



STACK TALK

JULY 2015

The Official News Letter of the Adobe Mountain Railroad
Phoenix Arizona, Operated by the Maricopa Live Steamers
Railroad Heritage Preservation Society,

It is impossibly hot outside, but work still goes on. Arntchoo is still being repaired and has come a long way.

There is a lot of track work that members can do on their own, I am talking about all the stub sidings that were damaged in the floods. It is easy to do, but requires labor to get it done. The steps are simple, first take off the splice bars (angle bars, or joints) at the switch where the track is hooked to the switch, then move the track off to one side, then scrape the ballast off to one side making the roadbed as flat as possible, then place the track back in place, now take some time to straighten the ties and make sure the screws are tight and hook the track back to the switch, then call for the ballast train. If just a dozen members took on a dozen sidings it would not take long to get the repairs done.

Remember no meeting in July, come August there will be a meeting along with Ice Cream to eat, come one, come all and have some fun. who knows it might be cool enough to run a train.

The side walk is in and some work done to fill along the concrete, trees trimmed, electric conduit run to the fence and to the area between the containers, it is starting to look real good. The club owes a big thank you, to ones who have work so hard on the improvements.

There are a lot of hard working members, if you don't believe me just look at the west wall in the club house.

Time to take the engineer test for the year, and sign up for the fall runs.



Please be careful on your vacations and your travels we want see you all back safe and sound, have fun though.

Cliff Fought



CALENDAR FOR JULY & AUGUST 2015

There will not be a Board or General Meeting for July 2015

- | | |
|-------------------------|---------|
| August Board Meeting | 5:00 pm |
| August General Meeting | 5:00 pm |
| Annual Ice Cream Social | 6:00 pm |





Sahuaro Central Track Plan for the 14" gauge railroad..

The Adobe City Station building, which was on the corner of the AMRS property has been moved to an area closer to its final location. Concrete pads still need to be laid for the foundation of the building.



The Railroad

Freight Trains

We've all been there. Sitting at a crossing in our car, watching a freight train roar by us, blasting its' horn. Sometimes, if we're lucky, we even get a front row seat! Freight trains show us just how powerful modern diesel locomotives are; they often pull upwards of 7000 tons. However, we're not looking at the modern engine today. (That's best saved for another time.) Today, we will look at what the engine is pulling.



Freight railroads have played a major role in developing the American economy and has contributed arguably the most to the vast expansions in wealth seen in the 1800's. Today, railroads ship many tons of freight back and forth between the country. Delivering commodities like oil and coal from suppliers to producers. America's economy would not be the same without freight railroads, and our extensive 140 thousand miles of route track. There are currently nine class 1 railroads, with a revenue of at least \$356 million, operating in North America, excluding Via Rail and Amtrak who ship only passengers.

Freight trains, in terms of commodities carried, can be separated into two different categories. Mixed freight trains are intended to stop at many different spurs to deliver a certain car or multiple cars, and they carry many different commodities. This is best exemplified by our annual operations meet, in which participants are dispatched to deliver their cars to certain industries along the railroad. The destinations are car specific, so you'll never see a army tank car go to an industry like Shelby's Lollipops. (Unless Shelby's Lollipops is planning a war!)



The other type of train is a unit train. It contains nothing but the same commodity and has only one destination, the industry that ordered the shipment. These trains do not need to stop and commence any switching, nor do they need to be sent to a classification yard. For that reason, this type of train is con-



sidered more economical and profitable than their mixed counterparts. Often this type of freight trains are used for very large shippers, such as refiners, car manufactures, coal mines, shipping docks, and fruit juice producers. The image above is of the Tropicana Orange Juice Train ran by CSX, a perfect example of a unit train.

Mixed freight trains can be separated further into two more categories. Local mixed freight is a train that goes from the yard to the various destinations, usually within the metropolitan area where the yard is located. Sometimes train loads need to be carried over long distances before being broken up into local freight. A train traveling from a yard in Phoenix to one in Yuma is an example of a through freight train. Once that train reaches Yuma, it will probably be sent to a classification yard to be sorted and sent out on a local train. Even if it's a longer route, say Phoenix to Los Angeles, and the train needs to stop in Kingman for switch of crew and servicing, it does not mean it becomes a local train, it is still considered a through train. On our railroad, a through train would be one that, for example, went from Adobe Yard to Pardee Yard, non-stop.



