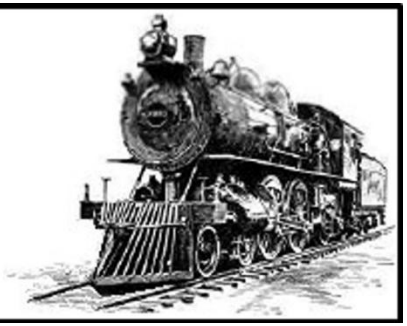
Maricopa Live Steamers
STACK TALK

June, 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

I have been on vacation for the past three weeks seeing my grandkids in CA. Thought I would have a problem having anything to report. I spend one day at the park and have a few things to talk about.

We will have a Membership and Board meeting on June 12. Board meeting will be at noon and the Membership meeting at 1 pm. We need to decide when to start giving public rides and what days on which to give rides. I think we should start slow, maybe Sundays only and then go from there. If you recall, it was every other Saturday and Sunday for a short time and then got shut down due to the plandemic. Anyway, think about volunteering and which days you prefer.

I'm going to start begging now. Ken Giordano has got a very debilitating eye condition that can't be fixed. He has double vision and is finding it difficult to work on the computer to produce the Stack Talk anymore. Today's June ST will be his last. He says he has streamlined the process as best that he can with templates (mainly cut and paste, very little writing) and will help anyone get started when we get a volunteer. He has been doing this for three and a half years and did a great job. I and the Board and the members **THANK YOU** for your service to this club. Your work will be missed. Does anyone want to volunteer to be the Editor of ST**?**

I have taken the starter out of the forklift to be looked at because the starter ring gear won't engage. It will be down for some time.

Joe Schnyder is on a much deserved motor car trip to Ely, NV, and into Idaho where it is somewhat cooler than here. Terry Liesegang has been working on tracks all over the park. **THANK YOU** for all your hard work getting the track into great shape, Terry and Joe.

The White Golf cart has stopped working. The batteries have given out. This cart is a great asset and new batteries are needed. Please donate if you can to replace the batteries. They are over 100.00 apiece and there are eight of them. We all know how important that cart is to those of us who have tired legs and back problems.

Bob Rauperstranch and Stan Ferris have completed the repair of Lovellonia siding. **THANK YOU** so much for taking on this project. It looks great. Bob and Stan have done quite a few things around the park, such as weeding and cleaning up the wood pile. Always improving things around the park. **THANKS** again -- we love and appreciate our volunteers.

This past Memorial Day weekend Larry Kirchner, Dan Benton, Tim Freeman and John Bergt repaired three switches going into Fisher. **THANK YOU** so much for your hard work on this much needed repair.

I cannot say this enough -- keep hydrated, and keep hydrated, wear a hat, gloves, watch out for snakes, watch where you put your hands and legs near bushes and be safe.

Remember, July we take a break and have no meetings.

Safety first, please**!**

Perry

COVID-19 RESTRICTIONS are relaxed but are still in place.
For members' and visitors' health and safety, follow the new rules.

If you wish to be removed from this email distribution list, please "REPLY" to this email with a request to "UNSUBSCRIBE." Please, DO NOT tag this email as JUNK.

Roger Netz is on hospice care now. Palliative at first, however, he is refusing to eat or drink or talk or much of anything. All good things in good time. Roger is the last of the founding fathers. And what a great ride this has been. I talked to him a little on the phone at the nursing home and he responded fairly well. They are going to see if he can retain some life for awhile and if that fails, we will let him go. He's done enough on this tired old planet. He had an incredible life, I saw to that. He is leaving with no regrets. Thank you for your prayers. Babe Netz!

The hospice Chaplin who is assigned to Roger called me to tell me that she actually had a conversation with him today, and his responses were good. She prayed for him. He was grateful. Said some other things he understood. Tried to take his hand but he pulled away. He never opened his eyes and he is not eating or drinking. His abdomen is caved in as a starving person's would be and she, NOT being a nurse, said in her experiences she will be surprised if he's here this time next week.

Funny. His life is flashing before MY eyes now. Keep in mind, I have been letting him go for 63 years. He did a lot of things. Went a lot of places that could have taken his life and he might not have returned. I got used to feeling that absence. I know this is going to be different, but hopefully I will come to terms relatively soon. So far we are good.

He's done a lot on this Earth and he isn't happy doing nothing. So he needs to go where he can be useful and happy once again. He has his ticket and his bags are packed. For now he is coasting. Babe Netz! justbabe@cox.net

In 1968, Roger was one of the Founding Members of the MLS at the Scottsdale location, then chose to stay with the club as it transitioned and rebuilt at Adobe Dam. We shared in Roger's 80th Birthday celebration in the last August ST.

MLS is grateful to Roger for all that he has done for the club and pray for his peaceful passing.

from the Desk of: **Terry Liesegang** Signals Superintendent

Far Flung Branch is closed past Joshua Junction until further notice. A Blast will be issued when it is open to traffic again.

Thank you.

from the Desk of: **Hank Gallo** Operations Superintendent

Regarding: Weekend Public Rides Schedule

At the May BoD meeting, we discussed planning for 2021 – 2022 public runs. Since we never got to complete our season in 2020, we never decided how we should continue in the future – (option 1) back to Sundays only every week October through April or (option 2) Sat and Sun on the first and third full weekends of each month.

Perry is having a Board meeting on June 12 at noon and Members meeting at 1pm to discuss this issue. It needs to be decided so that we can let the membership vote on what they feel is the best way to proceed. Since the restrictions are loosening around the country and in Maricopa County, we are planning to begin MLS public runs in October, expecting that we will get permission to open.

In the general membership meeting on June 12, 2021 at 1 pm, we would like to take a vote whether the public runs go back to every Sunday from 11am until 3pm, as we did in 2019 and the years prior, or continue with the first and third FULL weekend of each month, as we were doing in 2020 until shutdown. Our run season will continue from October through April.

Unofficially, the results of the Board's discussions so far have been that we simply split the riders that we used to host on Sundays by hosting them half on Saturdays and half on Sundays. If we don't have enough volunteers to staff each run day, we will go to emergency plan B, once per month public runs.

Jerry Grundy has volunteered as Stationmaster, but we can always use a backup. Remember that public rides provide a source of income that helps keep our dues low, and we are anticipating a rise in park lease costs that we're preparing for now.

We also have to prepare ourselves for liability forms that each guest (and each member) must sign upon entering the property. One form will cover all three clubs, but a management plan hasn't been devised yet.

I will have sign-up sheets available for either option (weekly or twice monthly) at the clubhouse on June 12th so we can begin getting ready, do some refresher training and confirm everyone has passed their engineer's test for 2021. We'll do car and loco inspections on September 25th at 9am in preparation, if we can get 6 volunteers.

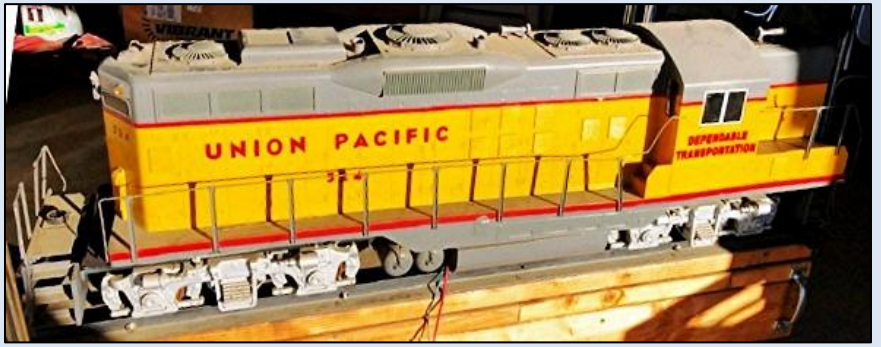
Please contact me with any questions or concerns, and if you can volunteer for inspections on 9/25.

