our house, and I had a model train as a kid. Now, my brother grew up in the same house, and he could care less about trains, so I don't know what the magic is, but it's something I've loved all my life."

At 21, with some help from his parents and the college fund they had saved for him that he never used, he bought the Everett Railroad, which is not something that someone who isn't a robber baron traditionally does.

To everyone's surprise, from the town to his parents to the manufacturing industries he serves in the area to the families and rail fans who discovered his steam-engine-powered excursion railroad line, Maples has been more than relatively successful.

"We are a working railroad serving industries around the area; we also run these excursion trains during the summer and then in the fall and the Christmas time as well," he said, pointing to the meticulously and carefully restored passenger trains in the rail yard behind his office.

The company was originally incorporated in 1954 in its namesake town of Everett, 33 miles south of here. By 1982, it had been essentially abandoned and then sold and moved here to Blair County.

Yet by 1984, Maples was able to make the first run under his ownership, delivering a load of bauxite ore. Since then, it has been a carrier-freight railroad in the Interstate 99 corridor of Blair County.

Maples said he just lost a big customer this winter when the Appvion Paper Mill, which had been at its nearby Roaring Spring operation since 1866, closed, costing 300 people their jobs.

The closure hit Maples hard: "That was our biggest freight customer. So, that's put a world of hurt on us right now."

Maples says that type of freight delivery is the kind of business he relies on. It also demonstrates why railroads were the lifeblood of small towns for generations.

Railroads originally began as a way of transporting commodities such as farm goods, coal and timber to market; almost immediately, they facilitated the region's agriculture- and manu- facturing-based economy. They were reliable; they could function in any type of climate.

Then, along came the new cars and trucks and airplanes, as well as barges and pipelines, all of which took away a lot of the transportation of goods from the railroad companies.

And all of those small towns or industries that had benefited from the new markets and availability of new resources had to scramble to figure out how to access the people and products the trains had opened to them.

Maples' facility is one of the oldest railroad properties in Pennsylvania.

"When they were opening up the routes to the West, before railroad technology was fully developed, they had canals," he explained.

In between, you had the mountains.

"So, they had a horse-drawn, very primitive railroad that came right through here to take cargo from the two sides of the canal and go up over the inclines on the mountains," he said.

That was 1834, meaning for nearly 200 years, this spot has been in continuous use for transportation purposes.

The magic of the visit, though, is in the restored rail cars and engines that Maples uses for the excursion rides. For anyone who has wondered what it feels like to ride a train the way your grandparents or greatgrandparents did, this is a shrine to that era.

There are several other excursions available as well, all the way up to Christmas.

"There is really nothing like seeing a child or a grandparent's face light up when they see the steam of the engine as it pulls up to the train station; whether it is the child's first time or the grandparent remembers a time from their own childhood, they know magic will happen when they step on that train," Maples explained.

"You can't capture the joy and wonder of anticipation in a bottle, but we sure come close to it here at the railroad."

Salena Zito is a national political reporter and columnist for the Washington Examiner as well as a weekly columnist for the New York Post. She reaches the Everyman and Everywoman through shoe-leather journalism, traveling from Main Street to the beltway and all places in between.

TRACKING TRACKSIDE PROGRESS 2021

POTTSVILLE TRACK REJUVENATION

story and photos by Joe Schnyder

Here is some of the track at Pottsville in front of the museum that is now being renewed because of the tie condition in the curves. When I uncovered this portion of track, there was an 11 foot section where the ties were not holding the screws and another 7 foot section where no screws were holding the rails down to the ties. Rails were being held by the ballast, keeping them from having wide gauge issues. Joe and Trish Kalisak have been busy installing these ties and working their way around the curve. I am hoping that we can get most of Pottsville done before we start public runs. This is just another instance where your donations for concrete have made a huge difference in the track structure. I really want to **THANK ALL OF YOU** members who have helped us improve our tracks, making them the best they can be for many years to come. To all of our donors who will pass over this track on a train, you can say that you helped make this the most safe and comfortable track possible for many years to come.

The first section of concrete ties were put down between Mad Dog and Rattlesnake Creek just about 4 years ago. The ride over that section is just as good today as when it was first installed.

I opened a new box of plastic tie plates on June 1st and, in just this short time, we have used half of that box of 5000 plates, which is 1250 ties installed in only two months.