The entire country relies on these railroads. They ship our food, our appliances, our energy, our way of life. Thanks to the railroads, we can have a mass amount of products available to us, anywhere in the country, and still be affordable. So let's take our hats off to the men and women who work so hard on the railroads to keep America running!

Before I finish, I would just like to share with you several facts about freight trains.

- Trains in the west tend to carry more cars than trains in the east, carrying an average of 105 cars, you'll likely see those lengths outside of the metro area.
- During the transition era, when steam engines were being rapidly replaced by diesel, it was pretty common to have an engineer, fireman/brakeman, flagman, and a conductor, today most freight trains in North America only have an engineer and conductor, with some railroads even contemplating eliminating the conductor position and transferring his duties over to the engineer.
- Union Pacific was reported to have had a revenue of over 20 billion dollars in the year 2013. According to a 2007 report, at the time UP had nearly 95,000 rolling stock cars.

- According to the Guinness Book of World Records the record for the longest train ever was set by an Australian mining company in 2001 by a train carrying 682 loaded iron ore cars, with a weight of almost a hundred thousand tons, and was pulled using 8 GE AC6000s. It measured at about 4 and a half miles long.

Thanks for reading,
Gabe Zorbas

P.S. Me and Hank Gallo are currently writing an encyclopedia for the club. If you have any interesting and/or needed information you would like to share (For example, how a bridge or spur got it's name.) contact me at GabeZorbas@gmail.com or call at 623-326-2630.



Engineer cards expired on May 31st, so now it is time to take your test

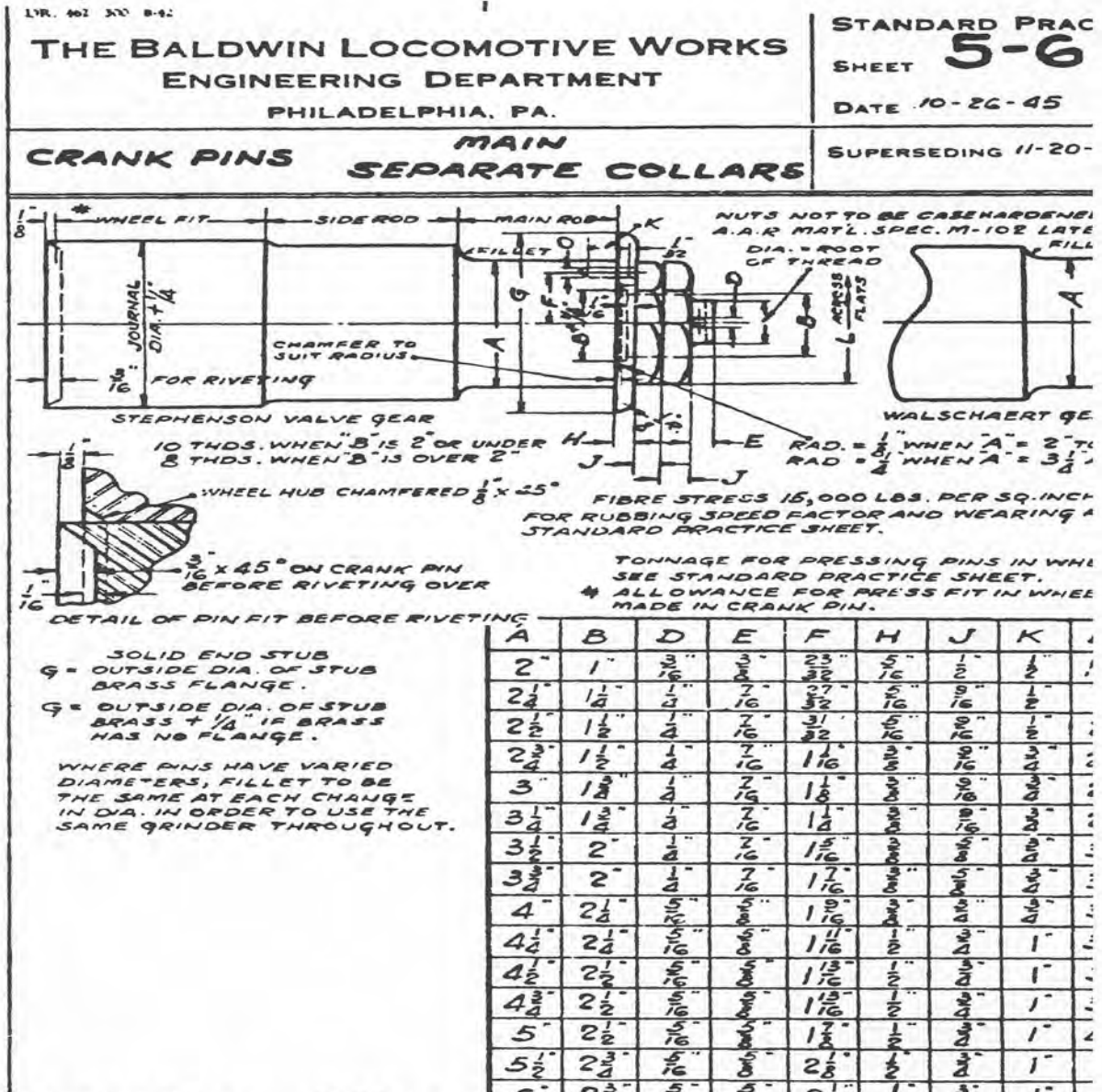
It can be taken online at Maricopalivesteamers.com



