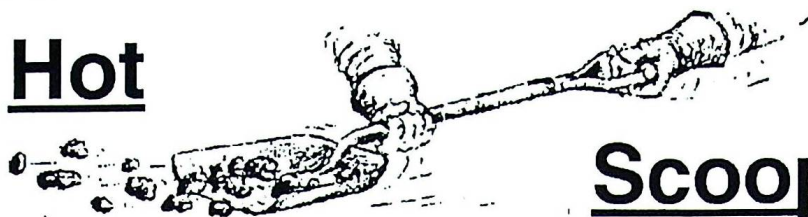


Hot



Scoop

A publication dedicated to the volunteers of the San Diego Railroad Museum

June 1994
VOL VI NO VI

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DIRECTOR OF CAMPO OPERATIONS

Denby Jones

If someone were to ask me "how big a plate is the Museum carrying" I would have to respond, "about the size of the Pacific Ocean". At staff last night we went through the 75th anniversary tasks, and they are formidable, but they are not unobtainable. However, it is going to take work, dedication, and focus from everyone.

Superintendents get together with your groups, go over the tasks that you are responsible for, come up with the best way of attacking it and go. If you can not complete a task, look hard, we may be able to delete it, but if that is the decision, document it so that it will not be forgotten. Because it is deferred for the 75th anniversary work load does not mean that it can be forgotten about. That is how we got into the position we are now with some of these tasks, they were deferred and then forgotten. In my off ice at Campo there are status boards. These tasks will be up there along with the status and responsible party. As a task is completed, or if it is deferred, indicate that on the status board. If someone was concerned enough to identify a task that needs to be accomplished, it is important enough to complete.

Not all of the work load is being driven by the 75th. FRA is driving railroad equipment and track maintenance, CDF is driving weed control, County Health is driving hazardous waste. These organizations do monitor us, and it is in our best interests to comply.

A final driver is the Multiple Use Permit and the erection of the new display building. It is a lot, a whole lot, but I think that we can do it.

Speaking of Railroad equipment and track maintenance, we are looking for someone that has an interest in right-of-way and track

maintenance. Paul Westover was our man and did an excellent job, but he has moved north, leaving a big whole to fill. This is an extremely important position. We are required to inspect the track regularly and maintain it, and we really need someone to run that program. If you are interested, please contact me, Denby Jones, at 279-2419 or Kay at the office, 595-3030. That is about it for now. See you at Campo, Denby

OPERATIONS DEPARTMENT

Maryanne Thompson

The ridership total for the month of April was 1680 including school days. As usual I want to thank all of the crew members who help to keep the trains rolling. Now that we are getting into summer and vacation time for a lot of people, there will be a number of blank spots on the Call Board. Please continue to fill in the blanks when you can. During May we were short trainmen almost every weekend. If you can fill in an extra spot now and then it would really be appreciated.

For those who still haven't completed their speeder training runs, please contact Mike Reneau at 466-5402 to make arrangements. We are into the fire season now and need to run a speeder behind our Miller Creek trains on the weekends. And, while I'm on the subject of fire season, please be alert to any signs of fire at Campo or along the right-of-way and report any sightings in a timely manner.

Since the Operations meetings have been so poorly attended, the next scheduled meeting will not be until Wednesday, August 17th. Future Operations meetings will be held on an as-needed basis. Any important information will be forwarded in this report or in the Call Board letter. If you have any specific concerns or problems, please contact Mike Reneau or myself and they will be handled. (I guess like Lew I'll find out if anyone really does read this!)

Hope you have a good summer and I'll be seeing you at Campo!

SAFETY CORNER

Lew Wolfgang

Snake Bite Kits

Maryanne Thompson reports that she has donated the funds to purchase three snake bite kits for our use at Campo. Two will be located in the Conductor's first-aid kits, and one will be located in the first-aid locker in the Car barn. Maryanne will provide instruction on their proper use, please see her if you have questions. Thanks, Maryanne!

Accident Analysis

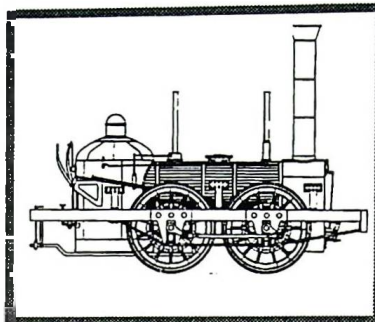
The following description of the SP Cajon Pass Wreck of a few years ago was published once in the HotScoop, but since we have many new members I am presenting it again. It may seem disjointed in places, it was assembled from information obtained from the Internet, but still

holds a poignant message.

Begin analysis:

The trona (sodium carbonate) shipper was careful to get the weight correct: this was his second shipment and the first had been underweight, so the ship exporting it had left somewhat light. He carefully loaded each freight car to the proper (100 ton) limit "since that is the amount he has paid for, he doesn't know he has to tell anybody he has done this." Each car then weighed 130 tons total.

Each of the three yard clerks (there were three



partial shipments) entered a different estimate of what the shipment weighed (50, 75, and 60 tons). "The yard clerks didn't feel bad about guessing because they thought the weight would be superseded by the Southern Pacific rate clerk in Los Angeles when that gentleman got the shipper's bill of lading."

Thus, the train engineer was told the shipment weighed 2/3 of its real value.

The clerk who wrote up the bill of lading didn't record the actual weight. Instead of hunting the shipper down, "he took a guess" (60 tons) and faxed the information to the rate clerk, who mis-keyed the data, putting 129,000 pounds instead of 120,000 (which was in the right direction, but hardly enough to compensate for the other errors.)

"Here is a good thing that did happen -- but it did not make a difference. After all this mess of guess weights, wrong estimates ... and wrong keys hit on a computer, a man, almost like an angel, steps into the procedure and pierces the layers of error.... Mr. Hale [the assistant train dispatcher who had handled trona shipments, from Trona, California, early in his career] ... looked at the transfer information ... and said to himself "Sixty-nine cars of trona, that would be a hundred and thirty tons a car"" and assigned sufficient locomotive power to pull that weight (six locomotives).