Thank you,
Hank
Operations Superintendent
602.300.3396 cell (call or text)
HanksGT@yahoo.com

From the Desk of: Gail Woodward
Subject: **Bob Woodward Estate Sale**

RJGW1409@yahoo.com **Please mention that you are from MLS**
Cashiers Check only View/Pick Up at home or LALS – California

1" Scale – **UP Diesel Engine** **$5,000 OBO**



7.5" Gauge – **Alco PA Engine and Riding Car** **$12,000 OBO**
Gasoline engine and runs well

from the Desk of: **Ken Giordano** (retired) Stack Talk Editor

THANK YOU for 3-1/2 enjoyable years of sharing club happenings with all of you. I really did enjoy it. Yes, I've been fighting double vision for over a year. Thank God for the ZOOM feature in most software. Without it, I can't distinguish between a comma and a period. Because I use prior month's pages as templates, you've probably been noticing the incorrect heading dates and titles that I have missed during my many attempts at proof reading.

I see Perry has gotten the word out on the street asking for a volunteer to replace me. Don't be afraid, because it really isn't that bad. I've streamlined everything with templates and shortcuts. It **REALLY IS** just cut and paste right out of the emails and documents that folks send in. Then you download the photos and you are good to go. I write very little, just correcting grammar and spelling as I go. I use only common software – namely Microsoft Office 2007 Powerpoint and Picture Manager. I can even provide an install disk if you don't have Office on your computer.

The one thing that I regret being unable to do was go to the park and take my own photos. I had to depend on Hank, Joe, Mick, Tom and Perry. Many, many deep, heartfelt **THANK YOU**s to them.

If you are a wanna-be journalist or photographer, please step up. You'll learn a lot here, and I will help as best that I can.

There have been so many nice people in the club that I have met, and some are gone now. My best wishes and thanks to all. **Ken**

From the Desk of: Jerry Grundy

Subject: **Jerry's Train is For Sale in preparation for Jerry's and Sandra's Travel Plans**

Have a Great Trip!

Delivery needs to be discussed with Jerry. 623-628-5523. Thank you.

I want to sell my 1/8th scale Dash 9 train, cars, trailer and container.
I am asking $45,000 for the entire package.

PHOTO

- **A:** 2 Vip Riding cars (they hold 2 adults **+** 1 child)
- **B:** 1 1/2 Gondola **/** 1/2 Flat Car (has air brakes)
- **C:** 1 Flat car (Bomb Car) was a Lumber Car
- **D:** 1 Wooden Caboose (damage to right front step)
- **E:** 1 Santa Fe Box Car (tool car without tools)
- **F:** 1 Santa Fe Caboose
- **G:** 1 Coke Zero Tanker
- **H:** 1 Cattle Car
- **I:** 2 Gondolas
- **J:** 1 Orange Flat Car

1 Dash 9 with Cable Control Panel **/** with Engineer Riding Car

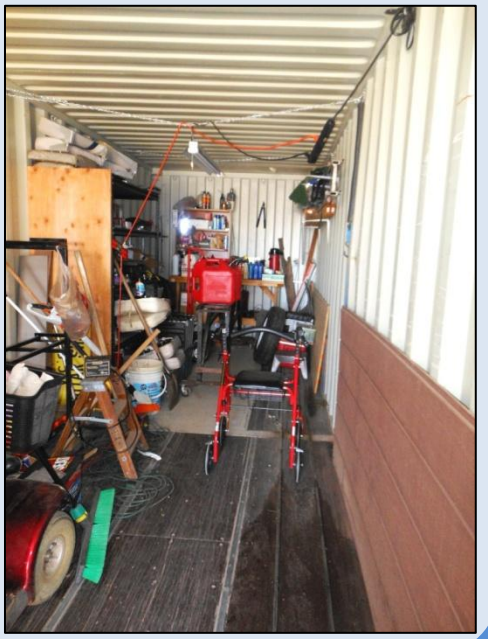
1 12 ft. Trailer with Racks on each side. The Engine goes in the center. Due to the size of the Cars, they will not all fit in the Trailer. I have had the 2 Vip Riding cars, 1 Box car (tool car), 1 Gondola, Caboose and Engine with Engineer Car in the Trailer at one time.

1 40 ft. Container Has 3 levels on the left side. Empty Space in center. There is only 1 level on the right and that is where the Engine goes. Another level could be added above the engine, if wanted.

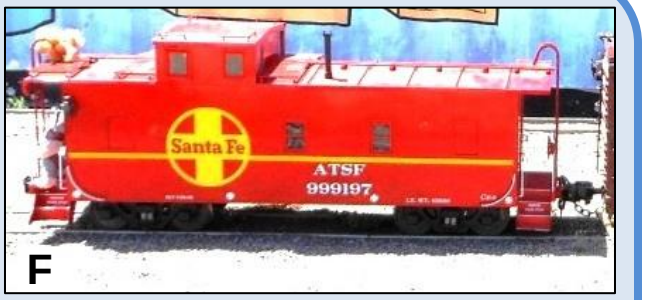
MORE PHOTOS on PAGES 6 & 7

Trailer
(Left)

Container
(Below and Right)




Santa Fe


Santa Fe
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Santa Fe


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Santa Fe


Santa Fe

MEMBER CONTRIBUTIONS!

= *Flashback to Weekend Public Rides* =

story and photo by Donna Hohm

Sunday, May 16

Chuck Larom and Jim Theobald took some of us for a ride on Sunday. Very enjoyable.

