

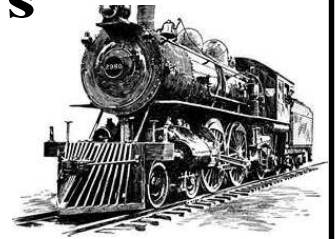


Maricopa Live Steamers

STACK TALK

March 2017

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



President's Message

Spring meet is two weeks away. Have you signed up yet? Remember the potluck on Saturday night and bring your train related stuff to be raffled after the potluck dinner.

West Werner is still closed and will be for the summer. Hopefully it will be open by Fall meet. Joe Schnyder and Bob Douglas sure could use your help digging up the track.

Rain gutters have been installed in the station so the bears and souvenirs won't get wet. We won't get any more rain at the park now that we put the gutters up. On the other side of the souvenir stand a roof is being installed over the door so the cookies won't get wet during the Christmas runs. Oh, I forgot, it won't rain any more.

I'm supposed to be positive when writing this blog but some of our members seem to think that anything that the club has belongs to them. For an example fire wood is being burned for a members own pleasure. Club members work hard to acquire the wood and split it. It's for cooking the food for meets not for just burning for fun. Another thing that has happened is the speeder that belongs to the club is being used (which is OK) but the speeder is not being put away after being charged. If you used it come back the next day and put it away. Don't leave it for someone else to put it away. Off the soap box for now.

It's starting to warm up which means the critters will be slithering out of their winter homes and will be very hungry. Watch where you step and put your hands. A new crop of baby snakes will be showing up also and they don't have a very good disposition.

For those of you that have a container-- it's your responsibility to keep the weeds at bay. Look in the rule book to see which side you are responsible to keep clean.

The tie crew sure could use your help cutting them up. You notice I said cut ties not fingers.

Safety First

Let's us have fun at our meet and hope for cool weather.

Perry

Calendar of Events

March 2017

Public Runs Sunday, March 5 12:00 PM - 5:00 PM

Board meeting and General meeting: Saturday, March 11 - 12:00 noon
 (Meetings are now back to back starting with closed session of board meeting.)

Public Runs Sunday, March 12 12:00 PM - 5:00 PM

Mark your Calendar ***March 17, 18 , and 19, Spring Meet*******
 (See Registration form on the last page.)

Public Runs Sunday, March 19 12:00 PM - 5:00 PM

Boy Scout Cross-Over Event Saturday, March 25 8:30 am - 4:30 pm
 (See article under Events, this issue)

Public Runs Sunday, March 26 12:00 PM - 5:00 PM

**Abbreviated Minutes from
 March 11 Board meeting and
 General Meeting**

Board meeting began at 12:00 pm - closed session followed by general meeting.
 General meeting began at 12:37.

Superintendent's reports:

Tower, Greg Gorman - See Greg's article in this issue.
 Boiler Inspector, Bill Pardee - Hand pump has been purchased and is operating.
 Maintenance of Way, Joe Schnyder - 45 to 50 tons of ballast at Rossow's Roost.
 Warner is still out.
 2 mph at all switches and 5 mph max, speed on all track.
 Construction, Cliff Fought - Tractor shed has been completed, gutter on station is next.
See project list in this issue.
 Operations, Hank Gallo - One club locomotive is down, all others are up and running.

Old Business:

Still need donations for more cameras.
 Sign up for the Spring Meet with Belinda.
 Now have a catalog for shirts at the gift shop - see Sandra or Jerry Grundy for special orders.
 Need to decide on location for stationary steam engine.
 Joe Kalisak volunteered to chair the Christmas Light Project. Oversight to Board by Mick.

New Business:

Perry needs \$1,500 for weed control chemicals. It was approved.
 New party location is old tractor storage area. New concrete pad OKed.
 Birthday parties in newsletter is moving target, may not be accurate..So no.
 Need Tim's E-mail in Stack Talk.

Sandy Rauperstrauch, Stack Talk editor, requests articles of interest and any photos for Stack Talk to be used (at editor's discretion) submitted in a timely manner **before the last week of the month** to allow for formatting in the newsletter.