In the photo, you can see the standing water in the background, and it was one of those days when the temperature was only 93 degrees but the dew point was 68, which is not the dry heat that Arizona is supposed to have. Joe and Trish have been working through the hottest month of the year, arriving here between 5:30 and 6 in the morning, trying to make good progress before it gets too hot to pick up the tools. When a drill or any piece of metal exposed to the sunlight gets too hot to touch, they put on gloves. And when their gloves fill up with sweat, it is time to quit for the day.

TRACKING TRACKSIDE PROGRESS 2021

FORKEENDAROAD

story and photos by Joe Schnyder

Here is Forkeendaroad where the ties are being replaced from the crossing with FarFlung up to the first bridge across from Honeybee Mine. This switch is now plastic with concrete ties on both sides, because the termites had eaten the switch ties to the point that the screws were not holding any longer. This curve has steel rail installed now and will be good for many years to come. This is another example where your contributions for concrete ties are making a difference in your club's future. **THANK YOU** to all who have been helping, because it definitely **IS** making a difference. The last 2 photos show the track completed and ready to tamp and water. Looking at Bill Lowes' records of switches, this one was 11 years old. The switch points and frog will all be used again in another switch, but it will have plastic ties now. I do not think termites like plastic and, with the amount of petroleum used in making plastic, it might just poison them little buggers, so just eat away at this new switch fellows.

BEFORE

AFTER

TRACKING TRACKSIDE PROGRESS 2021

Serpentine and South Arntchoo Still Closed

story and photos by Joe Schnyder

Here is a photo of the track at Serpentine where we had two trestles burn up in the brush fire. You can see where the water is running out of the ditch into the scissors wye and down toward Waylost and Pardee Point. I was concerned about having a few washouts from this storm on Friday night, August 13th. Go figure. Upon research, I found where the rain gauge on Adobe dam recorded the rain fall of 1.39 inches of rain in 10 minutes and a total of 1.79 inches of rain in 30 minutes. It came down so fast and heavy that it had no time to soak in and just ran to the lowest point in the area, and our track was in the way. All of these were repaired on Saturday and Monday, and I will be adding a few new bridges and building additional flood channel berms at these locations. Mother Nature tells me where to put them, so it is not a guess of where a bridge needs to go. The Serpentine will be closed for a while until I can get back in the burn scar area to do some work with the tractor. Watch the board for the routes that are closed so that you do not drive off into a hole where we are working. Remember the red flags are to the right of your approach and they are there for your safety. Please notice that the weeds are growing like wildfire where the ground was burnt from the fire. We are going to have one big green lawn this year and this is from only two rain events.

South Arntchoo will be closed for a while also, until we can get down there and remove all the dirt and mud from the top of the rails where we buried the track, which was after the 2014 flood. I do not have to replace any track in that area, just clean off the mud and dirt. Ray and Charlotte Hughes' idea to bury the track has paid off again because, instead of three months of replacing track and ballast, we just need to walk along with a shovel and clean off the rails.

STEAM LOCOMOTIVES

BOILER

Stokers

by Dave Griner

Hello there . . . more of this AZ summer thing . . .

. . . so much fun . . . **STILL!!!**

Anyway, we'll finish studying the Good Firing Manual as follows:

95. Engine crews should also notice the condition of arch tubes and report any defects, such as bulges, blisters or warped tubes. The formation of heavy scale on the outside of the tube is very often an indication that the inside is not clean, and such conditions should be reported, as a little care and attention at the proper time will prevent accidents.

96. To SUMMARIZE:

The arch saves coal by reducing smoke loss, by reducing losses due to sparks and cinders, by reducing CO losses and by reducing losses due to unconsumed hydro-carbon gases. It increases the evaporation from the fire-box heating surfaces, by increasing the temperature in the fire-box and by increasing the radiating surfaces. It is a direct aid to the fireman, as it enables the same amount of steam to be produced with less coal, or will increase the capacity of the boiler with the same amount of coal. It protects the flues, and reduces flue leaks and failures.

STOKER FIRING.