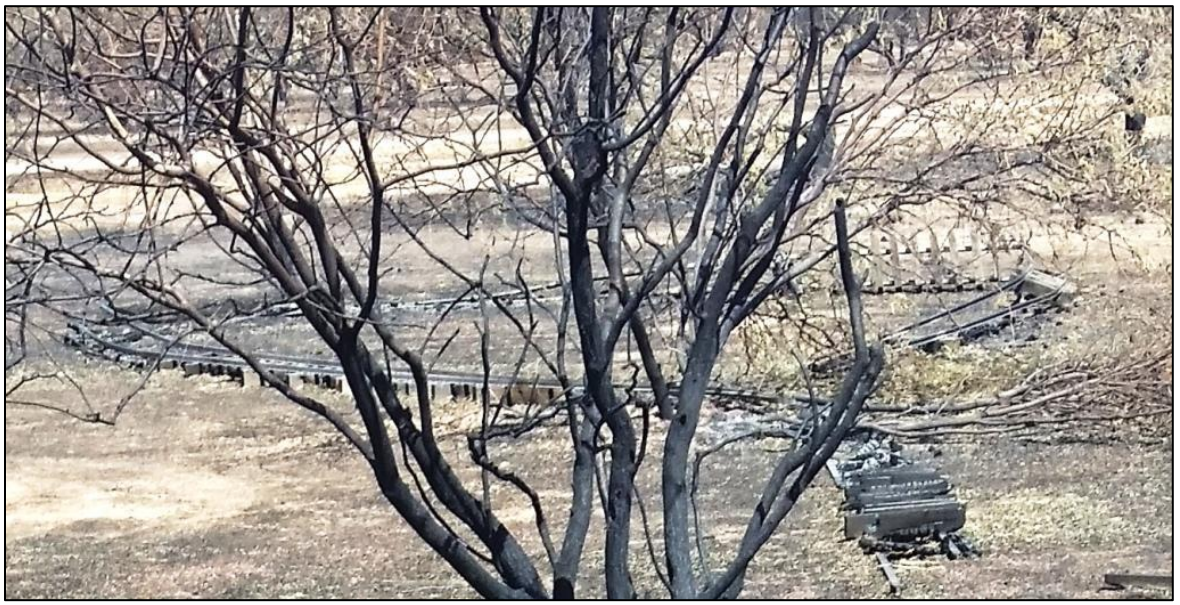
story and photo by Perry McCully

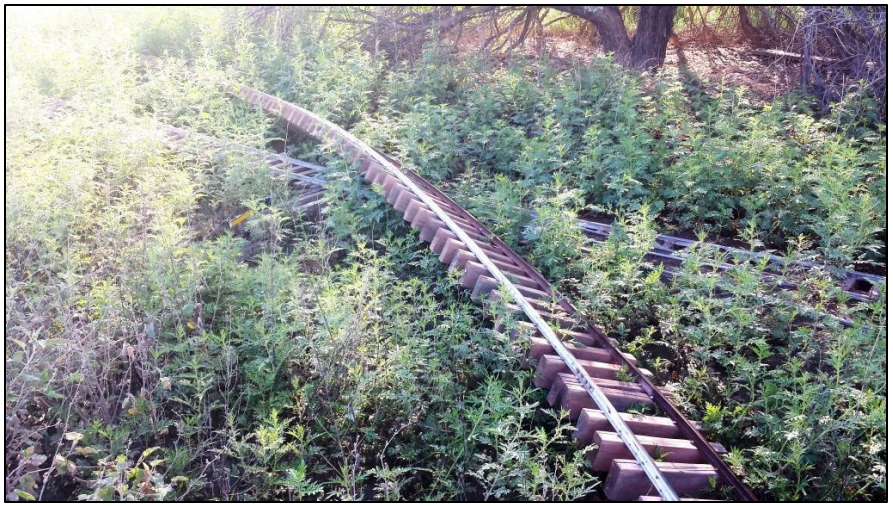
Pete Pennarts took on a project to rebuild a baggage wagon that Andy Saez donated to the club some years ago. The wagon came out of Stockton, CA from the Santa Fe RR. Andy bought it and stored it in Durango for many years. Pete did a fantastic job of restoring the wagon. It is under cover on Ford Station patio for the time being. **THANK YOU** so much Pete.

MORE WILDFIRE RELATED . . .

story by Joe Schnyder and photos by Joe Schnyder and Mick Janzen

You can see in the background the panels that were wrapped around the trees from the 2014 flood are now a pile of ash and some of the rails were melted where the tree that it was wrapped around got just a bit hot.





2014
Archive Photo by MJ

story by Joe Schnyder
photo by Hank Gallo

Talk about a hot fire – notice the molten aluminum rail. I should look for someone to melt it all down and make a memorial statue / plaque from it.

TRACKING TRACKSIDE PROGRESS 2021

stories and photos by Joe Schnyder

ARNTCHOO

Here is a switch at Arntchoo yard entrance that has some seriously worn rails and ties that have been termite meals for a long while. You see the new plastic tie and steel rail switch that will be installed around the 29th of March because I do not want to work on this route while there are so many people out here running and enjoying the winter weather here in Phoenix.

BRIDGE OVER TROUBLED WATERS

This is the Bridge Over Troubled Waters on South Arntchoo just after we got the track buttoned up. Second photo is after we got the new steel walkways installed on the bridge. The wood ones were burnt and we had steel left over from another project, which was installed so we wouldn't need to come back in 2 years and paint the wooden boards, and again in 6 years to replace them. With the new price of lumber that has skyrocketed, it was almost the same price as steel, so we put in steel and do not have to do the periodic painting.

TRACKING TRACKSIDE PROGRESS 2021

DAVELLEN GLEN

story and photo by Joe Schnyder

Notice all of the burnt trees and scorched ground here. Back in 2014, we had a flood out here and this was washed away. Ray and Charlotte Hughes came along and took it all up and we made a 16-inch channel 6 inches deep so that they could put the track back in a way such that the next flood would just run over the top of the depressed track and not do any damage to the ballast. Well, little did I know that doing this would save this section of track from the fire. Where there were trees close to the rails, it was so hot that it melted the rails and set the wood ties on fire and turned them into charcoal ashes. This was all saved by the track being buried below ground level where the heat of the burning trees and weeds did not set the ties on fire and, in turn, did not melt the rails. This will be ready for the next Operations Meet, and all I had to do was sweep the top of the rails off from the ash and burnt branches. I thought this was a nice tribute to Dave and Ellen Augustine and for what Ray and Charlotte Hughes did to restore it after the flood. As we replace other spur tracks, I hope we will be able to dig them all up and put them below ground level from now on so as to save the track from the next fire or flood, as this turned out to be a labor saver for the future. It took less than 2 minutes to clean off Davellen Glen spur.

TRACKING TRACKSIDE PROGRESS 2021

stories and photos by Joe Schnyder

BUGTUSSLE

Here is the switch at Bugtussle, where the wood ties got just a little bit too hot, so now they are new plastic ties. As you can see, the area got just a bit warm and set the wood on fire, but it was not so hot that it melted the rails, so all I had to do was change the ties and not the whole switch.

ADOBE YARD

I was asked why I was working in the Adobe yard changing track panels. These are the best ties we had in track number 11 and they were not holding very well. I have 3 different projects going on at the same time and I was asked why I did not stay with one until it was completely done. Here is my response. I change things up from day to day because some of the jobs are very labor intensive and I only work on it for one day then go do something else to let my old muscles have a day off and do something not so hard. Also if someone shows up at the park looking for something to do, I can direct them to one of the other projects while I am working on number 3 project. It is getting to be summertime in Phoenix and my body is telling me to slow down and drink more water.

With the news from the county about relaxing restrictions so we can go back to having campers at the Meet, we are anticipating a big crowd at the next Meet the last week of October. There are quite a few people ready to get out and get back to having fun playing with their trains. I am finding this out with the motorcar trips, that are filling up very fast because people are ready to get back to having fun and being around their friends again.

TRACKING TRACKSIDE PROGRESS 2021

PERRYVIEW

story and photos by Joe Schnyder

Here is Tom Harrington at the westbound side of Perryview installing new concrete ties on the route going to the museum. Because this is really cleaned out well, this will be one of the first routes we open to steamers, and I want it to be in first class shape for our Public Rides and Meets. This route has been rebuilt 3 times since the park was opened, and now we have the chance to do it for the last time with concrete, because this area is really concentrated with termites. If you look at the ties off to the side, they are in really bad shape for a main track. During this summer there will be many times that it will be closed to traffic while we work, but I am hoping to have all other lines open all summer long. You know there will be closures of some lines for repairs, but I hope to not have more that 2 lines closed at any one time for you.

We intend to do all concrete from Perryview over to where the first concrete ties were installed, and then from Lizard lip to Perryview, then from Rattlesnake creek to Massie, then North junction to the museum entrance. These are the areas that are concentrated termite activity areas. Let them little buggers eat 3500 psi concrete for a while. That will dull their teeth. I want to thank all of the volunteers who are coming out to help make these ties, and especially all of you who have donated to the concrete tie fund as we have been blessed with very generous donors who are keeping the tie fund in the black and keeping all of us working to make our park better and the ride smoother and lasting many, many years into the future.

Because of your donations, we are going to be making concrete ties well into the summer and, with the heat, we only have to let them cure for one day before we knock them out of the forms and install them. Some more pans were purchased by a member and now they are making 140 ties at a time. That is a whole pallet of concrete for two pours. That is 280 ties and at the 6 inch spacing, that is 140 feet of track that the termites will not be able to hurt. Every person that has contributed to this fund and every person at the park making and installing these ties should be so proud of themselves for what they are doing for the future of the club and its members and our guests.