As the story unfolds, two of the locomotives had no dynamic braking (the engineer only knew about one) and the accident was a certainty. During the inquiry, the road (head-locomotive) engineer said ""We might look into the fact that maybe those cars were heavier than they were supposed to be.... I said that from the weight of that train on that profile to the number of cars we had to the tons per operative brake, I didn't see how that train could be that light. I don't know, I didn't question it, I never had any reason to question it before. I don't weigh them, I don't try to out-guess the people who put the information

out. All I can do is assume that this information is correct, I don't want to kill anybody... But if it's not correct, I can't operate and make decisions to handle a train like that unless I have the correct information. If I know what's going on.""

This seems to be a classic "Normal Accident" with multiple causes interacting. Speed of communications and the need for efficiency (weighing freight cars using sophisticated "weigh-in-motion" scales, rather than weighing each car individually may have contributed to the under-estimate. On the other hand, a person (Mr. Hale) who understood the problem was almost able to un-do the damage. Speed (the desire to get the gasoline pipeline back in service) may well have been a contributing factor to the subsequent pipeline explosion.

Once the train started down the Hill, there was no way to stop it...

Do these trains run with no normal air brakes on every car? Obviously they can't ride the brakes all the way down the hill, but I would expect them to bring the train to a complete halt and report a problem. There may be some crew error involved here.

Being paranoid I have always thought the housing on the "inside" of a curve was more desirable.

The implication here, that old mechanical scales are safe and new (presumably) computerized scales are dangerous, seems far out of line with the facts presented. The crash occurred because the train was overloaded and because they only had half the braking capacity they thought they had, both bits of misinformation due to plain old poor operating practices, not fancy modern scales.

Hadn't the engineers noticed that the train took longer to get up to speed than expected; an obvious application of $F=MA$? Maybe you need scales to get highly accurate weights for the purpose of generating freight bills, but wouldn't a full 1/3 overload be noticed by somebody paying marginal attention to the throttle and the speedometer? Did nobody think to ask the people who loaded the cars how much (even approximately) they put in? And why assume the cars were 2/3 full? Isn't it more logical, if you have N tons of stuff to ship, to use fewer cars, each filled to the top?

Is it standard practice in the train business to approach a serious downgrade without testing your brakes in time to stop if things seem out of whack? Surely, with half the braking and 150% the mass expected, even the shortest, most rudimentary test would immediately show that something was seriously wrong, no? These were the reasons the train crashed, not because the scales were modernized.

:Laxness, not modernization, at fault in train wreck.

Regarding the train wreck at Muscoy, in which a train with 69 hoppers cars of sodium carbonate or "trona" lost control coming down Cajon Pass and derailed into a residential neighborhood (also damaging a gasoline pipeline, which doused the area with burning gas 13 days later):

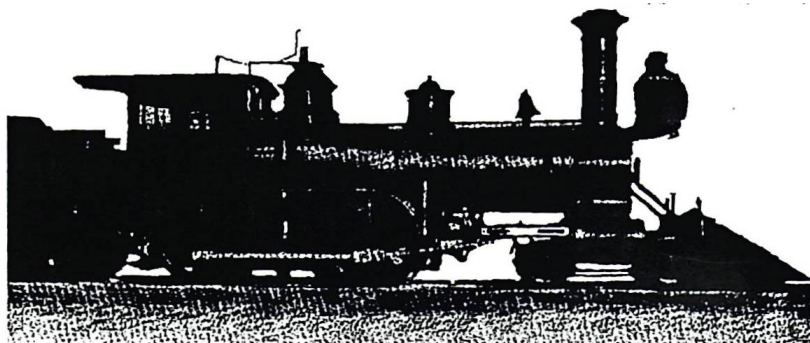
In Volume 10 : Issue 55 Chuck Weinstock writes The point of all of this is that had the railroads not modernized the way they dealt with weighing goods, this accident would probably not have happened (though the miscommunication regarding functioning dynamic brakes also played a big part.) Sometimes the old ways are > the best ways.

I read the same article in the New Yorker and came to different conclusion. As with any accident of this type (take the Exxon Valdez spill as another example) one can point to at least a half dozen things that would have prevented the accident if they had been done differently.

brakes were not allowed on the tracks or if...

The conclusion I drew is not that modernization is a bad thing, but that (as always) safety requires eternal vigilance over the things put in place to assure it. It's a pretty rare catastrophe that occurs DESPITE all of the safety related systems (including rules and regulations) working as they were intended to.

Rich Weyand wrote: A big problem exists when people say, we can take this shortcut, it never hurt before. The shortcut gets institutionalized. Then another. Then a few more. Finally an accident occurs which took all of these shortcuts, and mistakes, and it's-



Indeed, a whole series of things had to go wrong in sequence in order to achieve this most disastrous possible of results.

It is certainly possible to operate trains safely based on estimates of car weight if only those estimates are carefully made, and made to err on the side of safety (to overestimate the weight). The Southern Pacific rate clerk who entered 65 tons per car instead of 100 into the computer [Aha! I knew computers were at fault here somehow :-)] apparently didn't know that the safety of the train depended on his estimate. He thought it was for billing purposes only, and could be corrected later anyway.

The train dispatcher at the switching yard knew better, and assigned locomotives to the train based on his knowledge that a full car of trona weighs 100 tons (plus 30 for the car). He didn't pass this information on to the engineer though. Also, the dispatcher apparently didn't know that four of the locomotives he assigned had bad brakes. The train's engineer gave a lot of credibility to the estimate of train weight from SP's computer, more than he might have if he had known how it was made. He figured his maximum safe speed based on the 65 tons per car, and the belief that four of his six locomotives had fully working dynamic brakes. The article makes no mention of Southern Pacific's policy regarding the use of partially defective locomotives, that would interest to know too.