97. A stoker-fired engine requires a light, thin fire so as to be productive of best results. The fire in a stoker-fired engine should be uniformly level and burned through. Best results are obtained by using the shovel to prepare the fire for the trip, and stoker should not be used to build, maintain or prepare fires in engine terminal. It may be advisable to have the fire slightly heavier at the back end when starting out so as to compensate for heavy draught through the back portion of the fire on some engines equipped with an arch.

98. In preparing the fire for stoker-equipped locomotives, the blower should be used as sparingly as possible and the fire should be burned through properly, adding coal to bright spots where needed with the shovel—this in order to avoid raising the fire-box temperature too rapidly. Where strong blower draft is used, it has a tendency to cause clinkers due to the draft not being strong enough to draw air through the grates, but burning the fire over the top surface and frequently causing clinkers.

99. The coal should be kept well dampened, as by so doing the fine particles of coal will adhere to the coarse coal and reach the fire bed while if it were dry many of the fine particles would pass over the arch in the draft in a partly burned or tarry condition. Also, in many cases this partly burned coal will adhere to bridges between flues, providing a resting place for cinders and later develop into honeycomb. Damp coal reduces

stack loss and saves coal. After the fire has been burned through and is uniform on the grates, and the engine is coupled to the train the stoker should be started in advance of the opening of the throttle by engineer in starting the train so as to avoid pulling ash from the grates and heating same while in suspense, which is likely to cause honeycomb to form on the flue-sheet.

100. After the train departs from the terminal and the fireman has the stoker jets adjusted to distribute the coal properly, he should watch the stack and steam gauge closely. By observing the steam gauge closely the fireman can determine just what amount of coal is necessary to apply to the fire-box to maintain the proper pressure. The stack should also be watched closely and the emission of dense smoke be avoided, as this indicates that too much coal is going to the fire-box which will result in the fire being banked and clinkered. There is also a possibility of this same condition creating honeycomb on the flue sheet due to particles of fine coal being carried off the banked fire in a partly consumed condition.

101. At points where closing the throttle is anticipated the fireman should shut off the operating valve of the stoker far enough in advance to prevent the pop valve opening. This matter should also be watched closely by the engineer, who should give the fireman warning when he intends to close the throttle.

In order to make stoker firing a success and economical, there must be close cooperation between engineer and fireman.

The throttle, reverse lever and injector should be handled with the same regard for economy that is exercised with hand-fired engines.

102. The same general principles that pertain to hand firing apply to stoker operation; that is, to maintain a thin, level, light fire and a uniform distribution of fuel over the entire grate area at all times.

The stoker should be run slowly and continuously, just fast enough to supply the proper amount of coal to the grate area. It should never be speeded up and then shut off. Running the stoker as stated above, will prevent black smoke, save coal and produce more heat.

103. The use of the rake and shaker bar should be avoided as far as possible.

Grates should not be shaken unless absolutely necessary, as it is better to have some accumulation of ash over the grates, which in many cases will prevent clinker formation.

104. To do a good job of firing, a fireman must use good judgment in supplying coal to the fire-box in accordance with the way the engine is being worked, and in seeing that his distributor jets are set so that the coal is distributed where needed.

Frequent observation of the fire is necessary to guard against heavy firing, creating "banks." or insufficient coal creating "thin" spots.

The amount of coal fired is determined by the speed of the stoker engine, control of which is manual and under direct supervision of the fireman. Its distribution to the various parts of the fire-box is effected by manipulation of the valves controlling the steam supply to the jets.

105. If banks form in the fire-box it is best to burn them out by cutting out the jets or elevator supplying that particular part of the fire-box. The practice of shaking grates to get rid of a bank is wrong. It is also wrong to use the rake to get rid of a bank unless it is caused by arch brick or clinker, in which case the rake should be used to remove the cause of trouble.

Correct adjustment of the distributing jet valves will give proper distribution of coal in the firebox at all times, which makes the use of the fire hook unnecessary; but if a bank should form, it should be disposed of as soon as possible. This can be accomplished by readjustment of the jets.

If thin spots develop in the fire bed, it will be found more convenient to supply the required coal by hand firing. Then adjust the distributor jets.

Bear in mind that early treatment saves trouble.

Inspect the coal on the tender frequently and do not allow pieces of rock, iron, wood or other foreign matter to feed through the stoker.

106. If the stoker stops while the train is running and cannot be started readily, the fire should be maintained by hand until the first stop. If the stoker can be started without delay

to the train, it should be done. If not, the train should be brought in by hand firing the engine to the terminal.