(*continued next page*)

TRACKING TRACKSIDE PROGRESS 2021

PERRYVIEW (cont'd)

story and photo by Joe Schnyder

Here is Tom Harrington busy at work screwing down the concrete ties. After he is done, he will replace the ballast and then I will come over to line, level, and then tamp them solid for a smooth and safe ride. I just wish he would come out to Phoenix more often, because I like to have him around, and he knows how to work like a dog.

story and photo by Tom Harrington

Finished photo of the Perryview track project that I worked on during my last trip to the park in May. Here is my commentary, as I was told that I should do this to accompany the photo. Officially, I only helped on this project. When I saw the final photo, I was shocked. Man, does that look like a prototype 100 mph railroad or what**?** After working on something like this, it is very satisfying to reflect back on the process and the many hands that made it happen. The hat needs to be tipped to the whole team starting with the leader, Joe Schnyder.

I am just proud to be able to say that I contributed and "have supported my club." Amazing what can be done when we all work together, each doing what he does best. At GP, they described the talents of folks as "comparative advantage," putting the right person into the right job.

I hope to run on this track when I come out to the park in June, but maybe slightly under 100 mph.

TRACKING TRACKSIDE PROGRESS 2021

LOVELLONIA

stories and photos by Joe Schnyder

Here is the depot at Lovellonia after Stan Ferris and Bob Rauperstrauch got the track gauge problems repaired and replaced ballast and watered the area, so now it is ready for the Operations Meet come January. All of this area has been rehabilitated and put up to MLS operational standards.

Here is the lead going into the Lovellonia complex after Bob and Stan got the track repaired and ballasted. **THANK YOU** guys. It is now ready for the next Operations Meet. Notice the new bridge and all of the berms for flood control of the tracks.

Here is the new switch that will serve the Lovellonia complex. I took it off of the curve at Brown Bear and moved it west of Gamble where it is in straight track now. Bob and Stan have done the rest of the work from the clear point all the way to the end of all of the spur tracks. It is now ready for the next Operations Meet.

STEAM LOCOMOTIVES

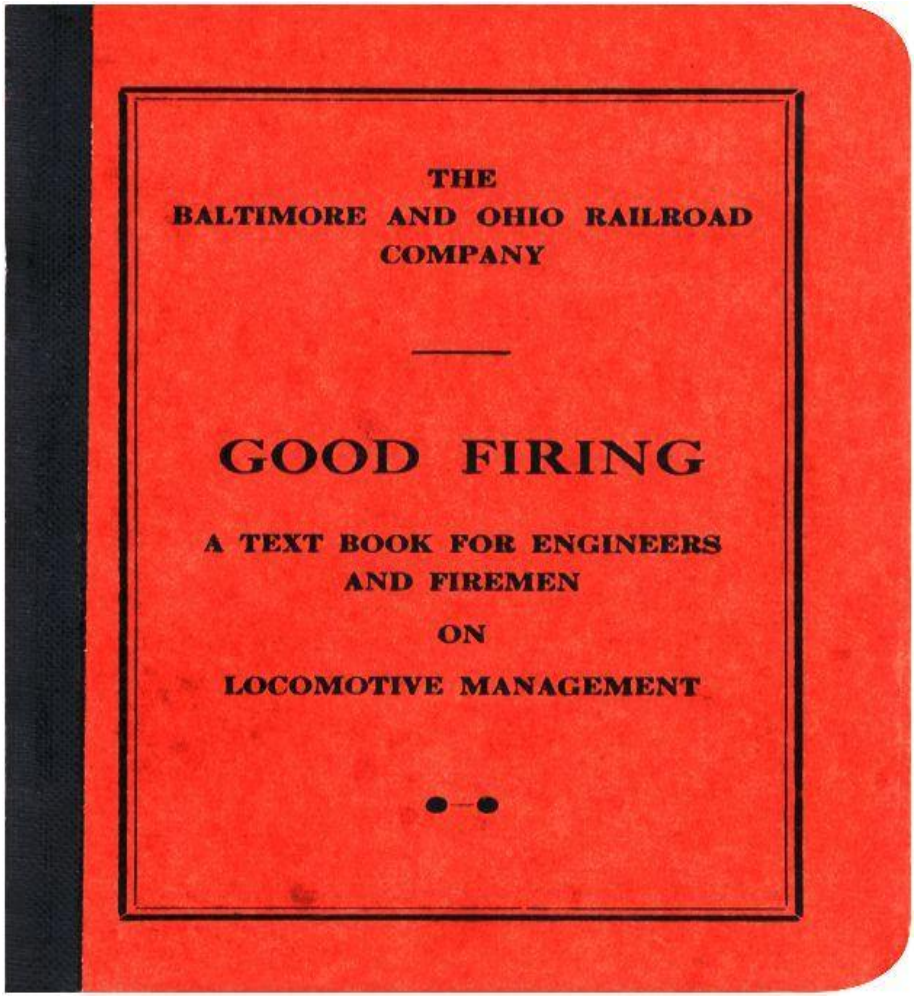
BOILER

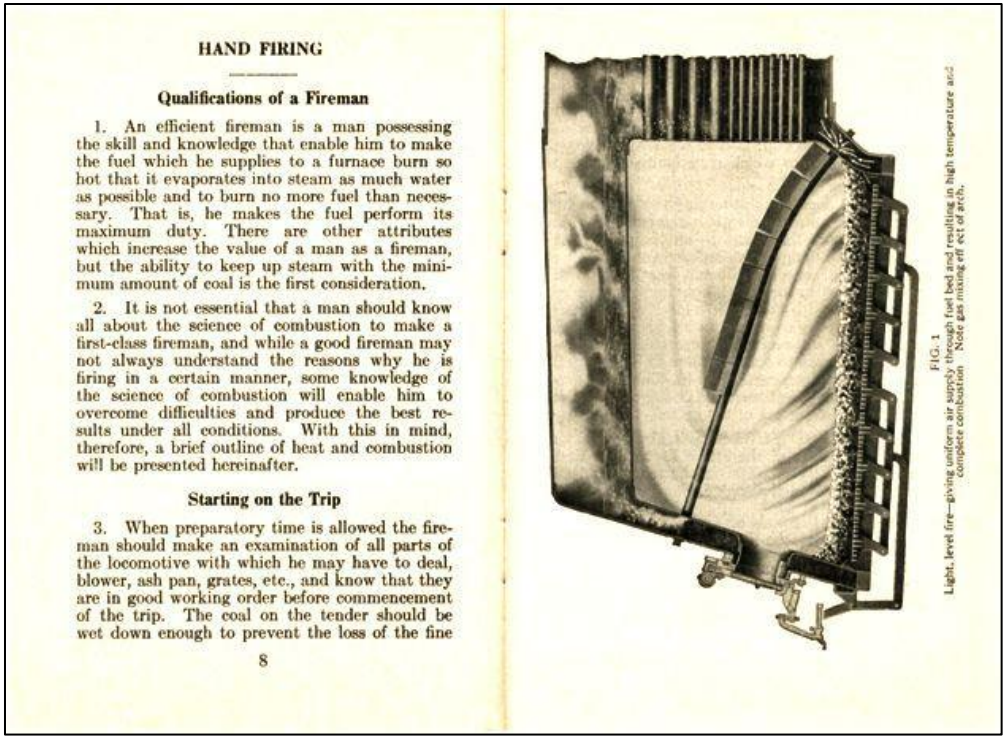
Stokers

by Dave Griner

Hello, Folks. Here we go with summer. Oh, boy **!!!**

We're going to revisit hand firing with this fine handbook, only looking at the first part which discusses hand firing quite nicely. The next pages (next month), will bring stoker firing closer, with the end result being an almost complete review of the subject, so **. . . . .**





HAND FIRING

Qualifications of a Fireman

1. An efficient fireman is a man possessing the skill and knowledge that enable him to make the fuel which he supplies to a furnace burn so hot that it evaporates into steam as much water as possible and to burn no more fuel than necessary. That is, he makes the fuel perform its maximum duty. There are other attributes which increase the value of a man as a fireman, but the ability to keep up steam with the minimum amount of coal is the first consideration.