Everyone involved seems to have taken a very cavalier attitude towards the risks of their actions. If the engineer had known what the dispatcher knew, or if the rate clerk had been more careful, or if SP's computers were more cleverly programmed, or if engines with bad

ok-we've-done-it-befores at the same time to be possible.

The lesson is: never accept a shortcut. Doesn't matter if it was 'ok' before. The load estimate was a shortcut, the engines with non-functioning dynamic brakes was a short cut, etc. The engineer should never have accepted a train requiring 6 locos with only 4 known to have good brakes. Even one engine brake failure would have then left him with half the HP stopping as starting! Turn down the train. The union and the feds should back him up.

There are no shortcuts in safety.

The following article is another description of the wreck, also interesting.

Carl Benevit wrote:

This accident happened to the SP in 1989 (I think) where a train "ran away" coming out of Cajon Pass. It was estimated as going in excess of 100mph when it left the track at a curve and plowed through a small group of houses. The train consisted of hoppers loaded with potash and the actual weight of the cars was about 80% greater than the manifest indicated. This was traced to a clerk at the potash company that was under pressure to ship the cars and entered the "typical" weight of each car into the company's computer system. I think the listed weight was 60T and actual was 100T! Strike 1 against the train crew. SP compounded the problem when a clerk there saw that there was no listed weight on the cars. He tried calling the potash company and did not find their phone # so he entered the typical car weight of past shipments too.

The train received helpers for the ascent and descent of Cajon Pass and made it up fine as all

diesel engines were working fine as far as generating horsepower. Strike two occurred when the dynamic brakes of one of the helper engines did not function. **THIS WAS KNOWN TO THE HELPER CREW** but not to the head-end crew. With the listed weight of the train, not having dynamics on one engine was okay.

The train was over-weight for the descent of the Cajon Pass grade and the crew soon exhausted all the train-line air and could not pump-up fast enough. At this point the dynamics were useless and you had the runaway. Strike three was the sharp curve in the tracks.

The wreck destroyed all head-end engines, 5 houses, and killed the engineer and conductor on the head-end and one person in one of the destroyed houses. The local rescue personnel could not extricate the conductor's body with the "jaws of life" as the engine metal was too thick. SP provided shop personnel with a high power cutting torch to dismember the lead engine's nose where the conductor had crawled prior to the wreck. The wreck occurred in early dawn just after 7am and rescue crews, using a human-sniffing dog located a young man buried in an air-pocket in the wreckage of one of the houses. Backhoes were brought in and he was dug out around 10pm, uninjured.

I have garnered these details from a Video Rails 30 minute tape of the wreck. In addition to the wrecked houses and engines there were **MANY** wrecked hopper cars and potash **EVERYWHERE**.

End Analysis:

There is one short sentence in the analysis that really says it all. It is so good that I think I will adopt it for our safety motto. If anyone can give me a call and tell me what sentence I am thinking about they will take home a cold six-pack of root beer.

Last month's six-pack goes to Randy Houk for correctly identifying four layers of protection that we use to prevent unscheduled movements to Tecate. They are: Air brakes, hand brakes, skates and details.

Air Brakes

I found an excellent writeup concerning train air brakes on the Internet. It is so good that I am including it here instead of the tiny-letters Netnews section. I am sure that we all have been asked by members of the public: "Say, just how do train brakes work? Do springs push against the wheels?" Well, the answers are here. Enjoy.

Early Train Brakes=====

The first train brakes were very simple. To stop the train, you blew a certain pattern with the engine whistle and brakemen would jump from car to car setting handbrakes. Brakemen, needless to say, had trouble getting life insurance... :-)

The next generation of brakes added a compressor to the locomotive, and a brake pipe running the length of the train, connected between cars with gladhands, which were symmetrical "non-gendered" connectors that were latched together by hand and would separate by themselves if pulled on. The brake pipe was

connected to an air cylinder on each car, which pulled on the handbrake chain when the brake pipe was pressurized.

In other words, charge the brake pipe with air, and the brakes went on. This worked MUCH better than brakemen, but it still took a long time to pump all that air back to the cars. And, all it took was a parted hose or other failure anywhere in the brake system to cause the system to fail entirely.

Westinghouse's Invention=====

A guy named George Westinghouse didn't like the direct air brake either, and he invented a thing called a triple valve. This valve, and a reservoir on the car, inverted the behavior of the direct air brake: charging air into the pipe charged the system and released the brakes, and draining air from the brake pipe applied the brakes. He now had a much more responsive system that was fail-safe. It worked, and became the basis of the modern air brake.

The triple valve attached directly to the brake pipe, then had a connection to the reservoir, and to the brake cylinder. It was called "triple valve" not of the three connections, but of its three modes:

1. **Charging.** At rest, the Westinghouse brake system has no air in it. So the air brakes in the train must first be charged. As air is pumped down the brake pipe by the locomotive, the triple valve directs it into the car's reservoir, where it is held for use in applying the brakes later. When the system is fully charged, brake pipe and all the reservoirs in the train will be at a pressure designated by the railroad, for this discussion let's say 70 pounds.

2. **Applying.** When the engineer wants to apply the brakes, he sets the brake handle such that air is removed from the brake pipe. When the triple valve sees brake pipe pressure fall, it allows reservoir air into the brake cylinder, and the brakes apply. It's pretty simple; if you reduce the brake pipe pressure 5 pounds to 65 pounds, the triple valve transfers air into the cylinder until the reservoir drops to 65 pounds. Due to the relative volumes of the reservoir and (properly adjusted) cylinder, this will put 12.5 pounds of air into the cylinder.

A 10 pound reduction will give 25 pounds of cylinder application (by reducing the reservoir from 70 to 60). The maximum braking, then, is a 20-pound reduction, which puts 50 pounds in the cylinder, and leaves 50 pounds in the reservoir. At this point, pressure in the reservoir and cylinder are equalized, and that's as hard as the system will brake. Even if the brake pipe pressure is reduced further, nothing more will happen.