**2017
 MLS Board of
 Directors**

Perry McCully
 President

Pete Pennarts
 Vice President

Bob Douglas
 Treasurer

Mike Lewandowski
 Secretary

**Mick Janzen
 Joe Fego
 Mike Grant**
 Members at Large

Cliff Fought
 Construction
 Superintendent

Hank Gallo
 Operations
 Supervisor

Greg Gorman
 Tower Signal
 Superintendent

Terry Liesegang
 Road Signal
 Superintendent

Bill Pardee
 Boiler Inspector

Pete Pennarts
 Safety

Joe Schnyder
 Maintenance of Way
 Superintendent

Al Ford
 Construction
 Superintendent
 Emeritus

John Bergt
 Past President
 2016

Timothy Freeman
 Web Master

Jim Zimmerman
 Engineering Test &
 Card Administrator

Sandy Rauperstrauch
 Stack Talk Editor



Safety at MLS

from Pete Pennarts

Safety is the # 1 priority on the MLS Train Park.
PLEASE READ AND REMEMBER!
 The safety items listed below are taken from the
MLS Safety and Operating Rules.

Section 5 - Item 516: Engineers shall have radio contact with the dispatcher/stationmaster during public run times and when otherwise appropriate. During public run times, engineers shall make radio contact with the dispatcher/stationmaster before entering the mainline.

Section 5 - Item 517: Engineers shall carry a working flashlight for personal safety when operating a train at night.

Section 5 - Item 532: All trains must be operated at a safe speed, i.e. be able to safely stop in an emergency.

Section 5 - Item 534: All mainline switches shall be left in their normal, operational position.

If you do not have a copy of the MLS Safety and Operating Rules see Pete Pennarts to get a copy. It is important reading.



Snakes at MLS

Before lifting up some boards the first week of February, Pete kicked them, only to discover this rattlesnake. Beware! They are at the park even though it is still chilly.

They say not to use the old suction cups for a snake bite, just call 911 and go to the hospital. There, they sometimes use the venom from your bite to determine the type of rattlesnake, to know which anti-venom to use.

Everyone reacts differently.

You may become light-headed or nauseous, so radio or call for help at the RR park and have someone call 911.

Did You Know?

MAXIMUM SPEED ON ALL TRACK AT MLS IS
5 MPH - 2 MPH ON ALL SWITCHES
YOU ARE NOT THE EXCEPTION!

To calculate your speed at 5 mph, it is 22 seconds between mile posts.

STEAM LOCOMOTIVE VALVE GEAR

From Dave Griner

Hello again,

This time we'll look at two radial valve gears that were not used as predominantly as those previously reviewed.

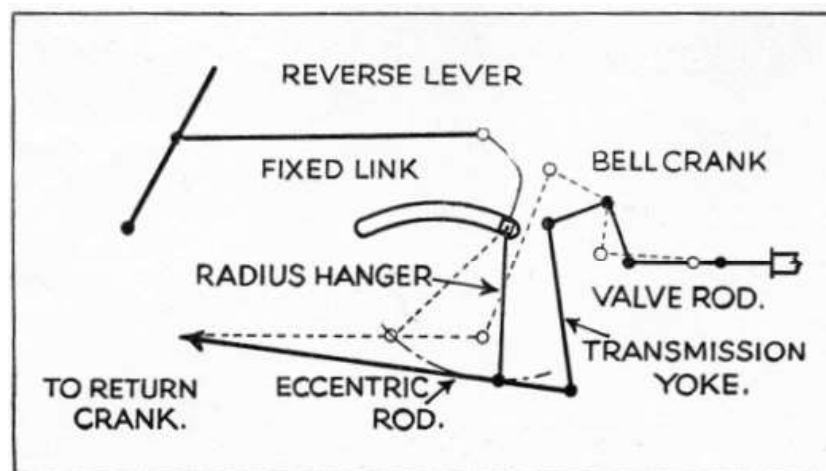
First of these is the Southern, again from Wikipedia:

Southern valve gear was devised by locomotive designers on the [Southern Railway \(US\)](#) and used on many locomotives on that line. The first patent was issued to Wm. Sherman Brown in 1906. He continued work and another patent was issued July 23, 1912. The gear was first tested on Mikado 586 in February, 1913 at Southern Knoxville Shops. It was specified for some [USRA standard](#) locomotive designs, though many locomotives constructed to these patterns used Walschaerts or Baker valve gear instead. The Southern valve gear was used on many Southern Railway locomotives, including survivors [630](#) and [722](#). It was also used on [East Broad Top](#) numbers 16-18, which survive today.