2. It is not essential that a man should know all about the science of combustion to make a first-class fireman, and while a good fireman may not always understand the reasons why he is firing in a certain manner, some knowledge of the science of combustion will enable him to overcome difficulties and produce the best results under all conditions. With this in mind, therefore, a brief outline of heat and combustion will be presented hereinafter.

Starting on the Trip

3. When preparatory time is allowed the fireman should make an examination of all parts of the locomotive with which he may have to deal, blower, ash pan, grates, etc., and know that they are in good working order before commencement of the trip. The coal on the tender should be wet down enough to prevent the loss of the fine

8

FIG. 1

Light, level fire—giving uniform air supply through fuel bed and resulting in high temperature and complete combustion Note gas mixing aft act of arch.

(*continued next page*)

coal. Large lumps do not make steam as well as small ones and should therefore be broken to as near the size of a man's fist as is consistent before being put into the fire-box.

The ash pan should be examined to see that it has been cleaned to avoid the necessity of dumping it during the trip; also to see that no green coal is left therein which may ignite and warp the sheets.

4. Local conditions governing the start make it impossible to recommend a fixed rule covering the kind of fire that must be on the grates. A heavy, hard-pulling train starting on an ascending grade will call for a fire different from that which is necessary when the train is light and easy grades are to be met with. A fire in a locomotive should be started slowly so as not to heat any one part suddenly, as some of the worst strains a locomotive boiler has to stand are due to the unequal expansion and contraction of its different parts (see par. 134). The fire should be bright and level over the entire surface of the grate.

5. The GOOD FIREMAN is also careful to see that the deck of the cab is kept clean, that there is a supply of water in the tender and all necessary tools on the engine.

Different Methods of Throwing Coal in the Fire-Box

6. There is only one proper method of throwing coal into the fire-box, for the purpose of keeping the grates properly supplied with coal. A fire maintained in the condition shown in Fig. 1

FIG. 2

Bank under fire-door reduces air supply through grates and reduces the temperature. Note large volume of hydrocarbon gases being driven off, escaping partly unburned

STOKERS (cont'd)

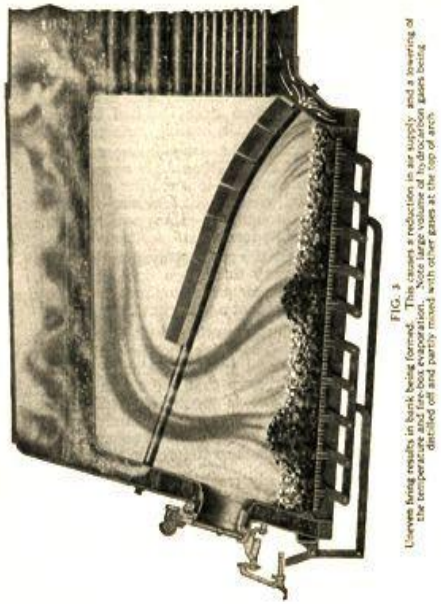


FIG. 3

Uneven firing results in bank being formed. This causes a reduction in air supply and a lowering of the temperature and fire-box evaporation. Note large volume of hydrocarbon gases being distilled off and partly mixed with other gases at the top of arch

will avoid popping of engines and waste of coal on the ready track and between the ready track and the yard.

12. The waste of steam from the pop is so obviously under the control of the engineer and fireman that it seems unnecessary to refer to it, but when it is remembered that some engineers look upon it as something of small importance evidently mention of it should be made. If engineers were aware that every time the pop valve is allowed to open unnecessarily, it is equivalent to displaying a placard with the inscription "This engine is operated by a careless and wasteful crew," their attitude would be altered. At 200 pounds boiler pressure a 4 inch safety valve can discharge in a minute 210 pounds of steam which is equal to 200 pounds of water or 30 pounds of coal per minute. For various sizes of locomotives and pop valves and for various boiler pressures and strength of popping it is estimated that an average of 20 pounds of coal is lost for every minute a locomotive pop valve is blowing. The large saving, which would result if engine crews would not permit waste of steam through the pop valve, would be well worth the little care required. A little self-examination will answer the question: "Is it worth the effort?" for YOU!

Prevention of Smoke

13. The absence of smoke when a fire-box or furnace is at work converting water into steam is not an infallible sign that the coal or other fuel is being burned under conditions which will

is best for steam making. It is known as the level fire and is more used than any other, and is the proper method.

7. A GOOD FIREMAN follows the practice of scattering the coal over the parts where the bed of fire is thinnest, always firing as light and as nearly level as possible, consistent with the steam requirements. Of course, the fireman must cover any thin spots that may appear. A good many of our heavier freight engines of the present time can be fired successfully with from three to five scoops of coal to the fire. The furnace door should be closed between each scoop of coal placed in the fire-box, and under no circumstances should be left wide open while placing in a fire.

8. The fire is built with a slightly heavier bed along the side sheets than there is on the other parts of the grates. This is good practice, because unless done, too much air will pass up here along the side sheets reducing the temperature of this part of the fire-box below the igniting temperature, thereby causing a waste of fuel and being responsible for cracked fire-box sheets.

9. Fig. 2 illustrates the effect of heavy firing under the door, commonly known as "the banking method."

This method of firing lowers the temperature of the fire-box at the door, since the heavy bed of coal does not allow the air required for combustion to pass through.

One result is a smoky fire with part of the fuel gases passing away unconsumed. Another is a

reduction in the evaporation of water from the fire-box heating surfaces. The evaporation around the fire-box depends almost entirely upon the temperature of the fuel bed. When a bank of green fire is carried under the door, the temperature of that part of the fuel bed is lowered, reducing the radiation from the fuel bed, and the evaporation from the heating surfaces.

It is also one of the contributing causes of clinker and "honeycomb," and it is now believed by those who have made scientific studies of "honeycombing" that a light and level fire with plenty of air through the grates will minimize the likelihood of its formation.

In order to get the greatest evaporation, it is absolutely necessary to carry a light, level fire, through which the air passes uniformly, thereby keeping all parts of it at a white heat.

10. Fig. 3 illustrates the result from firing thick on spots. The thick spot is cooler than the other parts and generates smoke until it slowly burns bright, so that the steam making capacity of the fire is greatly reduced. The man who fires in this uneven fashion always has trouble with banks in his fire, and resorts to the rake which causes clinkers to form on the grates.

11. On the ready track the fire should only be built up to raise 160 pounds of steam pressure to permit test of the injectors and air brakes. Between the ready track and the point where engine is coupled to the train the fire should be so prepared as to have maximum pressure by the time the train is to be started. This practice

produce the greatest economy, but it is fair to assume that "smokeless firing is economical firing."

14. Some locomotives are fired as if smoke prevention were not a possibility, and an immense waste of money results from the work of the careless fireman whose efforts are directed to converting coal into smoke. When some engineers are told that it is possible to burn bituminous coal in the fire-box of a locomotive without producing any black smoke, they look upon the statement as that of a crank or theorist and promptly reply that it cannot be done. Most men actively engaged in locomotive service have read book and pamphlet descriptions of how bituminous coal can be burned in a locomotive fire-box without causing smoke, but they regard the information as impracticable theories worked out by men who know nothing about the real work of firing locomotives.

