

Working (and Learning) on the Los Angeles & Salt Lake

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From September 1954 through early May 1955, I was a warehouseman in Pasadena earning \$1.20 per hour or \$39.00 weekly take home pay. After helping manually unload two carloads of cases of candy (110 tons, my aching back), one of John Santa Fe's brakeman picking up our empty cars told me, "You're working on the wrong side of the boxcar." He explained how to improve my situation. In May, I embarked on my first student trip out of East Yard on the Los Angeles & Salt Lake (LA&SL). The "rails" I have known across the years on the LA&SL not only "cut me in" on the tasks of engine and train service but also provided me with a storehouse of the work history and lore of our "Salt Lake Line." Some of them had entered "the service" as early as 1904. My gosh! Fifty-one years earlier. They were o-l-d!

This article focuses on Los Angeles & Salt Lake (LA&SL) railroading rather than its track, buildings, and equipment (overviewed in my: "The Los Angeles Terminal Railroad," *Observation Platform* June 1995:3-5). Accordingly, the concentration is on work tasks and the learning of them. Some of my steam reminiscences could well stem from my firing "Fresno" or "Valley," Mallets (2-6-0s) and the like on the San Joaquin Division of the Espee or elsewhere. Much learning on a railroad is informal, taught by peers on the job and in "old heading it," on the job and when not working. In these ways, the skeleton framework of the operating rules is fleshed out with exemplification and nuance. Part of the learning process consists of acquiring the railroaders' "lingo," a precise shorthand for the intricate tasks of work. Railroaders' lingo/jargon/cant/slang is in quotation marks.

In the Beginning, Rattlesnakes. By 1890, two short railroads ran from the east bank of the Los Angeles River near downtown northward to Altadena via Pasadena and to Verdugo Park via Glendale, thereby creating a **V** shaped route. That year, the two lines

became part of a new Los Angeles Terminal Railroad (LAT). In 1891, LAT built southward to Long Beach and, then, westward to adjacent Rattlesnake Island, a sandbar protecting the swampy mouth of the Los Angeles River. LAT thus became a Y shaped route. At its base, the LAT had its foot planted in the nascent, deep-water port in San Pedro Bay, the construction of which the federal government decided to fund in 1890. The rattlesnake land was not so bad after all. The LATers had a transportation future.

Some of the "oldest heads" I knew had worked with LAT men. One of the nuggets shown to me at East San Pedro, the main-channel-end of Rattlesnake, renamed Terminal, Island were some of the original LAT rails of the main track, still in place in the 1990s, after a century of use. At East San Pedro, about 50 feet south of the gate for the Mobile Oil facility a rail read on its web: "Cammell Sheffield Toughened Steel 61 ½ lbs P I C 1887 P."

"The Sea Shore Line," as LAT advertised, touted its island sandbar as a beach resort area but the snakes washing down the river during winter rains had to be cleared before Angelenos would pay the chair-car fare to brave the always-cold Pacific waters. One sandbar station labeled Brighton Beach was the location of the LAT's seaside attractions. Coney Island's Brighton Beach, watch out! At the Rattlesnake's far west end, East San Pedro, the LAT built piers and wharfs for shipping goods to and from Southern California by steamer, thereby competed with the octopus, the Espee in (the real) San Pedro. Little did LATers know, the vast Wilmington oil pool lay under the Rattlesnake's area. Through the 1980s, the many Union Pacific oil wells on the island bore white signs reading "LA&SL Railroad."

In 1901, former U.S. Senator W. A. Clark, "the Copper King," began construction of the San Pedro, Los Angeles & Salt Lake and absorbed the LAT into it. By later agreement, the Union Pacific owned 50 percent of the railroad and the Clark interests the other 50 percent. Completion of "the Arrow Head Route," to initially high engineering standards, was

on January 30, 1905, largely by funding from the banking interests of the UP's E. H. Harriman. "Clark might have been the Copper King but Harriman trumped him as the Railroad King," a 1905 engineer told me. The new SP, LA&SL was firmly in the traffic network of the UP. "The Pedro," as it was often called, deleted *San Pedro* from its name in 1916 because Los Angeles had annexed the harbor town in 1909. In 1988, the LA&SL lost its corporate identity when it became fully merged into the UP.