Unlike the Walschaerts and Baker systems, the Southern valve gear dispensed with the combination lever which transmitted some of the crosshead motion to the valves. As with those systems it used a return crank on a driver (instead of the eccentrics used by the [Stephenson valve gear](#)). The return crank attached to the eccentric rod, which hung from a pivot close to the far end of the eccentric rod. This pivot attached to the end of the radius hanger, the other end of which attached to a link block which slid back and forth in a track curved in the same manner as the expansion link of a Walschaerts gear. In this system, however, the track was fixed in place; sliding the link block back and forth controlled reversing and cutoff.

At the end of the eccentric rod, close to the radius hanger, the rod connected to the transmission yoke. The upper end of this rod connected to a bellcrank, which translated the up and down motion of the transmission yoke into back and forth motion of the valves.

The mechanism is a little less obvious than that of the other types, but control is fundamentally like that of the Baker system. In this case the controlling factor is the angle between the radius hanger and the transmission yoke; when they are parallel, there is little up-down motion of the transmission yoke and the engine is centered. As link block moves back and forth, the angle of the radius hanger changes, and the up and down motion of the transmission yoke in response to the back and forth motion of the eccentric rod is increased or decreased.



Continued



Now we move on to the Young gear, and from “Railway Wonders of the World”:

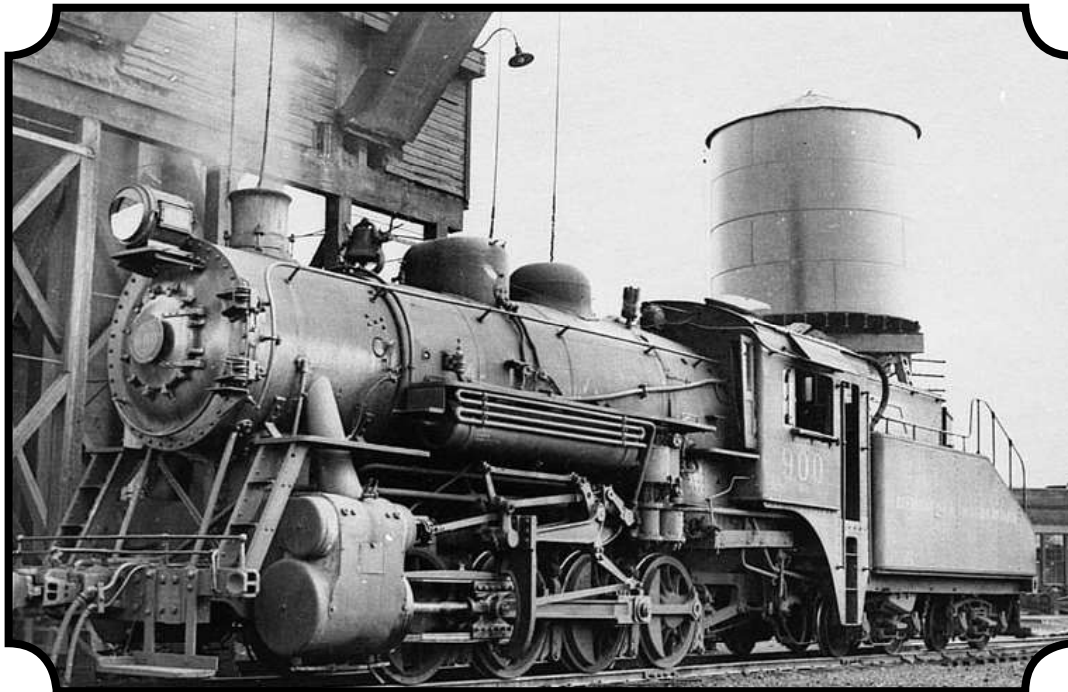
Although the Young gear has not had the extended application of those described above, they are worthy of note because of their incorporation of an ingenious idea. In all the preceding gears, the primary movement has been derived either from eccentrics or from return cranks, set at (or near) right angles to the main cranks. The designers of the Young gear do not use separate return cranks to operate their expansion links, but take advantage of the fact that the main cranks of a normal two-cylinder locomotive are already at right angles to each other. Therefore additional cranks are not provided, and the expansion link of either set of gear is operated from the crosshead of the other cylinder, which gives a movement the same as if it were operated by a separate return crank and eccentric rod.