15. Many good books published on firing have been prepared by men engaged in the OCCUPATION OF FIRING LOCOMOTIVES, and they give faithful descriptions of the methods followed by men who make the steam required with the least expenditure of coal and at the same time reduce to a minimum the emission of black smoke from the stack.

What is Necessary for the Prevention of Smoke

16. A thin, clean fire should be maintained, so that the fuel can be supplied with sufficient air through the grates for proper combustion, and

the production of a clear, bright flame. Cross-firing should be practiced to maintain an even bed, free from holes. Coal should be scattered first over front grates, gradually working back to the rear grates, in order to permit as clear a view of the fire bed as possible. Heavy firing should be avoided, as the latter method does not permit sufficient air to pass through the fuel and results in dense black smoke and clinkers. The use of the rake should be resorted to only when absolutely necessary to spread an uneven fire caused by improper firing.

17. The grates must be kept clean, in good working order, and well supplied with coal at the sides, ends and corners of the fire-box, and not more than two or three scoops of coal should be applied at any one time, in a narrow fire-box, scattering the coal. The same operation is successful in the prevention of smoke on the larger class of freight engines, only that the number of scoops to the fire is increased to from three to five according to the work being performed.

18. Air admitted above the fire is effective in preventing smoke, and if the fire-door is left ajar about an inch or two for a few seconds after each scoop of coal, the smoke will disappear from the stack when the current of fresh air is drawn into the fire-box.

19. For cleanly as well as economical reasons, engines are not permitted to emit smoke while about stations and depots and should be prevented from doing so by leaving the fire-door "cracked" and using the blower slightly, or if the engine is working, by light and careful firing.

(*continued next page*)

Smoke trailing back from the engine on either freight or passenger trains, is very objectionable and will not be permitted. On freight trains it obscures the vision of the trainmen, and on passenger trains it enters the coaches through the ventilators and open windows.

The Good Fireman

20. All men will not make first-class firemen but with attention to the instructions of supervising officers and of the engineer, application to work and a study of this booklet "GOOD FIRING," any able bodied, intelligent man will become a good fireman.

21. When the train is ready to start, the good fireman has a glowing fire on the grates, sufficient to keep up steam until the reverse lever is notched back after the train has worked into speed, and he then maintains the fire in a condition to suit the work the engine has to do. With heavy freight trains this firing is made sufficient so that the door does not have to be opened until the tremendous exertion of starting is over. At parts of the road where there are grades that materially increase the work to be done, he makes the fire heavier to suit the circumstances; but this is done gradually, and not be throwing a heavy charge of fresh coal into the fire-box at one time. This system of steady firing keeps the temperature of the boiler more uniform, and has the double benefit of being easy on the boiler and using coal to the best advantage. It is only by concentrated attention to the work to be done that a fireman can perform it in a first-class manner.

22. From various causes the fire does not burn evenly all over the grate surface, but thins rapidly in spots. The good fireman, upon glancing into the fire-box, knows where these spots are and loses no time in filling them. The fire is maintained nearly level; but the coal is supplied so that the sides and corners are just a little heavier than other portions of the fire-box, for there the likelihood of drawing in excess air is greatest.

Avoid Rapid Firing

23. Like heavy firing, rapid firing is wrong, and for the same reason. A much easier and more economical way is to commence in time and put in the "fire" in a LEISURELY manner, allowing the door to remain closed between each shovelful, for the fresh coal to start burning and for the furnace to regain its temperature. When the time for replenishing the fire arrives, the good fireman knows either from instructions or by observation that the effect of throwing a fresh charge of coal into the burning mass is similar to that of pouring a dipperful of cold water into a boiling kettle. A small quantity of cold water does not check the boiling of a kettle much, just as one or two shovelfuls of coal are little felt on the fire of a big locomotive; so the good fireman throws in only two or three scoops at a time, is quite deliberate in applying each charge, scattering it over the surface of the burning mass along the sides of the fire-box and corners so that each portion of fresh supply quickly gives up its hydrocarbon gases and becomes a vital addition to the bed of incandescent fuel.

STOKERS (cont'd)

door and adds eight or ten scoops of coal to the fire; then climbs up on the seat and waits for the black smoke to cease as the signal to get down and repeat the operation.

28. Finding that the engine is not steaming freely under this treatment, he gets down reluctantly and tears up the fire by the violent use of the hook and grate shaking lever. No act marks the poor fireman so strongly as his method of using the hook and shaking the grates. He does the work so violently and frequently that a great deal of fuel is wasted. The fire is badly disturbed, and unless it is very heavy, holes are made which admit cold air.

29. By this method of firing, small mounds of coal are dropped promiscuously over the grates. In intervening spots the grates are nearly bare, and cold air passes through without meeting carbon with which to unite and without becoming sufficiently heated to ignite with the volatile compounds distilling from the piles. The product is worthless smoke. Each mound is the protection for the formation of a clinker, which grows so rapidly that the shaking bar has to be frequently used.

Draft

30. Draft in a locomotive boiler is produced by the exhaust steam from the cylinders passing through the exhaust pipe and smoke stack. This action removes a certain amount of the gases and smoke (either burned or unburned) from the smoke-box at each stroke of the engine, creating a partial vacuum in the smoke-box which the air pressure on the outside fills by

passing through the grates, fire and tubes. This flow of air to fill the partial vacuum in the smoke box furnishes the oxygen necessary to support combustion in the fire-box.

Draft Appliances

31. What are known as the draft appliances of a locomotive include the ash pan, the grates, the appliances inside the smoke-box and the smoke-stack. The ash pan and grates ought to be so constructed that the air will pass to the fire with as little obstruction as possible, permitting fire gases to pass uniformly through the different rows of tubes. It is to regulate this flow of gases through the tubes that a lift pipe or diaphragm is placed in the smoke-box. Without this the tendency of the unrestrained gases is to pass through the upper rows of tubes losing the use for heating surface of the lower tubes, and permitting them to choke up with cinders and soot.

Effect of Small Nozzle

32 Thick, heavy firing, with all the losses described, is not always caused by ignorance or want of skill on the part of the fireman. It is very frequently the case that an engine will steam better when a heavy fire is carried. This condition is nearly always due to the use of very small nozzles which make the blast so sharp that a thin fire cannot be used, as the strong rush of air will tear holes in places through which it can pass directly into the flues. When engines do not steam freely, the tendency always is to call

Shaking the Grates

24. Should indications appear that the fire is not receiving sufficient air, the good fireman lightly shakes the grates, an operation which is repeated during the trip at intervals sufficient to keep the fire as clean as possible. Rocking grates must be shaken *lightly* and more frequently instead of violently at long, intermittent periods. Grates should not be shaken while using steam unless it is necessary. When the engine is working steam hard, grates should not be shaken nor should the hook be used to an extent that would disturb the fire bed and allow the draft to draw the particles of unburned fuel and ash over the arch onto the flue head, which would result in the formation of honeycomb on the flue head and stoppage of the flues. Ordinarily coal requires no more grate-shaking than that which will prevent clinkers from hardening between the grate openings. Coal that contains a great deal of ash will be burned to greater advantage when the grates are shaken lightly and only when required, and this shaking should be done by short, quick jerks. This will allow the dead ashes to fall into the ash pan and keep the grates and fire clean.

At Stopping Points

25. When approaching a stopping place, the good fireman takes care to have sufficient fuel in the fire-box so that he will not have to begin firing until after the start is made. The firing should be stopped long enough before steam is shut off to prevent smoke and the waste of coal,

and when making station stops the fire should be in such condition that more coal need not be added until after the start is made. It is a bad practice to commence firing as soon as the throttle is opened, because the deadening effect of the fresh coal, together with the use of large quantities of steam and a sudden circulation of cooler water in the boiler, will cause quite a reduction in the steam pressure. Firing just as a train is starting out of a station is not good practice for another reason—at that time the fireman ought to be looking out for signals.