What Were the Labor and Operating Jurisdictions on the Salt Lake Route? For railroad operations and labor relations, the LA&SL began with two divisions, each with its own employees, the Salt Lake and the Los Angeles. The Salt Lake spanned Salt Lake City to Caliente, Nevada (comprising lines constructed from the north before the Clark acquisition of 1901). The Los Angeles spanned Caliente to Los Angeles (comprising the LAT and lines constructed from the south after 1901). Northern LA&SL men had no jurisdiction, hence work, in the Salt Lake terminal because that belonged to the employees of the UP's earlier Oregon Short Line (OSL). For LA&SL road crews running in or out of Salt Lake City, OSL rules and timetable governed within the terminal limits. Similarly, my southern seniority rights ended at the west switch of the small terminal of Caliente because the northern lines and their employees had built through to that point before the 1905 completion. The two operating divisions eventually consolidated into one Los Angeles division and, then, split into Utah and California divisions.

Currently, on the UP, Salt Lake City to Yermo, California is in the Utah Service unit and Yermo to Los Angeles is in the Los Angeles Service Unit, each under a superintendent. The northern and southern seniority jurisdictions remained until the labor agreements imposed by the Surface Transportation Board consequent to the UP absorbing the SP on September 11, 1996. Today, the Brotherhood of Locomotive Engineers and Trainmen's Division 660 for the L A to Yermo district is named Tropic. This is because when

engineers founded the division, their union meetings took place in Tropic, both a station on the original Glendale Line and a farming town formed in 1887 and annexed as city by Glendale in 1918.

What Was Working on the Railroad Like? In 1905, the U.S. fatality rate per 1,000 trainmen was 8.1 individuals and the injury rate was 121.5 individuals (or 13 percent of trainmen were casualties, per year). (Today, the casualty rate is a hairsbreadth of that amount.) As mournfully recited to me by an aged brakeman:

"Only a coupling pin broken in twain, . .

Youthful the form that goes back through the rain, . . .

"Only the bloody form there on the rail,/

Over whose horrors the strongest grow pale,"

(and found in the classic poem "Only a Brakeman," *Locomotive Engineers Journal* 19[1885]:726.)

When I hired out, we still had some 1904 and 1905 trainmen working on the property. The oldest "brakies" on the "seni" list said, necessarily, the cars with "the Westinghouse" (lingo for air brakes) were all on the head end of a freight train and those without air brakes were on the rear end. Some freight trains were mostly without operable air brakes. Brakemen and switchmen applied hand brakes on each car's "B end" by turning a usually horizontal, spoked, brake operating wheel attached to a vertical steel "staff" around which a chain to the brake rigging (specifically, to the brake rod) could be wrapped to tighten or unwrapped to loosen. Railroaders used a wooden brake club ("staff of ignorance") for leverage in strong hand braking.

For braking force, an engineer would whistle "down brakes" (o o o o o o o) when he wanted to stop, say, to head in to a siding for a meet with an opposing train at the end of authority to occupy the main single track. The head, swing, and rear brakemen were

already at their permanent posts "decorating the tops" (of the cars). They, then, ran along the car tops, leaping from car to car, and tightening the staff brakes, "clubbing," with their clubs. That is, they were applying ungeared brakes using a club for leverage in a brake's operating wheel. On the car-top's catwalk or on the small, car-end platform for operating the brake, a man could be knocked off by a spin of the brake club from a releasing hand brake. The spin could "club" him, breaking bones. Sometimes, the brake chain would "ball up" and, then, slip loose as the railroader applied his greatest exertion and cause him to lose balance and fall between the moving cars. During the 1920s, an improved, "one-hand," hand brake had multiplication of muscle power with 3:1 and 4:1 ratios on a pair of gears, "brake boosters." Such hand brakes have vertical operating wheels and, today, also operating levers and offer safer and greater exertion advantage. The brake club is now "outlawed."

Hand brake too tightly and the car wheels would "pick up" at low speed, slide flat, and "walk" (ker plunk, ker plunk). Hand brake too loosely and the point of the train would run past the heading-in switch of the siding. The train crew thereby violated track occupancy authority for a while, until brakes could be released manually and the train backed under flag protection. The conductor usually "flagged," from the rear platform of *His* caboose, individually assigned by the railroad. No drawbar flagman was He. While thus inadvertently "lapping authority" to occupy the main track, the head end had to be protected against the opposing train by the "tallow pot," (locomotive fireman) who made a spot fire in his firebox and, then, left the cab with a flagging kit. He did so because the "brakies" were busy--all the more so in pitch black darkness with precipitation. On the main track's six steep downgrades of the LA&SL, if the hand brakes were too tight, car wheels would overheat and thermally crack. A brakeman had to learn just the right amount of "clubbing" for a particular operational and topographical situation. The amount of thick blue-gray braking smoke and

the heat smell were indicators of overheating. Trains hand or air braking on a steep grade were always wreathed in such smoke. Balancing a train on a descent of a mountain grade took a learned, coordinated team judgment by all crewmembers.