The only trouble is a minor one. When separate return cranks are used, they are both set to “lead” or “follow” the main crank, and both die-blocks are at top or bottom of the link together, according to the direction in which the engine travels. If, however, the right-hand main crank “leads” the left-hand, it naturally follows that the left-hand crank “follows” the right-hand; and, with one crank “leading” and one “following”, one die-block has to be at the top of the link and the other at the bottom, whichever way the engine runs. This introduces a complication in the reversing shaft. This has to be double in the Young gear.

The action of the gear is very much the same as the Walschaerts gear. In the Young gear the expansion link is mounted in the same way, but has a long tail, which is directly connected to the crosshead by a union link. The radius rod works on a short lever attached to a cross-shaft which transmits the motion to the other side of the engine, where a similar short lever is provided. The combination lever is mounted on this, upside down, merely as a matter of mechanical convenience; it is easier to drive it from the top of the expansion link on that side by a direct rod, than to connect it to the crosshead. As each crosshead drives the link direct, as mentioned above, it is obvious that the movement of the combination lever must be the same, whether connected to crosshead or link.

The inverted head of the combination lever is connected to the valve spindle in the usual way. The reverse shaft is double, and has two pairs of reverse arms, one being connected to a solid inner shaft, and the other to a tubular outer shaft. A double reach rod is used; and, whichever way the cab lever is moved, the die-blocks go in opposite directions, one to top of link, and one to the bottom.

The Young Valve gear can be arranged to give a quicker opening and closing of the ports than the Walschaerts gear, with normal setting; but as each side of the engine is dependent on the other side for its primary movement, it means that, should any defect develop in one side only, the engine is rendered helpless, and cannot be operated on one cylinder only, as on an engine with independent gears. Though breakdowns are infrequent nowadays, nevertheless some prejudice exists, and the interdependence factor has been put forward as one reason why the gears have not been more extensively used



So, there you have it for the valve gears most prominent in this country.
 Next time we'll go over oscillating and rotary, poppet valve gears.
 Take care,
 Dave

EVENTS!

To all Maricopa Live Steam Members

Yuma Territory Live Steamers

is having a meet and you are welcome to participate.

The Galloping Goose Trolley Meet is **March 10-12**. There will be a BBQ potluck on Saturday night. It is open to all of our train friends.

Please RSVP if you are going to make it.

Chuck Finnila at 928-247-7190 or livesteamersofyuma@yahoo.com

The MLS 2017 Spring Meet is Around the Corner!

March 16th, 17th, and 18th

Have you registered?

See all the information on the registration form,
last page of this issue.

Don't miss out!

Jim Brown Needs members to help out.

The upcoming Boy Scout Cross-over Event is coming up!

Saturday, March 25th, 8:30 am - 4:30 pm

Events will be held in different areas of the park and run crews are needed
to transport kids from one event to the next.

Call Jim at 623-694-1061 or e-mail at lgbtrains@aol.com

If you can help out.



Did we mention all the rain MLS had?
Dakota putting away a club train after a down pour.



Jim Theobald running the
Santa Fe Alco on a rainy
day.



Myrna and Sandy in the gift shop,
always there on Sunday runs to sell
train related items.

Firing a Steam Engine

By John Lovely

Firing a steam engine is an art. I am not an expert, judging from my struggles with my engines, and I am sure some of you have far more experience and would be willing to share what you know. I hope this can become a regular column in the Stack Talk as you write about your experiences.

The purpose of a steam engine, or any engine, is to turn heat energy in a fuel into mechanical energy. In the internal combustion engine, this is done right in the cylinder block itself. Liquid fuel is burned, making hot air, which forces a piston to move and turn a crank shaft. This rotary motion is converted into either electric current or, in our case, hydraulic current to turn the wheels.