The Poor Fireman

26. Failure to perform properly the necessary work at the beginning of a trip greatly increases the fireman's labors before the trip is finished, yet he will often repeat the same performance the next time. Practicing the best methods until they become habits is the easiest way to increase one's efficiency, or in other words, to reduce his labor.

27. When called to go out on a run, the poor fireman reaches the locomotive just as it is time to start for the train. He places some coal into the fire-box, sweeps the cab and waters the coal as the locomotive is on its way to the starting point. As soon as the engine pulls out, working hard to force the train into speed, this fireman throws in a heavy charge of coal. Steam begins to go back and the engineer shuts off the injector. As the fire burns through, the steam comes up; and just as the engineer finds it necessary to start the injector again, the fireman opens the

for smaller nozzles; yet it often happens that the nozzles are already too small for free steaming.

33. With the average coal, an engine will steam better while using a large nozzle. Small nozzles are also objectionable because they prevent the exhaust steam from escaping freely out of the cylinders, and the piston working against back pressure, reduces the amount of useful work it is capable of doing.

Good Judgment

34. Although a man may become a good and skillful fireman without any scientific knowledge, there is one attribute which he must develop or he will succeed only with difficulty, and that is GOOD JUDGMENT. Good judgment is a locomotive fireman's second important need. Good judgment is an aid to success in every calling, but it seems essential for a fireman, because he must depend to so large an extent upon his own resources after learning how the coal ought to be supplied to a fire-box.

35. In the course of a run over any division, a locomotive pulling a heavy train has to meet so many varying conditions in the demand for steam, that the successful fireman must exercise good judgment to have his fire just right for the demand to be put upon it.

Study and Promotion

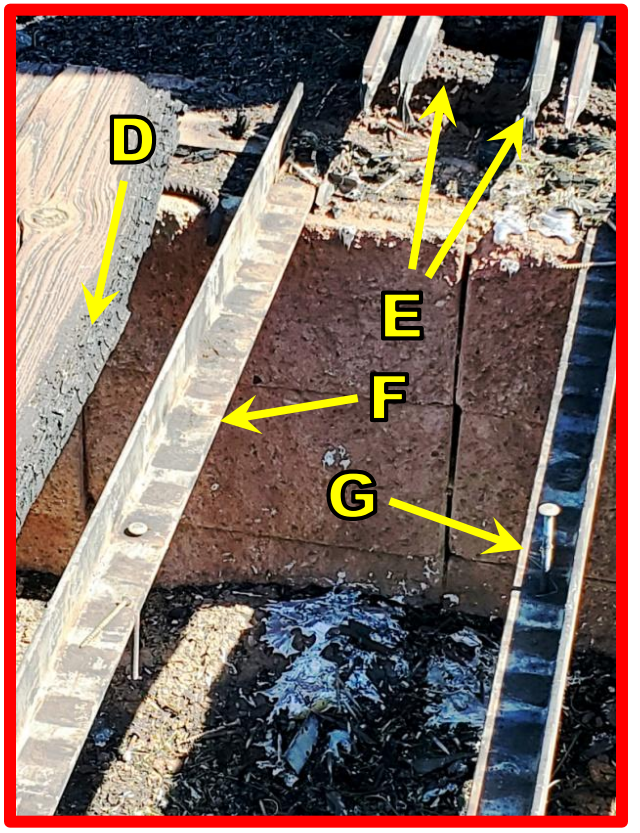
36. All those accepting employment in locomotive service and who intend to make the work of railroading their vocation, should study and understand the principles and best practices of

locomotive firing, as this knowledge is a necessary acquirement of a good locomotive fireman and ultimately of a good engineer. The vast amount of literature regarding locomotive engineering which has been written during the past few years and placed upon the market, makes an education along these lines within easy reach of all.

37. Firemen desiring to make their work as easy as possible, especially those desiring promotion, should try to cultivate and give early evidence of the possession of this necessary acquirement of a good engineer.

So, with that being said,
we'll adjourn for the time being.
Take care,
Dave

WILDFIRE!



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WILDFIRE (cont'd**)**

Defining Fire

by Ken Giordano

While photoprocessing all of the fire photos that I received, one in particular grabbed my attention, because it speaks volumes about our fire. It is the photo from Mick Janzen (previous page with the red border). In thinking through this article, I decided that Joe Schnyder's photos (with the green borders) and Dick Wieboldt's photo (orange border) also had value to this article. The other photo is an inset of Mick's photo.

My unique background as a Fire Department EMT, as well as all of the conversations that I have had with my friend the Fire Marshall about what he looks for when determining the cause of a fire, affords me a little knowledge in the field of Fire Science.

First, I need to clarify the vocabulary. When I use the word "structure," it will refer to atomic structure and molecular structure interchangeably. For example, the structure of air is a mixture of many individual gas atoms (oxygen, nitrogen **...**). The structure of water is many molecules, each containing two atoms of hydrogen and one atom of oxygen. And so on, such as the structure of wood, steel, dried weeds, etc. What holds each of these materials together is the strength of the atomic bonds holding their atoms and molecules together to make the structure of that material.

Every material has its own "ignition temperature," the amount of heat necessary for that material to begin and support combustion. Some materials, like metals, have such an extremely high ignition temperature that they seem not to be able to be burned. However, they do have a "melting point," a temperature lower than the ignition temperature at which the bonds weaken and the material liquefies. The melting point of mercury is **–**38**º** F. At temperatures below that, mercury is a solid. The melting point of aluminum is 1,221**º** F. The differences between the ignition temperatures of materials is due to the strength of those atomic bonds that hold their atoms and molecules together. Those with stronger bonds require more heat to achieve combustion or melting than those with weaker bonds. The strength of the atomic bonds is also seen in the "softness" of the metal, namely how much force is required to bend the material or to cut it. Steel is "harder" than aluminum.

The atomic bonds of some materials resist breaking apart so strongly that, when they do combust, they "explode." This is due to the release of the "potential energy" being held by those bonds. Potential energy can be demonstrated with a rubber band. Stretch one between two hands and hold it there. The amount of energy that your muscles are using trying to keep the rubber band stretched out is equal to the amount of potential energy that has built up within the stretched rubber band. Release one end of the rubber band and all of that potential energy is converted into motion. Dynamite requires very little heat (the burning fuse) to release its potential energy, and it does so in such a big hurry that we call it "explosive." Gasoline has so much potential energy in its atomic bonds that just a small squirt into 6 cylinders can propel a 2,000 lbs. automobile from 0 to 60 MPH in less than 30 seconds. Any material that does not explode will just burn after combustion and will release its potential energy in the form of heat and light. Those materials with stronger atomic bonds, such that they have a lot of potential energy, but are less than explosive, will burn much hotter than other materials with weaker atomic bonds.

One last thing that we must define**:** fire. Fire is the chemical process that begins upon "combustion," that point in time when the oxygen from the air is combined with a heat source hot enough (at or above that material's ignition temperature) to achieve combustion in any combustible (able to be burned) material near it. Once combustion has occurred, the conversion of the material's potential energy into heat (the chemical process known as fire) becomes its own sustaining heat source, at least until the material has all been consumed (converted to ash, smoke, etc.) and the potential energy runs out. Then the chemical process ceases to continue (the fire dies out). Since air and combustible materials are all around us, we can only control <u>one</u> of the three things that combustion needs to happen**:** the heat source. Sorry, but I'm being paid to say this. <u>Any heat source</u> is extremely unforgiving when it is surrounded by material with a very low ignition temperature, such as dried weeds.