3. **Releasing.** Once the brakes are applied, an *increase* in pressure told the triple-valve to release the brakes. When it saw an increase, it would vent the cylinder to atmosphere, and start to recharge the reservoir.

(In modern brakes there are two kinds of release actions: - Direct Release, in which *any* increase in pipe pressure kicks the brakes off fully. Freight brakes work this way. - Graduated Release, in which a partial increase provides a partial, proportional release. This is

used in passenger trains, though the valve becomes much more complicated.)

Westinghouse's triple valve improved response times, because it didn't need to move all the air needed to apply the brakes. It only had to move enough air to carry a _signal_ to the triple valve, telling it to apply or release. But still, the signal took awhile to work its way down the brake pipe. This would be improved later...

Improvements: Emergency=====

An Emergency feature was an early addition to Westinghouse's technology. This added a second reservoir, and made the control valve more complicated, but it added the means to make a harder application of the brakes. And, with a propagation feature called "Quick Action", it made them apply very quickly too.

"Emergency" adds a fourth mode to the brake system. A _rapid_ decrease in brake pressure signals the valve to immediately throw the "works" into stopping the train. Including the full contents of a second, larger reservoir, called the "Emergency" reservoir. (The original reservoir is now called the "Auxiliary" reservoir.

Most freight cars use a "duplex" reservoir, which are two cast halves separated by a steel plate. The steel plate is shaped like a dome inside, which makes the emergency half of the reservoir larger. A tab sticks out of this steel plate, one side labeled "aux" and the other "emerg" so the sides can be identified.

In normal operation, the emergency-equipped control valve operates just like the original triple valve, except, of course, that it also charges the emergency reservoir. But part of the valve is designed to detect a rapid drop in pressure, which trips the emergency mode. The valve will then dump the entire contents of both reservoirs into the cylinder, and when pressure



equalizes, there will be nearly full system pressure in the cylinder, 63 pounds or so on a 70-pound brake pipe pressure. This is as hard as the brakes will go, and will often lock up the axles at low speeds, skidding flats in the wheels. The force of an emergency application can also damage lading or even derail the train!

An emergency stop is now the default action almost anytime there's a brake failure. Any rupture in the brake pipe will cause an emergency application, as will a defective brake valve pejoratively called a "kicker" or "dynamiter" (which puts the whole train in emergency.)

The reason a defective valve could disable a whole train, is that part of the "Emergency" feature is another feature called "Quick Action". Since an emergency application requires a rapid drop in brake pipe pressure, there needs to be away to make sure the drop remains rapid, even far back in the train. The

locomotive alone can't do that; by the time the pressure drop got 100 cars back, it would not be so rapid.

So each valve repeats and _propagates_ the effect of the emergency brake. That's what Quick Action does. When the valve goes into emergency, Quick Action vents the brake pipe itself, thus _causing_ a rapid drop, amplifying the emergency action and making sure the next valve goes into emergency too.

That also means that if a valve is defective, and produces what is called an "Undesirable Emergency Application" (UDE), the entire train will follow suit.

When conductors rode in cabooses, they knew of four reasons for their train unexpectedly going into emergency: 1) An air hose has parted. 2) the train has broken in two. 3) One of the cars is a "kicker". 4) The head end is about to hit something.

Usually, they didn't think too much about the cause before grabbing a handhold; the slack action from an emergency brake could tear the stove out of the wall. But as soon as they stopped, they'd radio to the head end "All stopped!" Which gives the engineer some idea of how many pieces the train is in.

The AB Freight Control Valve=====

The Westinghouse "AB" control valve is, essentially, the modern brake. It has all the brake features discussed so far. While there have been technological upgrades ("ABD" to "ABDW" to "ABDX") the basic packaging is standardized, and worth talking about.

The "AB" control valve consists of a pipe bracket, to which all piping connections are made, and two control valve portions (the "Service" and "Emergency" portions) which bolt to the pipe bracket with three bolts. Each of the three pieces weighs about 65 pounds, which is (conveniently?) just light enough to be shipped by UPS.

The beauty of the system is its ease of maintenance. The two portions (which are quite complex inside) simply bolt off; and you don't rebuild them, you just ship them off to someone who does it for you for about \$120. Add ten dollars worth of gaskets and filters, and a field diagnostic, and you've done 16-year brake service on a railroad car. The hard part is cutting out the stencil which says "C.O.T.S. 1/4/94" (Clean, Oil, Test and Stencil)

The pipe bracket does not just unbolt; there are pipes attached to it. The five pipes are Brake Pipe, Cylinder, Auxiliary Reservoir, Emergency Reservoir, and Retainer. The last one deserves some explanation.

The retainer is a way of "keeping" some of the brake application even after the brakes are released. When an AB brake releases cylinder pressure, it vents it out the "retainer" port. On most cars, this leads to a retaining valve located on the side of the car. The retaining valve retains pressure in the cylinder when the control valve tries to release it. It can be set for "direct", which lets the air out directly, or "retain 10 pounds" which keeps the last 10 pounds of pressure in the cylinder.

This is used to descend long grades: with the

retainers turned up, the cars will hold ten pounds of brakes even while the brakes are fully released and recharging. More advanced retainers added two more settings: retain 20 pounds, and slow release, which would release fully but took about 90 seconds to do it.

On cars that didn't use the feature, a screen was put over the retaining valve port to keep wasps from building nests in the control valve.

More Improvements: the ABD valve=====

The ABD valve added two features which made brake response faster, but they worked mostly like AB valves, and were, of course, compatible. However, they were completely different internally.