In an external combustion engine, there is an extra step: heating a fluid which again causes a piston to move a crank. In a hot air engine, the fluid is air; as the name implies. In steam engines the fluid is vaporized water, which is advantageous because of its high heat of vaporization. That is, it takes a lot of heat to change water at 212° F into steam at 212° and this is the heat we use to move our pistons. So, the question is how do we get the heat from the fuel into the water to make steam. A common goal is to have the firebox filled with flame, heating air, and transferring that heat through the metal of the boiler into the water.

There seems to be three types of fuel: solid, liquid, and gaseous. Wood and coal come to mind for the solids. Mostly coal in our hobby, although I have read about people using wood pellets with a degree of success. From what I have heard about coal is the advantage of high heat (BTU) value and it tends to burn hotter with more draft (air flow). Thus, coal fired engines are somewhat self-regulating. I have not fired a coal engine, so I don't claim to have any expertise. I have read that it is important to have an even fire distributed across all the grate area, and have an arch in the firebox so the hot air flows toward the back head washing all the internal surface of the firebox before it enters the tubes to flow out the smokebox and stack to the atmosphere. Here is a topic for some of you soot- in-the-face people to write about.

The liquid is usually diesel fuel. Alcohol and other liquids are sometimes used on the smaller scales. With oil, the liquid is atomized into a fine mist by a steam jet and sometimes air and then ignited in the firebox. On prototype steam engines, the firebox is lined with firebrick that glows red/white hot and helps keep the combustion going. The burner jet is usually directed toward the rear wall about half way between the bottom of the mud ring and the fire door. With this arrangement, there is usually no need for an arch to direct the flow. Combustion air is restrictively added at the front of the firebox around the burner, at the rear of the firepan and sometimes at the bottom of the fire door. Again, I have not fired an oil burner and I have gained my knowledge from speaking to prototype firemen and some modelers.

Then we come to propane, the stuff I am struggling to get right. Propane, or liquefied petroleum gas (LPG) is stored as a liquid and evaporates at temperatures well below 0°F. For some interesting facts, go to <http://www.elgas.com.au/blog/453-the-science-a-properties-of-lpg>. Here are some: 1 gallon weighs 4.24# and provides 91,547 BTU. Pressure in the tank varies with the temperature but remains the same no matter how much has been used. That is why it seems to "freeze up" as you use the gas on a cold day, the pressure goes down. Propane gas is heavier than air so it will collect in low, enclosed places. Tanks seldom blow up – even when exposed to fire directly.

That is why it seems to “freeze up” as you use the gas on a cold day, the pressure goes down. Propane gas is heavier than air so it will collect in low, enclosed places. Tanks seldom blow up – even when exposed to fire directly.

From the LS literature, I surmise there are two basic types of propane burners: slot and rosebud. For the slot, or hole, burners, the air and gas are mixed in a tube before they get into the burner pipe. The burner pipe has a series of transverse slots cut about ½” apart. Gas nozzles with about a .040” (#60 drill) hole shoot the gas into the open end of the mixing tube. I have drawings for several styles, some very simple and some quite complex with tapered and curved mixing tubes. Some feed the gas at the front of the firebox, some at the rear, and some in the middle. I would think we would want the most heat, fire, at the rear of the firebox so the hot air had the furthest distance to travel, giving it more time to transfer heat. Center admission would seem to provide a more even supply over the length of the burner pipe, while the front admission would give the most mixing distance. Maybe someone has some evidence on which is best. Another feature of the slot burners is an enclosed bottom of the firebox with controlled secondary air admission holes or dampers. Another question I have is: as the engine pulls harder, inducing more draft, do you need to close or open the dampers? Or do you just try to hit a happy medium?

While riding GCR #29 the other day, I watched the engineer and fireman interact. The fireman was constantly changing the fuel valve, atomizer, blower, and damper controls to adjust to every change in throttle setting by the engineer along with maintaining boiler water level. Additionally, they were watching the track, calling stations, and copying track warrants.

Moving the air too fast through the firebox and tubes doesn't allow sufficient time for heat transfer. When pulling hard you want the most heat energy transferred, but you will get the most draft causing faster air flow. Here enters the design of the exhaust nozzle, petticoat and stack; a topic for future articles.