(*continued next page***)**

WILDFIRE (cont'd)

Before we look at the photos, I would truly like to thank Mick for taking the photo. I could see in Perry's photo last month that she spent a lot of time getting the photo just right. Somehow she knew the info that I needed, just like Hank always does when he takes photos. It would be extremely difficult for me to develop photo essays without the right photos.

The chemical process of combustion is very opportunistic. At the time that a heat source presents itself, if there is no material nearby with an ignition temperature at or below the current temperature of the heat source, then nothing happens. An example of this would be welding and grinding in the switch barn where the walls are steel and the floor has no weeds. This is how a fire break works – remove all combustibles with a low ignition temperature and the chemical process cannot continue. But sometimes a burning ember will catch a breeze and travel to where low-ignition-temperature combustibles are available. In other words, the fire jumps over an area and burns everything around it.

From: https://www.howitworksdaily.com/why-does-welding-cause-sparks/

Welding involves heating two pieces of metal (or plastic) so that they melt and fuse together, resulting in a very strong seam. This requires scorching temperatures of around 5,500 degrees Celsius (9,900 degrees Fahrenheit), which are most commonly generated with an electric arc. An arc is a discharge of electrical current – just like a tiny lightning bolt. In arc welding, the parts to be welded are connected to a grounded wire, and an electrode (made of filler metal) is connected to the power supply. When the electrode is put into contact with the welding materials, then moved away, the air in between the two is ionized and electrons leap across the gap. This generates bright light and intense heat. As the arc is drawn along the join, both the tip of the electrode and the working materials become liquid and fuse together. At such high temperatures, the molten metal bubbles and spits, expelling a shower of incandescent droplets: these are the sparks you see. They can be as hot as 1,300 degrees Celsius (2,500 degrees Fahrenheit) so be sure to stand clear!

What is Fire?
https://www.youtube.com/watch?v=tMDKeBaLWDw

Combustion Reactions
https://www.youtube.com/watch?v=zZ0swLIM5yY

The Combustion of Wood
https://www.youtube.com/watch?v=B0E4PX3e3RE

Table of Burn Temperatures of Different Wood Types
Three Phases of Pyrolysis Factors and Stages of Wood Combustion
https://startwoodworkingnow.com/how-hot-does-wood-burn/

Ignition Temperatures of Materials
https://www.tayloredge.com/reference/Science/ignition.html

https://www.reference.com/science/temperature-wood-ignite-5b1fcab3a521fe3a

The minimum temperature needed to ignite wood is 180 degrees Celsius or 356 degrees Fahrenheit. The amount of time of exposure varies due to the type of wood. Long-leaf wood has the fastest ignition time at this temperature, taking about 14 minutes to ignite. For a wood ignition time of less than one minute, the wood must be heated to a temperature of 430 degrees Celsius or 806 degrees Fahrenheit. According to the U.S. Dept. of Agriculture, studies on wood ignition conclude that there is not a fixed temperature for ignition, and the moment of ignition largely depends on the amount of exposure time, the density of the wood and the type of wood.

https://www.fireengineering.com/leadership/ignition-temperature-of-wood/

Wood placed in an oven at 700°F. catches fire almost immediately. At oven temperatures of 450°-500°F., the wood gradually chars and usually ignites after several hours. "Pyrophoric carbon," formed when wood slowly chars, absorbs and combines rapidly with oxygen. This produces heat which under certain conditions causes the charred wood eventually to catch fire at temperatures well below those required to ignite the original wood. Cases are recorded where wooden flooring in contact with steam pipes at 250°-300°F. has caught fire after years of exposure, according to insurance company records.

(*continued next page*)

WILDFIRE (cont'd**)**

In the photo with the A arrows, there are weeds next to ashes and a branch with leaves right above those ashes. Being in the creek bed, that branch and those weeds must have been hydrated enough to raise their ignition temperature above the temperature of the burning weeds and trees around them. Those dried weeds did not burn long enough and the flames were not hot enough to dry out those hydrated leaves and weeds sufficiently to bring their ignition temperature down before those flames ran out of combustible material and extinguished (chemical process ceased).

Also seen in the photo with the B arrows and in several more of last month's fire photos, the fire took the leaves and small twigs but was not hot enough to ignite many of the midsized branches. Joe's green bordered photo with the C arrow is the only photo that showed a tree that was fully consumed, which is surprising since it has no other trees near it. It must have gotten its heat from the Bridge Over Troubled Waters in the foreground. Dick's orange bordered photo with the C arrow shows how even the fire that consumed the entire Wieboldt's Woods Gazebo was not hot enough to consume the nearby mid-sized tree branches.

If you haven't enjoyed the videos linked on the previous page, I hope you will go back and watch them, especially the one that talks about the phases of pyrolysis and the stages of wood combustion. You will learn that wood is very difficult to combust. Anyone who has ever built a campfire understands that you can't start a log burning with a match. It has to be done in stages. First, the match's heat is so low that it can only ignite "tinder" such as paper, cotton, dried leaves and dried weeds. As that burns, "kindling" is added to it, such as twigs and small sticks. As those begin to burn, the fire grows hotter, and midsized sticks can then be added to the fire where they can dry out and combust. Only after this progression of adding thicker and thicker sticks ("fuel") can the size of the fire be increased to where a bed of coals develops that is hot enough to ignite a log.

In the green bordered photo of the Bridge Over Troubled Waters, we know that the fire there reached at least 1,221° F because the aluminum rails were completely melted. However, as the D arrows are pointing out, the wooden walkway planks did not combust. As old and dried out as they look, they reached stage 2 and "charred," but did not combust.

So far our discussion has determined that the dried weeds don't burn for very long and are not very hot. They just combust easily and combustion will continue spreading quickly as long as there are more dried weeds nearby. If it wasn't for Dave Kulman's quick thinking to make a fire break, the weeds ("tinder") would have continued combusting all the way to Pinnacle Peak Road. Dave should be awarded the honorary red fire chief's helmet from firehouse #1. No joke, he did something extraordinary.

Now, you ask, if the fire wasn't so hot, how did it melt the aluminum rails**?** Let's take a close look at the bridge photo now. As the E arrows are pointing out, the liquefied aluminum rail abruptly ends as soon as the wooden ties are surrounded by ballast. This is another indication that it was not the burning weeds that melted the rails, which were exposed everywhere throughout the burn area. Looking at the two angle irons that held the wooden ties with the rails attached, the F arrows show the scorch marks on the angle iron made by each of the wooden ties.

Before I give you the answer to the question, let's talk about the sequence of events. We know that the wooden ties burned because they are nowhere to be found. Being under the rails, the ties had to be generating enough heat to melt the aluminum, 1,221**°** F. However, although the ties burned hot enough to melt the rails, they didn't burn hot enough to have any effect on the screws and other hardware that held the rails onto the wood, as shown by the G arrows. Considering the sequence of events, the 4 aluminum rails had to be fully melted before the ties underneath them finished combusting and extinguished. Furthermore, the screws and other hardware wouldn't have been released until the wood had completely burned away from around them. So what we should see in the gully is the melted aluminum covered by the ash from the ties, and covered by the screws and track hardware, as shown by the H arrow.

Oops, something's wrong. There's no ash on top of the aluminum puddles or on the angle irons. Also no leftover bits of unburned 2x4 ties. Sooo**....** what can cause wood, which is difficult to combust, burn hotter than the burning temperature of pine 2x4s, and burn up so fully as to disintegrate where there is no ash (like you see under the trees)**?** An accelerant**!!**

I don't know what petroleum derivative is the base of your wooden tie treatment, but its ignition temperature was low enough for burning weeds and its burning temperature was high enough to melt the aluminum, but not the screws, and caused all of your damage. Who could have seen that coming**?** Those burning weeds just lit up those bridge ties. Smokin'. Nobody dump ashes while sitting on a bridge with wooden ties. Explosive.