107. The jets on stokers should be kept turned on enough at all times to keep the firing plates cool. Cooling holes under the Duplex and Lower distributors should be kept open at all times to prevent over-heating, and burning or warping of distributors when engine is working. When starting the trip, if the engine starts to lag for steam, it would indicate that the engine is not getting proper distribution of coal in the fire-box and the stoker should be closed off while the fireman makes a close observation of the fire-box to locate the trouble so that it can be corrected promptly. It is not a good practice to use the rake for this purpose as use of the rake disturbs the fire bed and causes clinkers. If, however, the fire is uniformly level it would indicate that the trouble is not with the distribution of the coal, and the rate of firing should be increased slightly. Care should be exercised in crowding the fire to avoid banks and to avoid filling any part of the fire-box with green or unburned coal which aggravates a bad condition.

108. Care should be exercised approaching or passing through tunnels—stoker should be shut off or run so as to fire as little as possible while passing through tunnels.

109. Account of the fire being light in stoker-fired engines, it is good practice to keep a small amount of coal going into the fire-box particularly when drifting or when engine is being worked lightly, as this permits uniform steam pressure

(*continued next page*)

without excessive smoke. If light firing is not done under these conditions the fire gets low, making it necessary to operate the stoker too fast which results in objectionable smoke and possible banks. At points where engine has been standing for some time the stoker should be started slowly shortly before starting the train to build up fire-box temperature enough so it will not be necessary to crowd the fire after starting.

110. At the completion of the trip, the fireman should deliver the engine to the fire track with fire burned down. Any banks or heel which may have accumulated in the fire-box should be levelled over and no more coal should be placed in the fire-box.

Stoker slides in tank should be closed far enough in advance of arrival at the terminal to insure all coal being worked out of trough, this being especially important in the winter season.

111. Stoker jets should never be entirely closed off except when fire is drawn. If jets are closed off it results in stoker table or distributors being overheated and warped.

Any condition observed in connection with the stoker or any part of the locomotive which results in excessive fuel consumption will be called to the attention of the engineer who will report it for correction.

DUPLEX TYPE STOKER

112. The Duplex stoker consists of a flexible screw conveyor below the shovel sheet flexibly connected to a hopper below the locomotive cab deck. The coal delivered to the hopper by the screw conveyor is lifted by two elevator screws to two points, one on either side of the fire-door. From these points the coal is delivered to the fire-box by a system of steam jets and distributor mechanism located inside of the fire-box.

113. The stoker engine mechanism consists of an 11" cylinder controlled by a reversing head similar to that used on the Westinghouse 11" air pump, and operates in about the same manner. The power is obtained through a piston and rod coupled to a driving rack located in what is commonly called the rack housing, through which power is transmitted from the cylinder to the elevator gears which mesh with the elevator side of the rack and drive the two elevator screws located in the casings at the back head of the boiler.

114. A pinion gear mounted on a shaft meshes with the top portion of the main rack. Through this shaft power is transmitted to a head where a series of pawls are located, which control the screw conveyor in operative, neutral and reverse positions. The power is transmitted to gearing at rear end of the conveyor by a flexible shaft, which is located underneath the shovel sheet of the tender.

Operation

115. To start the stoker the fireman should make sure that the main steam supply valves are

STOKERS

all open to the throttle valve and steam jets and that the lubricator is feeding not to exceed two drops of valve oil per minute to the stoker engine. The two jets which blow the coal from the distributors should be turned on to about 15 to 20 pounds, depending on the size of the coal, after which the ½" stoker throttle valve should then be opened slowly, allowing the pressure to build up in the stoker cylinder so that the condensation will drain slowly for a few strokes or revolutions of the elevators, after which the steam pressure may be gradually increased until the stoker is operating at its required capacity.

116. The proper method of operating the stoker is as follows:

The fireman should first see that the stoker has been properly oiled at all bearings or wearing surfaces, after which the stoker should be tested to see that it is in proper operating condition to make a satisfactory trip. After this has been determined, the fire should be built up gradually with the shovel until it is thoroughly burned through, raising the steam pressure gradually while maintaining the proper level of fire.