Rosebud style burners stand vertically on a manifold. They are usually about 1” to 2” high, and have six slots arranged radially in the head. Combustion air is drawn in through 3 to 6 holes at the base with about a .026” (#70) jet. Locoparts.biz sells the burners I am using and they will also make manifolds for you, from 6 to 60 burners per their catalogue. They are good, but quite high (long), thus I have my manifold mounted below the mud ring to keep flames low in the firebox. Another homemade and shorter version by Marty Siegel, “Marty Burners,” use 1/8” brass pipe components. Both versions put out about 5400 BTU. (You physics people can figure how many BTU's we need.) I have 10 burners, about 50,000 BTU, and an arch to direct the flames toward the rear, but I still use more steam on a hill than I can make. A third design by Jan-Eric Nystrom was in Live Steam and Outdoor Railroading Jan/Feb 2010, called a “swiss cheese” burner. It has twenty-one, 2-4 mm holes in the head. The pictures show flames shooting out every-which-way.

My next projects/experiments may be a firepan to enclose the firebox and regulate the air flow. I am also thinking about a burner that will emulate the oil burner. I have a large propane torch head that advertises 50,000 BTU output and shoots a flame about 4” long. Two or three of these should do the trick.

I am looking forward to your discussions on this topic and other steam topics.

John

MLS Video System Upgrades

By Greg Gorman

We are finishing up a multi-year, multi-part project to overhaul and update the MLS live video streaming system. If you have been out on the layout recently I am sure you have noticed some of the changes we have made! We have had several goals in mind as we have been improving the system and infrastructure that supports it. Obviously, we want to be able to show more parts of the track system so that the video displays are more interesting. Behind the scenes, we also want to make it easier to manage, maintain, expand and leverage new technology for other parts of the club.

Part 1: Park-Wide Wi-Fi System

Over the summer and fall, my team and I installed a set of Ubiquiti NanoStation M2 transmitters around the Adobe Tower. You might have seen them suddenly appear and wonder if we're building a cell network! They



do sort of look like cell antennas, but they are high-power Wi-Fi base stations. They have a flat-plane antenna that covers about 60 degrees of view, with a range of over 2000 feet. We installed 3 of these devices on an antenna pole to cover various directions from the tower. South, West and Northeast. We also have an antenna on the East side of the tower to send a signal over to the clubhouse so we can display video on the TV screens there.

Why a high-power Wi-Fi system? It gives us a lot of flexibility. As technology becomes cheaper and the "Internet of Things" creates devices that might be useful for us, I wanted to be sure we had the infrastructure in place that would make it easy to incorporate new ideas into our system without running miles of wire.

Can you use the Wi-Fi system? Sadly, no. We are reserving it for MLS Operations only at this time. Our Internet connection is via a long-range wireless provider (via the dish antenna on the South side of Adobe Tower) and is very limited on its available bandwidth. You will have better performance keeping your phone on your wireless network because our streaming video loads up the link quite a bit.

Why are we not using Century Link (or other wireline provider)? Simple, it's not available at this time. We would prefer to have a fiber or DSL line to give us more bandwidth, but none of the local providers have a service drop nearby. We continually monitor availability and when it makes sense financially and technically, we will jump on it!

Part 2: The Video System

MLS has been streaming live video 24/7 for many years and it's very popular with our members and visitors. The original system uses hard-wired cameras into a DVR inside Adobe Tower. A few years ago some wireless links came available that replaced the co-ax cable and allowed us to have cameras in new locations around the park. While the cameras were not very expensive, the wireless links are quite pricey, have to be matched 1-to-1 with a camera and antenna on the tower, and are limited in how many we can use. Today, we have them on the cameras viewing from the ZOO Tower and Alkire. A third unit at Harrington Crossing failed last summer (more on this later).



The good news is that over the past 12 months, prices of Wi-Fi cameras have come down significantly. Now that we have our high-power Wi-Fi system, we now have amazing flexibility as to where we can place new cameras. Instead of spending nearly \$300 for each wireless installation (camera and point-to-point link and antennas), we can now spend about \$60 for a camera and (if necessary) a few dollars for a larger antenna and can put that camera just about anywhere within 1/2 mile of the Adobe Tower! Instant flexibility!