STEAM LOCOMOTIVES

CRANKPINS

This time around we will be looking at crankpins. They are one of the relatively small items that make the locomotive function, however, they are critical to good and reliable service from the engine. Loose a pin and everybody goes home the hard way!



This drawing shows how Baldwin went about the design of crankpins and how much pressure was required to set them properly into the driving wheel center. It might also be interesting to note the pin has provision for being riveted over at the

rear. Close attention was given to providing generous radii to prevent stress raisers from developing due to corners where diameters changed.

THE BALDWIN LOCOMOTIVE WORKS. ENGINEERING DEPARTMENT. PHILADELPHIA, PA.	STANDARD SPEC SHEET 5-6 DATE 7-12-40
PRESSURES FOR MOUNTING DRIVING AXLES AND CRANK PINS IN CAST IRON WHEEL CENTRES.	SUPERSEDING SHEET SHEET #44, 5/10/33

THE DESIRED PRESSURE IS BASED ON 10 TONS PER IN DIAMETER OF WHEEL FIT. A VARIATION OF 10% OVER OR 15 ALLOWED.

● - A.A.R. STANDARD

(MECHANICAL PROCESS INST)

DIA OF FIT	TONS PRESSURE			DIA OF FIT	TONS PRESSURE			DIA OF FIT	TONS PRESSURE			DIA OF FIT
	MIN.	PREF.	MAX.		MIN.	PREF.	MAX.		MIN.	PREF.	MAX.	
2	18	20	22	5	45	50	55	8	70	80	90	11
2 $\frac{1}{8}$	19	21	23	5 $\frac{1}{8}$	46	51	56	8 $\frac{1}{8}$	71	81	91	11 $\frac{1}{8}$
2 $\frac{1}{4}$	21	23	25	5 $\frac{1}{4}$	48	53	58	8 $\frac{1}{4}$	73	83	93	11 $\frac{1}{4}$
2 $\frac{3}{8}$	22	24	26	5 $\frac{3}{8}$	49	54	59	8 $\frac{3}{8}$	74	84	94	11 $\frac{3}{8}$
2 $\frac{1}{2}$	22	25	27	5 $\frac{1}{2}$	50	55	60	8 $\frac{1}{2}$	75	85	95	11 $\frac{1}{2}$
2 $\frac{5}{8}$	23	26	28	5 $\frac{5}{8}$	51	56	61	8 $\frac{5}{8}$	76	86	96	11 $\frac{5}{8}$
2 $\frac{3}{4}$	25	28	30	5 $\frac{3}{4}$	53	58	63	8 $\frac{3}{4}$	78	88	98	11 $\frac{3}{4}$
2 $\frac{7}{8}$	26	29	31	5 $\frac{7}{8}$	54	59	64	8 $\frac{7}{8}$	79	89	99	11 $\frac{7}{8}$
3	27	30	33	6	55	60	65	9	80	90	100	12
3 $\frac{1}{8}$	28	31	34	6 $\frac{1}{8}$	56	61	66	9 $\frac{1}{8}$	81	91	101	12 $\frac{1}{8}$
3 $\frac{1}{4}$	30	33	36	6 $\frac{1}{4}$	58	63	68	9 $\frac{1}{4}$	83	93	103	12 $\frac{1}{4}$
3 $\frac{3}{8}$	31	34	37	6 $\frac{3}{8}$	59	64	69	9 $\frac{3}{8}$	84	94	104	12 $\frac{3}{8}$
3 $\frac{1}{2}$	31	35	39	6 $\frac{1}{2}$	60	65	70	9 $\frac{1}{2}$	85	95	105	12 $\frac{1}{2}$
3 $\frac{5}{8}$	32	36	40	6 $\frac{5}{8}$	61	66	71	9 $\frac{5}{8}$	86	96	106	12 $\frac{5}{8}$
3 $\frac{3}{4}$	34	38	42	6 $\frac{3}{4}$	63	68	73	9 $\frac{3}{4}$	88	98	108	12 $\frac{3}{4}$
3 $\frac{7}{8}$	35	39	43	6 $\frac{7}{8}$	64	69	74	9 $\frac{7}{8}$	89	99	109	12 $\frac{7}{8}$
4	35	40	45	7	65	70	75	10	90	100	110	13
4 $\frac{1}{8}$	36	41	46	7 $\frac{1}{8}$	66	71	76	10 $\frac{1}{8}$	91	101	111	13 $\frac{1}{8}$