117. During the preparation of the fire, the blower should not be used excessively, otherwise the fire will be built up too rapidly, causing steam to be generated too rapidly and wasted through the safety valve before the engine leaves the ready track, thereby causing an unnecessary waste of coal.

118. The stoker should not be used either in the roundhouse to maintain the fire or to assist in the building up of the fire on the ready track. The firing should be done by hand until the engine is coupled to the train ready to begin the trip. After coupling to the train, during the air test the fire should be burning very brightly over the entire grate area, with the steam pressure near the maximum, and the water at its proper level in the boiler. When the engineer is ready to start the train the stoker should be turned on a little in advance of the start and should be operated very carefully while the train is being gotten under way. The fireman should observe his fire very closely for several miles to see that the coal is being delivered properly to all parts of the grate area, otherwise banks will form, which will cause clinker formations on the grates, and will lead to possible steam failure unless proper adjustments are made on the stoker mechanism, such as the dividing rib in the transfer hopper below the cab deck, or the steam jet pressure which should be raised or lowered, depending on the part of the fire-box at which bank formation may have started. By observing this operation for several miles at the start of the trip and making any necessary adjustments on the stoker, a minimum amount of coal will be required. The smoke can be kept down to a minimum also by careful observation on the part of the fireman.

119. When this procedure is not followed, and if banks are allowed to form, causing clinkers, it may eventually become necessary to shake

(cont'd)

the grates and possibly clean the fire and the ash pan, which will require excessive time and hard work plus an unnecessary consumption of one to two tons of coal.

120. After the engine cuts off from the train in the terminal, the tank slides should be closed over the conveyor opening from the rear end of the coal space forward to the coal gate, and the coal left in the conveyor and elevator should gradually be fed to the fire so that on arrival at the inspection pit the conveyor and elevators will be free of coal.

121. Before leaving the engine the fireman should advise the engineer just what work is required on the stoker so that the necessary work can be reported and repairs can be made before the engine is again dispatched.

LOWER STOKER

122. The Lower stoker consists of flexible conveyor jointed at the front end to an inclined elevator located beneath the cab deck and ending at the bottom portion of the fire door. A conveyor screw is driven by gearing at the rear end of the conveyor and is connected by a universal joint at its forward end to an elevator screw which ends at or near the fire door.

123. The Lower stoker is driven by a two-cylinder double-acting high-speed engine located either directly below the fireman's seat underneath the cab or in the front left-hand corner of the tender.

124. A number of oil pipes lead to the various bearings in both the engine and the gear case. These should be filled before leaving the ready track, engine oil being used in all except one oil cup. This is equipped with a large container or cup leading directly to the crank case. For lubricating this part of the stoker engine valve oil may be thinned down by using one-half machine oil; otherwise ordinary valve oil should be used.

Operation

125. The fire should be built up with the shovel by hand, using the blower lightly in the same manner as that employed with the Duplex stoker.

126. Before starting the stoker for test on the ready track the main steam valves should be opened, including the control valve leading to the

jets; the jet valves should be turned on with the jets blowing about 8 to 10 pounds to the back corners, about 15 to 20 pounds for the bottom jets between the ribs on the firing plate, the upper jets should be turned on to 30 or 40 pounds, depending on the size of coal. The ½ throttle valve should be turned on slowly until the engine has made a few revolutions, permitting the condensation to pass out of the drain cocks, after which the engine may be turned on to see that the stoker mechanism is in proper operating condition.

127. The bottom steam jets should be kept turned on very light to keep the firing plate from becoming too hot when the stoker is not in use. Also it is very important that the fire be kept at least 6" to 8" below the firing plate at all times, otherwise it will become very hot and be destroyed, whereas with proper manipulation of the stoker and jets the firing plates will last for several months.

128. Figure 6—Descriptive Chart and Instructions for Maintaining Fires with the Lower Type Stoker illustrates the proper method, also the improper method of firing as well as maintaining fires with this type of stoker.