This also required us to buy a new DVR that can manage up to 16 Wi-Fi cameras and is complimentary to the one we already have for the wired cameras. We have software that integrates video from both DVRs so that we can show all the cameras on the live stream video in one view.

With the new way of supporting cameras, you probably noticed an ‘explosion’ of new cameras around the park. The first one we installed was to replace the camera at Harrington Crossing where the point-to-point link died. It was a good proof-of-concept for us and showed these low-cost cameras can be easily configured and quickly installed. The only requirements are 12v power and the ability to ‘see’ the signal from the Wi-Fi system.

Just this past weekend (Feb 11 th) we installed 3 more cameras: Adobe Station, Wilson Wash Bridge and Arntchoo/Werner crossing. Over the next few weeks you will see them come “online” in the livevideo stream.

We also upgraded both of the DVRs with large hard drives in them and have them set up to record a rolling 7-day video history. That way, if we have a need to review something the cameras might have seen, we can support it.

And Finally...

About 2/3 of the cost of the system was donated by one MLS member. If you would like to donate a camera or help with the cost of more antennas and transmitters, please drop me a note. The cameras are less than \$60 on Amazon and I can send you a link, or just send a donation to the club and we’ll take care of it! The high power units are a little more. I want to set some more up to relay signals farther out as we choose more camera locations.

I also want to thank Wade Gorman, Tim Freeman and Pete Pennarts for all their hard work and assistance! I hope you enjoy the upgraded experience!

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Where would we be without Donna’s “Doohickies and Custom Paint shop”? Her painting efforts are very much appreciated and the work is endless! Thanks Donna!



Dewey puts a sign up at his Sweet shop. The old time village is getting a new look.



Joe Fego and Rich Mock with the 1st panel of 1” track. More information will follow as progress continues.

MLS 2017 PROJECTS

(updated 2/22/2017)

(Random - not in any order)

1. Install walkway fencing (have material for project just need concrete for posts) In progress.
 - * 2. Add two lights in kitchen. Completed cost \$150.00 - **Done**
 3. Work on parking lot expansion.
 4. Extend walkway to station 100 ft.
 5. Install stationary steam engine display pad and roof with air and power. (Have some material)
 6. Vendor area concrete pad for additional picnic area. See Minutes.
 7. Install three more parking lights for parking lot expansion.
 8. Archoo Junction generator pad/building (already in progress) \$300.00
 9. Concrete pad for west transfer table area.
 10. Install movable side walls in Ford Station outside area.
 - * 11. Drainage system by barbecue area. (Already in progress) \$30.00 **Done**
 12. Adobe Yard track re-work by turntable, adding more electrical receptacles.
 13. Conduit for Mega Tree wiring. (Have material for project)
 - * 14. Conduit to new equipment area/wiring. Completed \$1000.00 (monies already in budget at \$2200.00) **Done**
 15. New alternator for west transfer table and new motor.
 16. Build 5 more riding cars.
 17. Build 3 more conductor cars.
 - * 18. Build 2 more CP buildings. **Done**
 19. LED light upgrades on Zoo/Adobe Tower
 - * 20. Camera on Wilson Bridge. **Done but needs to be wired.**
 21. Parking lot stone.
 22. Secure walkway posts.
 23. Fence south side vendor area.
 24. Club container fronts.
 25. Gutter for station.
 26. Change yard lights to LED's.
 27. Driveway reseal and relined (cost \$12,500.00)
 28. AJ Tower install new wi-fi tower (just need concrete and wiring to complete)
- * **Done**
Funded Projects From 2016:
1. Tractor repair, \$1100.00
 2. Camera system, \$500.00
 3. New insurance estimates ??
 4. Move west transfer table charger ??

Check out the MLS website!

www.maricopalivesteamers.com

If you have photos for the web page, send to Timothy Freeman at tim@maricopalivesteamers.com

Questions or comments write to John Bergt at john.bergt@maricopalivesteamers.com

or to Timothy Freeman at tim@maricopalivesteamers.com

*Take a look at Train Mountain's newsletter.
They are getting ready for their summer event
and have some interesting comments.*



In April's issue, read about Jr Engineers
and how they got started.