The old AB valve used technology of 100 years ago inside the valve: small pistons moved brass slide valves, aligning or blocking ports to make the valve function. They had to be lubricated with graphite, and there were always problems with scoring and leakage. With the ABD valve, rubber diaphragms (like in a car's fuel pump) replaced the pistons, and sliding shafts with rubber gaskets replaced the brass slide valves. Although they did basically the same thing.

Two functional features were added to AB and newer valves: Quick Service and Quick Release. Both worked like Quick Action, manipulating brake pipe pressure to propagate the brake commands more quickly.

Quick Service propagates the effect of a service application. When it sees an pressure drop of 1-1/2 pounds or so, it vents some more brake pipe pressure to atmosphere, assuming a 5-pound application. This means that the next valve sets brake more quickly, and so on.

Quick Release does the same thing, for releases. When it sees an increase in pipe pressure, it adds some air from the emergency reservoir into the brake pipe. This increases the pressure some more, and all in all makes the train release much more quickly.

But... remember the trouble with "Kickers" and the Quick Action feature, where one car could put an entire train into emergency? The same thing can happen here, but now one car can *release* the brakes on an entire train. This caused major problems until it was learned that certain ways of handling the brake were causing it.

Picture, if you will, a train crew on a hill, trying to uncouple the locomotives from a train. The engineer makes a heavy brake reduction, which causes air in the pipe to move toward the locomotive. Then, a brakeman closes the angle cock (the valve between cars that closes off the brake pipe) on the first car, so they can uncouple. Normal enough, but watch what happens in the brake pipe...

Air is moving through the brake pipe, and suddenly the air passage is shut. But air has momentum, and it's still moving toward the locomotive. So it piles up at the closed angle cock, a little pneumatic traffic jam. And as it does, the pressure at that spot in the brake pipe, *increases*. Guess what the control valve in that car does. It releases.

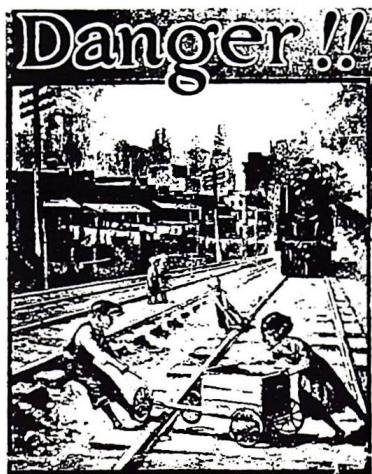
This wasn't a problem with the AB valve; at

most one or two cars at the front of the train would release. But the Quick Release feature changes all that, because it propagates the release back through the train. That knocks the brakes off the second car, which knocks the brakes off the third, and so on...

By the time the crew realizes it, their entire train has released, and it's headed down the mountain.

Education has pretty much fixed the problem; wait until air has stopped moving before closing the angle cock; or leave it open a bit so air continues to drain.

Braking down Hills =====
Diesel locomotives have two brake systems: an



Parents: See that your children play in a safe place! Do not send them out on the railroad tracks to pick coal!

air system, which is independent of the train brake; and dynamic brakes, which use the main drive motors as generators, and discard the generated energy out large resistor banks.

Ideally, braking down long grades is done with dynamic brakes. They never overheat or wear out. Realistically, some help from air brakes on the train is often needed, and that's done either by normal use of the brakes, or by stopping and turning up retainers.

I won't talk about how air brakes perform over long periods of use, but I believe they are sufficiently leak-resistant that they can make it down the hill without needing to stop and recharge. However, if the engineer repeatedly applies and releases the air brakes, he will eventually drain the auxiliary reservoirs on the cars (but the emergency reservoirs will be intact...). If an engineer foolishly does this, he may need to use emergency to stop the train. Then he will need to turn up enough retainers to hold the hill, and release the brakes, and pump air into the system until it is recharged. While he waits, the trainmaster will show up and cuss him out, of course...

There have been several rounds of evolution on locomotive brake stands (which together with the control-valve-like Distributing Valve, control the locomotive's and the train's brakes). The very early varieties had three positions: Running (which charged the brake pipe up to a

set pressure), Apply (which discharged the brake pipe), and Lap (which did nothing to the pipe). An engineer would move the handle to "Apply" until he got the pressure he wanted, then he would move the handle to "Lap". Unfortunately, leakage would tend to reduce the pipe pressure further, which would cause the cars to set the brakes harder and harder. This caused problems on hills, as described above.

The most common contemporary model is the "26", which is a pressure maintaining brake. Meaning, if you set the handle to 65 pounds, it will automatically hold it at 65, even against leakage. This solves the hill problem.

Before the invention of the pressure maintaining brake, engineers would improvise one by adjusting the "feed valve", which is the pressure regulator that feeds the brake system, and thus determines maximum brake pipe pressure. That's supposed to be set at whatever brake pipe pressure the railroad runs as a practice (70, 80 or 90 pounds) and left there. To maintain pressure in their brake pipes, engineers would dial the feed valve to the application they wanted (say, 60 pounds) then let leakage bring it down to that. The feed valve, thinking 60 pounds was the running pressure, would dutifully hold the brake pipe there, against leakage. It was illegal but it mostly worked.

Runaways =====

Seems like there's a runaway in almost every train movie. But there's only about three ways a runaway can happen, given modern brakes...

1. The crew forgot to charge the system in the first place. If you couple onto a string of cars that's been stored for a week, there's no air in it. If you then haul it away without booking up air or doing an air test, you could lose your train simply because the locomotive is the only brake on the train.
2. The "Quick Release" bug. Described above. If there's anyone on board capable of pulling an emergency cord, it'll stop the train.
3. Going so fast down a hill that you gain kinetic energy faster than your brakes can get rid of it. Like running down a steep hill.
4. The brake pipe gets "bottled up" behind the engine. Either an angle cock vibrated shut (very unlikely) or the brake pipe fell on the tracks and got bent and pinched shut in a way that "bottled the air" in most of the train, so there aren't enough responding brakes to stop it (also very unlikely, but it HAS happened...) Again, if there's anyone back there to pull the emergency cord, they'll stop the train. Or, if there's enough brake pipe leakage in the bottled portion, one of the valves will go into Quick Service, and will cascade at least a minimum application...