The Straight Scoop on the Straight Air. What about the engineer's use of air brakes? I learned about the ancient A-1s from "hoghead" Bill All. Masterful Bill was an SP,LA&SL 1906 man and known as an "air man" (air-brake artist). Using the short, vertical, straight-air lever of the Westinghouse A-1 air brake system, I learned the following regarding the independent engine brakes. You push the lever forward on the quadrant into *application* position and apply the straight air; pull backward into *release* and release the air. On center is the *lap* (of desired amount of an application) position (see diagram). As Bill questioned, "How does all that straight air go through all these curved pipes?" I operated A-1 straight air when hostling two 1873 engines used by Hollywood in Westerns (the ex-CP, V&T 18 and 19; both 4-4-0s, or American Standard types).

Ordinarily, an engine has two manually operated, engineer's brake valves in his work area, *independent* for engine (and any tender) and *automatic* for engine and all attached suitably equipped cars. In the A-1 system, a *straight-air* brake valve is the partial predecessor of the later independent brake valve.

What's so special about Mr. George Westinghouse's A-1 (Automatic-One), "combined automatic and straight-air brake equipment" for freight service? The "air man" taught me, not only could the car brakes be train lined for automatic use, i.e., reducing the brake pipe pressure to effect braking, but also, instead, compressed air could be forced back to apply the car brakes. In either mode, a car had a triple valve for brake application and release (see diagram for K-triple valve). Of course, if the train parted while in the straight air mode, you had no braking on the cars, whose air pressure rapidly bled off to the atmosphere. And about 10 cars or so was all you could get by with using straight air in the

cars. Using straight air in the car brakes allowed the engineer to recharge his automatic brake system after a brake application, done in automatic *running* position.

Two three-way cocks in the engineer's work space allowed his use of either straight-air or automatic-feature braking of a train. An advantage of straight-air braking of a train was that the engineer could graduate the amount of braking force he released, say, going from 40 psi car brake cylinder pressure, to 28, to 17 psi, to 8 psi. With the automatic, reduction mode, the engineer could only entirely release his freight train brakes, say, going from 25 psi car brake cylinder pressure to 0 psi. At an initial terminal or after picking up or setting out cars, a train crew had to make both a straight-air and an automatic brake test. If straight-air pressure dropped greatly during an application of car brakes on a downgrade, the engineer had to cut over to automatic braking and immediately stop his train. He, then, whistled o o o o o o o and the brakemen held the train with hand brakes before they inspected and repaired the straight-air system on. If the repair was not simple, say, a burst air hose, the brakemen applied all retaining valves on the cars, released the hand brakes, and the engineer descended the grade relying on the automatic system alone.

In straight-air braking, the automatic feature is a backup system. For trains larger than a dozen cars, crews relied on the *automatic feature* to apply car brakes, i.e., reducing pressure in a charged *train line* (a continuous brake pipe having hose connections between cars) running the length of the train. When the train--and thus two of its connecting hoses--parted, the automatic feature included that the all-of-train brakes would automatically apply in an emergency application. This occurred as air escaped to the atmosphere and reduced train line pressure to 0 psi, thereby causing the braking. A braking control valve called a triple valve is on each car and engine. This triple valve has triple functions. From the "signal" of changing compressed air pressure in the train line, it governs the charging of an auxiliary compressed air reservoir on each car and the applying of compressed air to and

releasing it from the car brake cylinder. In all, the automatic feature functions through the medium of the car control valve, with a reduction in train-line pressure from any cause: engineer's manipulation, other crewmember's manipulation as with opening an angle cock at either end of the train line, parted air hose, burst hose, and leakage. In brief, any source of decrease in train-line pressure results in a consequent (automatic) increase in brake cylinder pressure, and a "break in two" of a train results in an enforced stop.