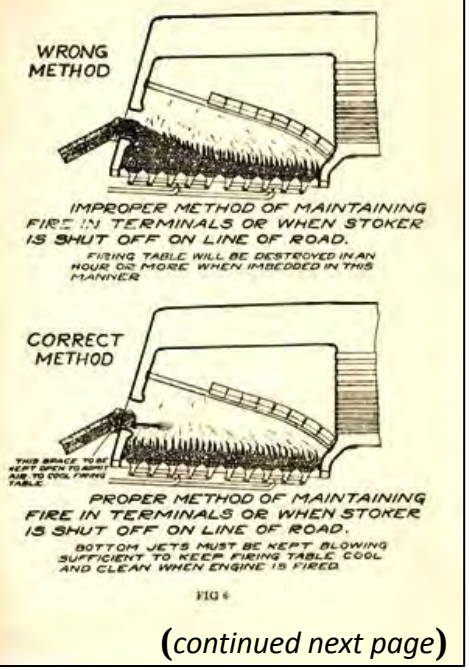


FIG 6

(*continued next page*)

STANDARD STOKER

129. In the Standard Stoker the screw conveyor extends forward under the engine deck and mud ring of the boiler to a point in the rear of the ash pan where the coal is delivered into an elbow and vertical conduit in which it rises to a point in the fire-box below the fire-box door. As the coal rises above the end of the vertical conduit it is distributed to the various portions of the grate by properly directed manually controlled steam jets. A protecting grate surrounds the vertical conduit and admits air to aid the combustion and prevent overheating of the conduit.

130. As in the other types of stokers, the amount of coal fired is determined by the speed of the stoker engine under the manual control of the fireman. The distribution of the coal to the various parts of the fire-box is done by regulating the steam supply to the different jets.

131. The fire should be built by hand and maintained with a scoop until ready to start the train.

132. Before starting the stoker—

(a) See that the petcock on the stoker engine bed indicates correct amount of oil in engine bed.

(b) Pour a small quantity of car oil into oil reservoir on tender at the beginning of each trip.

(c) Start the lubricator feeding the stoker engine. This should complete the lubrication necessary on any part of the stoker over the entire division.

Operation

133. To start the stoker, first open all valves the steam lines leading *from* distributor manifold, then open slightly valve leading *to* the distributor manifold, and allow steam to blow through, cleaning distributor and pipes of any condensation.

Open stoker engine throttle valve slowly in order that condensation may escape before engine operates at speed.

The stoker throttle can then be opened to run the stoker at desired speed.

Open the first tender slide by pulling it forward.

Coal will now flow into the conveyor and pass into the fire-box. The amount of coal passing, as well as the speed of the stoker, can be observed through grating in the forward conveyor trough.

When the coal begins to overflow the vertical conduit in the fire-box, adjust the distributor steam jets to get an even distribution.

After starting, the fire door should be opened occasionally to observe how the fire is burning, and the jets should be adjusted if necessary.

STOKERS

IMPORTANCE OF STEADY STEAM PRESSURE

134. The most destructive influences which affect locomotive boilers are expansion and contraction; these actions being the result of variation of temperature—expanding when heated and contracting when cooled. One of these actions takes place with every variation of temperature, and the repeated stretching and shrinking movements of the different parts of the boiler are generally the cause of leaking flues, broken staybolts and damaged fire-box sheets.

In the following table we see that steam of different pressures has different temperatures to correspond therewith. A variation of pressure is always accompanied by a variation of temperature of the steam and water contents of a boiler, and of the metal of the boiler also. To maintain an even temperature of a boiler and thus avoid the damaging effects of expansion and contraction, it is absolutely necessary to maintain an even steam pressure. The steam pressure should be kept within the limits of ten pounds.

Pressure Shown on Steam Gauge	Temperature in Boiler
0 (Boiling point).	212 Degrees.
10	240 "
20	259 "
30	274 "
40	287 "
50	298 "
60	307 "
70	316 "
80	324 "
90	331 "
100	338 "
110	344 "
120	350 "
130	355 "
140	361 "
150	366 "
160	370 "
170	375 "
180	380 "
205	390 "
235	401 "
245	404 "

(cont'd**)**

DONT'S

DON'T SLUG.

DON'T OVERLOAD TENDERS.

DON'T OVERFILL SCOOPS.

DON'T SHAKE GRATES OR USE THE HOOK WHEN IT MAY BE AVOIDED.

DON'T ALLOW POPS TO OPEN UNNECESSARILY.

DON'T PERMIT A DIRTY DECK OR APRON, ALLOWING COAL TO RATTLE OFF.

DON'T KNOCK COAL OFF BY CARELESS HANDLING OF TOOLS.