These are all pretty bizarre, and they just don't happen much. And when they do, it's in the paper :-)

If you have safety on your mind, You may call at any time!

Daze 553-3106 Nites 662-9019



PHONE NUMBERS

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CAMPO

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Business Office, Bobbie Ringersma.....	595-3030
Business Office Fax.....	595-3034
Director of Operations, Denby Jones.....	279-2419
Executive Director, Kay Carter.....	265-7682
HotScoop Editor, Lew Wolfgang.....	553-3106
La Mesa Depot.....	465-8444
Campo Depot.....	478-9937
Campo Car Shop.....	478-9917
Campo Caretaker, Thomas Lee Braginton.....	478-9344
Campo Gift Shop, George and Nancy Boggs.....	789-4210

DEPARTMENT HEADS

Facilities, Steve Wade.....	469-8029
Interpretation, Rich Borsstadt.....	294-9321
Research, Bruce Semelsberger.....	264-7282
Chief Trainman, Mike Retz.....	466-8808
Mechanical, Jim Wilson.....	697-9544
Library, Roy Pickering.....	462-3392
Operations, Mike Reneau.....	466-5402
Restoration, Ted Kornweibel.....	461-0098
Safety, Lew Wolfgang.....	662-9019
Steam, Richard Dick.....	276-2222

NETWORK NEWS

In which articles from the Internet's Usnet rec.railroad are presented for your edification and further enlightenment.

Accuracy can not be verified and strange characters or layout are a result of the conversion process.

From: robl@glvc12.cen.encompass.com
(Ernest "FREIGHT TRAINS" Robl) Subject: Amtrak accident at Selma, NC

I took some time off to drive over to Selma to look at the site and make a few photos. Though the area was basically cordoned off by the time I got there (around noon) I did manage to learn a good bit that was not on the news reports.

Here's a brief overview (based on both information from the scene and info from broadcast news reports):

The trains involved were CSX 176 (northbound), a fast TOFC train, and Amtrak 87/97, the "Silver Meteor," (southbound).

The location was at the southern city limits of Selma, N.C., south of the station and

south of the Norfolk Southern diamond. (This is important because it lets CSX detour from and to the north over NS through Raleigh and from there to Hamlet.)

The actual location is just south of the US 70 bridge over the line (for anyone familiar with Selma).

The Amtrak train was on the eastern track (welded rail) while the freight was on the western track (jointed rail).

For reasons not yet known, train 176 lost a trailer (loaded with kitty litter, according to some reports) from a TOFC car near the end of the train (but apparently NOT the last car as reported in some accounts). The trailer fell into the path of the Amtrak train.

87/97 does not stop at Selma, so both trains could have been doing in the 70 mph range. Word at the scene was that at least one of the engines on 176 had a down-loadable event recorder, so it should be possible to establish the actual speed of the train at the time of the accident.

After the impact, the Amtrak train derailed, with at least one car ending up diagonally across both tracks. It looked like 176 broke in two, a few cars from the end (but apparently not derailling, as far as I could see). 176 went into emergency, with the engines coming to a stop about a hundred yards south of the NS crossing at the Selma station.

The tracks are relatively straight in the area of impact, which probably reduced the number of casualties. The derailment of the Amtrak train wiped out the code wires adjoining the track, so that the CTC for Selma junction and the rest of the area was not working. (Amtrak 80, the northbound "Carolinian" had to put all switches in hand mode after getting orders to pass red signals as it moved from the NS onto northbound CSX tracks.)

There were a large number of vehicles from a Richmond, Va., contractor already on the scene, including Hi-rail cranes, but no actual work had started yet. It sounded like the CSX had hopes of getting at least one track open some time this evening, which would probably minimize the number of trains having to detour over NS. Due to the straight track in the area, the amount of damaged and destroyed track did not appear to be excessive - at least from what I could see from a distance.

I did not see any on-rail CSX wreck equipment, though I heard some CSX crews getting radio permission to approach the site from the south.

That's about all I can tell you at this point.

-- Ernest Subject: Re: Steam Engine TE

From article <2raljp@c86@bart.meiko.com>, by hoppy@meiko.co.uk (Paul Lee):

Some of you may have seen the formula for TE of a steam engine, at 0 mph. (.85 d^2 snp) / 4w My questions are; 1) How do you factor the locomotives cut off into this

equation?

The equation makes no provision for considering cutoff. If you do cut the steam off during the power stroke, the tractive effort provided by that piston for the remainder of the stroke will fall off as a function of the initial steam pressure and temperature -- these vary from one engine to another.

Given these, fall back on your introductory chemistry course and use the equation:

$$pv = Kt - p = \text{pressure}$$

$$v = \text{volume}$$

$$k = \text{a constant}$$

$$t = \text{absolute temperature}$$

Then, integrate this as the volume expands from the point of cutoff to the end of the power stroke, and use that to compute the an average steam pressure over the full power stroke, then use that in your equation.

Of course, this only works if your steam continues to behave like an ideal gas, which it won't if the steam begins to condense (and yes, this does happen in real engines).

2) How do you factor speeds into this equation?

The equation makes no provision for considering speed. To take this into account, you need to know how quickly your boiler can make steam, and you need to know the resistance of the plumbing (including the throttle valve setting). For any combination of boiler and throttle setting, the output pressure will drop as you consume more steam, and this will cut the drawbar force.

If you have a horsepower rating for your boiler, or better yet, a drawbar-horsepower rating for your complete engine, taking into account frictional losses in the engine, that gives you the work per unit time it can accomplish with a wide-open throttle.

horsepower gives you work per unit time, and work is force times distance. Speed is distance per unit time, so, horsepower also translates to the product of force and speed.