During 1887, as the two predecessor lines of the LAT entered service, Westinghouse introduced the first "quick-action" automatic braking system, using an early triple valve. The improved A-1 system replaced it. A modern, more effective No. 6 system would replace the A-1. Eventually, the acme of triple valves, the K type, entered service. It began to be replaced by a more effective AB control valve in the 1930s. During World War II about half the freight cars had K-triple and half had AB-control valves and, today, the Ks are long gone.

No. 6 ET and ALL of That. Eventually, most engines had the "new" No. 6 ET (Engine & Tender) air brake system, introduced in 1906, the year after completion of the LA&SL. This braking system was designed for the new large heavy locomotives in high-speed passenger service and in heavy-haul freight service having long trains entirely with air brakes. With 6 ET, the era of hand braking trains came to an end. The 6 ET has, among others, *holding* and *release* positions on the automatic brake valve's quadrant (see diagram). *Release* position connected the train line directly to the main reservoir and its pressure of 120 to 130 psi, and *holding* held independent engine brakes applied when the automatic brakes on the cars were released and the train line recharged to a preset limit, say, 70, 90, or 110 psi. Independent engine brakes also held in the automatic's *release* position. A *running* position released and recharged train brakes and released the independent engine brakes. (I enjoyed using the 6 ET brake equipment on various steam

engine types). With *release* position, you could send back "a big gob" of air to help release the brakes but, if you were not careful, could overcharge the train line and cause sticking car brakes.

Using automatic *release* was like using the technique of "bridge braking"; old heads taught you the use and abuse of the rules. Here we find a learned subrosa subset of rules topics, tasks, and operations outside the official rules, such as running over the road on the authority of smoke orders or head rights. As our collective alter ego, Bozo Texino, chalked and instructed on car sides, "You can get by with breaking the rules every time, until the time that you don't." Then, you and others could be killed.

What is "bridge braking"? Until the advent of diesel-electrics with their dynamic brakes (a form of regenerative electrical braking) on the LA&SL, most trains were "bridged" or "fanned" down its six mountain grades. "Bridging" meant, first, moving the handle of the automatic brake valve counterclockwise to a *service* position, thus, making a reduction of air in the train line and applying some amount of train braking force, and next, moving slightly clockwise toward the automatic *running* (normal recharging) position to let a little reservoir air into the train line to overcome any normal leakage in the line. You could continuously "bridge" by moving every so often between the *running* and the *lap* or *holding* positions. Using the "fanning" technique, after an automatic brake application, you put the same handle in *running* for half a second or so, next, back to *lap* or *holding*, and did that incessantly to maintain the train line pressure at a desired amount of leakage. Of course with "bridging" or "fanning" you never really knew what amount of braking force you had back along the trailing cars: perhaps, far less than you thought. ("San Berdoo" here we come flying down the Cajon.)

Using retainers, the "pops." On steam, and sometimes on diesel-electric, the brake cylinder pressure retaining valve on each car had to be used to retard a train's decent

down a grade. Given a steep grade if the engineer simply releases the train brakes, it is "away we go." Insufficient time exists to pump the train line back up to its preset pressure. Having the brakemen apply the retainers on a specified number of cars, in the days of steam usually all cars, allows the engineer to slowly recharge the train line with air while descending without stopping. Then, when needed, the engineer could resume applications of his automatic brakes. To release brakes on cars having retainers set, the retainer handle on a car must be returned to its normal position or else the brakes must be bled off manually, while stopped, using the bleed rod on each car.

Water and Steam. So, all the engineer had to be concerned about regarding his engine were the intricacies of the independent engine and all-of-train automatic air brakes? No, among other things, there were water and steam for concern, like blowing up the locomotive from low water. Steam engines have steam injectors and steam-powered feed water pumps to put water in the boiler. Practice varies with the needs and time pressures of a particular run. I discuss oil burners such as used on the LA&SL (and on the Espee and Santa Fe in California) but water issues are the same on coal burners, I learned in Africa. I will cover only some of the pointers from fellow enginemen and from experience on the job.

First of all, know your true water level. Accordingly, blow out your and the engineer's water columns and their water-glass drains periodically, as per rule, and verify the water level with the orifices of the gage cocks. Those photos in the register room of blown-up engines were not posted there for sensationalism. ("There's a lesson here, fireboy. Learn and live.") Inspect the firebox for water leaks and plugged flues while you are at it. Too dark a brickwork in the firebox interior means you do not have enough heat to properly support combustion.