DON'T THROW LARGE LUMPS INTO THE FIRE —CRACK THEM.

DON'T USE BLOWER, EXCEPT WHEN NECESSARY.

DON'T PERMIT FIRE TO GET TOO HEAVY AND DIRTY.

DON'T BRING LOCOMOTIVE TO TERMINAL WITH A HEAVY FIRE.

DON'T ALLOW FIRE TO DIE OUT IN FRONT OF FIRE-BOX, CAUSING LEAKY FLUES.

DON'T BANK FIRES AND LEAVE DOORS OPEN WHEN DESCENDING GRADES OR STOPPING.

DON'T FIRE ON GREEN COAL OR ANY SPOT UNLESS WHITE.

DON'T PERMIT BANKS.

DON'T LEAVE FIRE DOOR OPEN WHEN ENGINE IS WORKING HARD.

So, that's the end of a brief study of hand and stoker, coal firing methods. Hope you enjoyed the discussions and that it might give some thoughts on firing your engine.

Take care,

Dave

HAPPENING NOW!

========== DSP&PRR Fall Meet – Sept 24, 25 & 26, 2021 ==========

Hello, all You Gandy Dancers,

Just a friendly reminder, the DSP&PRR - Denver, South Park & Pacific Railroad - Fall Meet will be on Sept 24, 25 & 26, 2021. It should be a great weekend running in the cool mountain air with the gold Aspen trees and beautiful views of the majestic Colorado mountains. We now have over 6,000 feet of mainline track with wyes at the top and bottom and three passing sidings so that we have bi-directional operation. There is an electric unloading table, seven 20 ft steaming bays and four yard tracks each 60 ft long. It is a fun and scenic railroad to run on and its topography is similar to that of the Air Force Academy with rolling hills, ponderosa pines and magnificent mountain views. The Argentine Siding is completed and the track has been laid all the way out to and around the Little Mountain loop adding 1,560 ft. to the railroad mainline. Please see the website for plenty of photos and more info --> **www.DSPPRR.com**

If you are bringing a steam locomotive, please RSVP and let me know so that I can have water and compressed air for you. Due to the extreme forest fire conditions only propane steamers can run. Of course diesels, gas and battery locos are welcome. There is plenty of room for RVs and camping. So come and stay the weekend. If you are bringing an engine, please RSVP and let me know so that I can reserve a parking spot for you.

For directions, please contact me at 303-847-8980, or email at mogul@dspprr.com. Be sure to bring your family radio for train dispatching, food and drink and a light jacket. There are four nice motels in Fairplay, CO about a half hour drive from the track. Below is their info:

Riverside Inn Hotel – 719-836-0600

Western Inn Motel & RV Park – 719-836-2026

Como Hotel – 720-386-1700 – This is the original RR hotel in Como right by the DSP&PRR station

Hand Hotel Bed & Breakfast - 719-836-3595

Thanks,
Woody Lewis
303-847-8980
MOGUL@DSPPRR.com

HAPPENING SOON!

SWITCHING SESSION

John Draftz
jzdraftz@cox.net

Based on feedback from guests, an operations segment is part of our open Meet. The goal of the 2-day segment is to give guests/members experience switching cars on a branch following prototype procedures, i.e. not moving cars by hand. The segment would be challenging enough so that veterans of operations Meets would still enjoy participating, but simple enough for those learning what operations is all about.

The Adobe Yard has 2-car cuts ready for spotting on a branch. On the branch are two other cars to be brought to the yard. Additionally, there is one car on the branch that is to be moved from point A to B. Since crews work with only five cars, it enables smaller engines to be used. An added "wrinkle" to the switching is that it is done in "dark territory," i.e. the signals are off on the branch, thus crews must use radio communication while switching.

The segment (or switching session) is Tuesday and Wednesday of the meet from 9-5. The branch is otherwise open to anyone. There is a safety/orientation briefing at 8:00 am Tuesday and Wednesday.

Maricopa Live Steamers
2021 Fall Meet
Registration Form
Meet dates are October 25th through October 31st 2021
Work week is Monday October 18th through October 24th 2021

Your name and the number of people in your party. (We will not be providing badges; this is only to get a count of people who plan to attend)._____

E-mail address:_____ Cell number: _____

WHEN YOU ARRIVE CHECK IN AND PLEASE SIGN THE WAIVER FORM THAT IS NOW REQUIRED BY THE COUNTY FOR ALL PERSONS ON THE PROPERTY. FILL OUT THE FORM AND DROP IT IN THE BOX NEXT TO THE FORMS. THANK YOU.