If the speed is zero, the horsepower is irrelevant, and the static boiler pressure is what matters. As the speed increases, the average drawbar pull for an ideal engine should remain essentially constant until your force-speed product equals the horsepower, and then, for any increase in speed after that point, the drawbar pull should decline to keep the product constant.

But! Close the throttle just a bit, and you cut the horsepower, and all this assumes that you close up the cutoff as your speed increases so that the engine stays tuned optimally for your speed.

Doug Jones
jones@cs.uiowa.edu

From: glennl@up.edu (Glenn Laubaugh)
Subject: BRASS KEY

BRASS KEY Volume 1, Number 12 May 18, 1994 "Train Chasing is Fun"

News of the Railroad scene, Portland Oregon, Pacific Northwest

CONSIST: 150 Years of Binary Information Network Oregon, California & Eastern Still Around Who Reads This, Anyway?

150 Years of Binary Information Network May 24, 1994 is the 150th Anniversary of the railroad telegraph. Various other communication inventions were developed over time, but it seems that the simplicity of the on-off-on system upon which the telegraph is based (as well as most computer equipment) is likely to experience continued popularity for at least another 150 years....unless there is a revolution in analog computing and communication sometime soon. Considering that almost all research is aimed at improving digital computers and communication equipment, it is not likely to happen....but possible.

In any event, the ability to send train orders from one place to another in a matter of minutes rather than days should be noted as a day in which the railroad industry revolutionized internal corporate correspondence. No longer was it necessary to depend on a complex system of ropes and bells to transmit a notice that a train had arrived or departed. No longer was it necessary to simply send trains into the unknown, hoping that there had not been a major washout and that the message would arrive days later.

Oregon, California & Eastern Still Around Some time ago, the Oregon, California & Eastern Railroad between Bly and Klamath Falls, Oregon was to be turned into a bicycle path. However, it appears that in spirit the line is still around. A southbound Southern Pacific freight at Brooklyn Yards, Portland included some of the OC&E's boxcars.

The parent company of the OC&E is a large timber and forestry company, and there are at least three other railroads owned by this company. So it is probable that the OC&E cars have simply been moved to one of these other lines.

Who Reads This, Anyway? For the past few months, I have been attempting to keep others informed of railroad activity here in the Pacific Northwest. This is no small task, since the local press ignores the railroad industry for the most part. Most of the articles were also posted to pdx.general simply to see if anyone else out there (other than readers of rec.railroad) was interested. I received everything from:

"What is an RDC? You should be more careful to explain what this is....." (An RDC is the model name for a locomotive and passenger car combination....sort of like Mazda used to make a GLC. It is sort of an abbreviation for "Rail Diesel Car" but the official name is RDC.)

to:

"Thank you for posting something new and interesting that has nothing to do with computers...."

So far, there have not been any major complaints from pdx.general or pnw.general (where one article was posted). In fact, there has only been the one complaint noted above. In any e-mail, please say what group you are posting from.

This is the first and last time BRASS KEY gets posted to so many other groups....unless I get some material that is of such interest that it is worthwhile to post it everywhere.

_____ The BRASS KEY is named after the world's first international binary network: the railroad telegraph. It is the unofficial, unauthorized internet newspaper of the Pacific Northwest Chapter, National Railway Historical Society. The Society was formed in 1935 "to preserve historical and technical information pertaining to railroad transportation, to issue publications relating to the subject, and to encourage the use of rail transportation."

All information included in the Brass Key announcements are opinions, errors, and obnoxious comments by Glenn Laubaugh, and does not necessarily reflect the views of National Railway Historical Society, Pacific Northwest Chapter, or anyone else mentioned in these lines.

From: ajw@guppy.mel.dit.CSIRO.AU (Andrew Waugh) Subject: Re: Steam Engine TE

In article <2raljp5c86@bart.meiko.com> hoppy@meiko.co.uk writes: Some of you may have seen the formula for TE of a steam engine, at 0 mph. $(.85 d^2 snp) / 4w$ Where d is the diameter of the pistons, s is the stroke, n is the >number of pistonns, and p is the boiler pressure. w is the driving wheel >diameter. I will check the units of this equation and re-post. I have sometimes seen the .85 quoted as .75. My questions are; 1) How do you factor the locomotives cut off into this equation? 2) How do you factor speeds into this equation?

The cutoff is already factored in: it is reflected in the 0.85 coefficient. This coefficient is the mean effective pressure in the cylinder over the complete stroke expressed as a fraction of boiler pressure.

The mean effective pressure in the cylinder is always less than the boiler pressure because of *pressure loss between the boiler and the cylinder (especially due to tortuous steam passages in and around the valve) *the cutoff (normally the maximum cutoff possible was about 70% - 80%) *condensation on cylinder walls ('solved' with superheated steam) *early release of the steam *back pressure (particularly due to bad design of the exhaust passages, but also due to the need to produce the blast). *compression at the end of the exhaust stroke.

As speed increased, the cutoff was shortened resulting in a lower mean effective pressure. This was mainly due to the greater expansion of steam, but an important secondary effect was the earlier closing of the exhaust port resulting in earlier compression and hence higher back pressure. The earlier closing of the exhaust port was the result of the single valve operating both the steam and exhaust valves (the same problem was also the cause of the relatively low maximum cutoff).

As you might guess the figure of '0.85' was just convention: the actual value might be considerably different (usually worse - due to poor design). Generation of real tractive effort diagrams involved the recording of indicator diagrams at various speeds and cutoffs. From these diagrams the actual mean effective pressures under different conditions could be calculated.

From: glennl@up.edu (Glenn Laubaugh) Subject: BRASS KEY

BRASS KEY Volume 1, Number 13 May 23, 1994 "Train Chasing is Fun"

News of the Railroad scene, Portland Oregon, Pacific Northwest

CONSIST:

UPDATE:

SP 4449 Not Going to Move (Yet....)