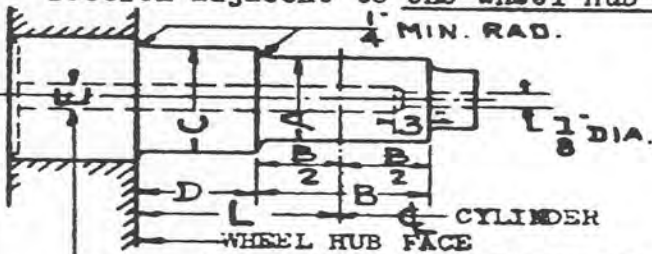
Here is the method of determining the physical size of the pins, notice that one of the more important variables in the equation is the fiber stress. Everything centers on keeping that number within the limits expressed. That aspect was learned

from experience where pins failed and more was learned regarding material characteristics, i.e.science at work!

THE BALDWIN LOCOMOTIVE WORKS ENGINEERING DEPARTMENT PHILADELPHIA, PA.	STANDARD PRACTICE SHEET 5-6 DATE 5-21-47 SUPERSIDING 01-24
CRANK PIN STRESSES	

MAIN CRANK PINS

Main crank pins are to be calculated for bending at the side rod joint section adjacent to the wheel hub - See formula below.



For maximum & minimum diameters of hollow bore see tables below.

SOLID PIN	HOLLOW
$S = \frac{P \times L}{E}$	$S = \frac{P \times L}{I_E}$
P = Full piston load	E = Section modulus in circular section of
E = Section modulus in circular section of	I _o = Moment of inertia circular section of
I _o = Moment of inertia circular section of	I _E = Moment of inertia circular section of
I _E = Moment of inertia circular section of	S = Fibre stress

The fibre stress S shall not exceed 15,000 p.s.i., based on steel minimum ultimate strength of 80,000 p.s.i. and a yield point of 4 for stress limit to be used with high tensile alloys or special treatments such as cold rolling or flame hardening raise question.

OTHER CRANK PINS

Crank pins other than main need not be calculated for bending as the pressure usually determines the pin diameter. Crank pins for tandem rods are to be calculated according to Frank Supply Company's Standard Practice Sheet D-32626-L.

HOLLOW BORING

Make hollow bore diameter "E" as near maximum diameters given in Table I stress limit will permit.

TABLE I - MAX. DIA. OF HOLE

SIDE ROD FIT DIA. "C"	E _{MAX.}
5 1/2" and under	.375 x C
Over 5 1/2" to 6 1/2"	2"
Over 6 1/2" to 8"	2-1/2"

TABLE II - MIN. DIA. OF HOLLOW BORE

DIA. OF FORGING
Over 6" to 8"
Over 8" to 10"

Baldwin had developed a method of determining the sizes of pins from a 2' gauge 0-4-0 to a 2-8-8-4 on the same page-----amazing!!

If there was a bit more space we could look at some pictures of pin failures, some very exciting moments there!!

Anyway, take care.

Dave