*Please check the box if you are bringing any equipment to be run on our 1500ft of 4 ¾" gauge track ☐

*Please check the box if you are planning on participating in the switching session (details on page 2) ☐

*All steam engines must have a current boiler inspection and solid fuel engines must have spark arrestors.

*All steam engines under fire must not be left unattended.

*RV's are permitted 10/18-10/31 Dry Camping only, no water, no electric and no sewer.

*No discharge of any water on the ground.

If COVID and County restrictions allow, we will have

Breakfasts and lunches served Thursday through Saturday 10/28-10/30

Continental breakfast of coffee and donuts will be served at a cost of $2.00 per person

Lunch and drink will be served at a cost of $7.00 per person cash only at the door

Drinks will be available for $1.00

NO EVENING MEALS WILL BE SERVED

THERE ARE MANY LOCAL EATERIES AND GROCERY STORES

*THERE WILL BE NO REGISTRATION FEE,

HOWEVER ALL DONATIONS WILL BE GREATLY APPRECIATED*

We now accept PayPal for donations at MLSDONATIONS@YAHOO.COM

We are inviting everyone to come ride trains and enjoy

Maricopa Live Steamer's 2021 Fall Meet

A Switching Session Safety/Orientation Briefing will be at 8:00am Tuesday and Wednesday

ALL COUNTY RULES IN EFFECT. ALL DOGS MUST BE LEASHED!

Please mail or email this form to:
Donna Hohm donnahohm@yahoo.com
10705 North 109th Way
Scottsdale AZ, 85259

Any questions contact:
Belinda Kulman: bkulman09@gmail.com
Donna Hohm: donnahohm@yahoo.com

Adobe Mountain Railroad / Maricopa Live Steamers

General Release

By signing this release, I acknowledge that railroading in general and riding on a scale riding car, or other Railroad track Equipment in particular, can be dangerous, and I agree to accept all risks associated with my voluntary participation, and release Maricopa Live Steamers (MLS), Sahuaro Central, Az. Model Railroad Society (AMRS), Maricopa County and Flood control from all liability for my property damage and /or personal injury.

In consideration of Maricopa Live Steamers their respective officers, agents, servants, volunteer's and lessors granting the undersigned permission to ride and agree that:

1. **Assumption of Risk**: I know and understand the scope, nature and extent of the risks associated with riding on an open air riding-car and I willingly and knowingly accept the risk.
2. **Rules Compliance**: As a passenger I have viewed the video on safety specifically on seating and my footing during the ride. As a passenger, I confirm that the rules applicable to my conduct have been explained to me, I understand them, and I agree to abide by them.
3. **Train rides are free:** Park visitors are not charged for riding the train. Donations are accepted.
4. **Release from Liability**: I release Sahuaro Central, MLS, AMRS, Maricopa County and Flood control from any liability for any claim, loss, damage, injury, or death, regardless of the cause, while participating as a passenger on this train ride. I understand that I am surrendering legal rights which I may otherwise have, and will be precluded from pursuing a claim or lawsuit against Sahuaro Central, MLS, AMRS, Maricopa County and Flood control in the event of destruction of my property, my injury or death. In that regard I covenant to indemnify, defend and hold harmless to the fullest extent permitted by law the foregoing persons and entities from any loss or damages, including reasonable attorney fees and litigation expenses, which may be incurred by them in the event any such claims are asserted against them or any of them.

READ CAREFULLY BEFORE SIGNING, You will be bound by the terms of this release if you sign without reading.

Date _____ Signature: _____ Name (Printed): _____

Date _____ Signature: _____ Name (Printed): _____

Date _____ Signature: _____ Name (Printed): _____

Date _____ Signature: _____ Name (Printed): _____

For Minor Child(ren) under 18 years of age, Adult assuming responsibility for Minor(s), must also personally sign.

Date _____ Signature: _____ Name (Printed): _____

Minor Name(s) Printed.

_____ Age _____

_____ Age _____

_____ Age _____

_____ Age _____