PNWC's "Ace in the Hole" (Not Quite)

Portland Development Commission ups the rent of Union Station The Railway Museum Narrow Gauge 2-8-2 Update Portland Traction nearing completion on Shops

UPDATE: SP 4449 Not Going to Move (Yet....)

Current plans for the Southern Pacific Brooklyn Yards, Portland have apparently been altered. At one point in time, it was said that the ancient wooden roundhouse at Brooklyn would be demolished, the SP 4449 Steam Locomotive, the Spokane, Portland and Seattle steam locomotive #700 both moved to another location. It is likely that it will be two or three years down the road, if this happens at all.

It is still not clear just where, exactly, the locomotives would be moved to. All of the editors of BRASS KEY (all one of us) went on a locating mission, and were able to find no satisfactory locations for storage in Portland. One member of the Pacific Locomotive & Railway Preservation Association stated that the location that they were able to find for some of their equipment was St. Helens, Oregon.

Speculation continues that all three steam locomotives owned by the city of Portland will one day wind up being sold to the California State Railway Museum at Sacramento.

PNWC's "Ace in the Hole" (Not Quite)

The Pacific Northwest Chapter, National Railway Historical Society owns some equipment (mostly passenger cars) that are also at Brooklyn Yards. Although none of the organizations that have

equipment stored there have been given notice by SP, all are preparing to move if SP changes their mind and asks them to move.

Although one member calls the Pacific Northwest Chapter's alternative an "Ace in the Hole", it isn't exactly an "ace". The Willamette and Pacific railroad is in the process of building their shops in Albany, and they have offered to store the cars at a very reduced rate if the W&P is allowed to use the cars for shipper's tours.

The trouble is that most of the people who do maintenance on the cars live in Portland, and Albany would be a significant distance to travel for the Saturday work sessions.

So, it is not exactly an "Ace in the Hole". However, if all other locations fail, there is always Albany.

Portland Development Commission ups the rent of Union Station

In the meantime, the Portland Development Commission (the people who now own Union Station) have decided that the Pacific Northwest Chapter's library at Room 1, Union Station is worth more than previously thought, and therefore are raising the rent to \$500 per month. There is some talk among some members of moving the library to a less expensive location as well.

The Portland development commission has also decided that the rent should be raised for rolling stock displays at Union Station. If the Pacific Northwest Chapter wanted to place something on display at the station now, it would cost \$1,000 per car per day in rent...at least, according to the sources I have contact with.

Ever wonder why the Union Pacific Challenger series steam locomotive was never placed on display there? The rent PDC charges for any type of display is the reason why Union Pacific kept the loco in its own yards...at almost no cost at all.

The Railway Museum

Ever since the city of Portland acquired its steam locomotives in 1955, there has been a select few who think that Portland would be a great place to have a railroad museum. However, the closest thing right now is a baggage car that is owned by the Pacific Northwest Chapter, National Railway Historical Society that contains a number of display items owned by the Oregon Historical Society. This car has remained in Brooklyn Yards for the past few years because of the cost of placing a display of any kind at Union Station.

However, in looking in areas outside Portland, there are a number of places where a museum would be interesting. Newberg is one. It has the Willamette and Pacific, and they are interested in operating passenger trains when they finally get complete custody of their track. Right now, SP owns the track and doesn't like the idea of having a lease operator

operating passenger trains. Clackamas, Oregon is another location that would be interesting because it is close to Portland, and also has railroad accessible industrial areas.

Narrow Gauge 2-8-2 Update

The narrow gauge 2-8-2 steam locomotive being restored inside the Brooklyn Yards roundhouse is still undergoing work. There is not much to report about the locomotive itself. This is the boring stage of steam locomotive restoration. It is the fitting of all the pipe and related hardware. Thousands of hours can be invested, and little visible progress can be made. However, slowly things are coming together.

The tender is a different story. The frame now has a fresh coat of paint and is now waiting for a new tank to be fitted. The old tank was damaged due to years of service in Central America, and can't be used.

Portland Traction nearing completion on Shops

The East Portland Traction Company is also slowly rebuilding itself. The new brick shops building is taking shape, and work continues whenever the crews are able to work on it. The original shops building is now an EPTC customer: Molded Container Corp., and receives plastic pellets via covered hopper car.

From: wolfbeas@news.delphi.com
(WOLFBEAST@DELPHI.COM) Subject:
NEW BRAIN BRAKING SYSTEM

WASHINGTON (Reuters) - American companies are developing a safer braking system for trains that will reduce stopping distances by 40 percent, the Association of American Railroads said Thursday. Association President Edwin Harper said the new system, replacing the currently used 125-year-old one, would use modern electronics rather than the pneumatic system invented in the 19th century by George Westinghouse. "We have refined and re-refined Mr Westinghouse's technology to the point where we've reached the outer limits," Harper said in a statement.

He said the new system, being developed by at least three companies, would transmit the signal to brake at the speed of light rather than the speed of sound. Association spokeswoman Carol Perkins said electronic brakes had been tried on passenger trains in the past, but there were problems and they were dropped. She said it was believed the newer models would now work on passenger trains. Harper said electronic braking, which could be on some freight trains by 1995, would cut accidents and derailments, increase line capacity and improve customer service. He said the existing system uses air both to apply a brake and to send the signal ordering the braking, while the new system would use air to apply the brake but send the signal to brake electronically.



SDRM TimeCard

[illegible]

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
Kornweibel D.O.	6 1830 Staff Mtg. SFD	7	8	9	10	11 Train Show, Queen Mar
Train Show, Queen Mar Reneau D. O.	13	14	15	16	17	18
Wade D.O.	20 1830 Staff Mtg. SFD	21	22	23	24	25 0800 Tecate Special
Wilson D.O.	27	28	29	30	May S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	July S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Month view by Calendar Manager

The Hot Scoop
San Diego Railroad Museum
1050 Kettner Blvd.
San Diego Calif. 92101

(June 1994)