A boiler check stuck open or leaking badly will lose boiler water in back flow to the tender, something readily seen on the level in the water glasses. The boiler check must

then be manually shut off and the injector attached to it can not be used again until shop repairs are made to the check. That is why the engine has two injectors. With backflow, the affected injector "breaks" and its tell tale drain pipe will emit steam and roar somewhat. Engineers warned me that with a really strong backflow you get a rumbling in the tender, as the boiler begins to empty therein via the feed water line. Are you paying attention? In addition, the 1904 to 1920 men told me, if the "tallowpot" allows the water in the tender to become sufficiently hot with backflow, the injectors and feed pump will not operate, until cooled. With backflow, falling water in the boiler, and a fire in the firebox, you can explode the boiler. Are you taking notes? So, in such a case, kill your oil fire! Perhaps all that happens is that you have softened the crown sheet over the firebox --waiting to blow with the next full head of steam and hot fire. Then, if time permits, "join the birds" and run like hell.

Second of all, water should be fed into the boiler as evenly and steadily as possible. Adding cold water from the tender knocks down your steam pressure, something you do not want on a grade. On a grade, you are often "trading water for steam." We are instructed to feed water into the boiler all the time the engine is working steam. Too high a water level and the throttle valve (in the steam dome atop the boiler) will work water into the cylinders, destroying lubrication, and possibly knocking out a cylinder head, rendering a "dead engine."

All "modern" steam engines I have seen have at least a pair of injectors. Thus, use the fireman's injector most of the time. If it goes bad order or you need more water for a short while also use the engineer's injector. A second injector used with another one will be putting too much cold water into the boiler at one time. So, use it sparingly, we are told. Otherwise, you will cool the crown sheet, damage flues, and loosen stay bolts, all causing

water leaks into the firebox. Allowing too much cold draft into the firebox will have the same "showers" effect. You are still paying attention?

On oil burners, always advance your firing valve handle, which regulates steam-atomized oil flow to the firebox, as the engineer advances the throttle. This action prevents cold air pouring into the firebox, with the undesired strong cooling effect. Similarly advance the firing valve with pronounced slipping of the driving wheels. A clear stack (exhaust) shows that excessive air passes through the firebox. However, do not waste fuel "smoking" your engine with a dark black stack. That unnatural act is done only so photographers can take atypical pictures.

On big power having a steam-operated feed water pump in addition to an injector, pump a limited steady flow of water from tender to boiler. As we thundered up rises at 6 mph, and at other times, I would add water from my injector. Procedures exist for freeing a steam-bound water pump. But if you cannot free it or it leaks badly, you still have your injector.

Just *how low* can you keep the water in the sight glass? Well. . . let's not discuss that matter. However, you always want to know that the two of you have a true reading in your water glasses. Sometimes the margin between "making the grade" with a heavy train and, at the very least, blowing one of the protective *soft plugs* in the crown sheet over the firebox (and emptying the boiler into the firebox) is quite narrow. The amount of fine tuning of this margin decreases with experiential learning. The soft plug is also known as a drop plug, is made of fusible metal, and, with a low water level, has a rising temperature, softening the plug. Its melting allows steam to blast downward, extinguishing the fire. Then you have a dead engine, no "alibi," and demerits (Superintendent George Brown's "Brownies" or "Brownie points"). We have not touched upon the systems of employee discipline for infracting the rules and making errors.

Freight Train, Freight Train Goes So Slow.

Of course, in the days of steam, as per the rules, a freight train had to make wheel-cooling stops on a steep downgrade. Otherwise the car wheels, which are heat sinks for the brakes, could fracture while in motion, derailing the train. On the engine, excessive braking of the steel driving wheels could overheat and loosen their steel tires, heat-shrunk onto the wheels. The loosened tires could leave the wheels and "tangle" with the flashing rods, perhaps hammering a thus broken rod through the cab and a crewmember, but always disabling the engine—big time. So, "cool your wheels." Stopping to "take on water," with the fireman jerking down the spout of a water tank in a "jerk water," or "tank town" does not count for cooling wheels.

According to Timetable No. 28 of AT&SF's Los Angeles Division (1910: Rule 28, p. 2), on their joint track, AT&SF and "Salt Lake" freight trains had to make two 10-minute wheel-cooling and inspection stops on the descent of the Cajon Pass, at Cajon and Devore. Because of the nature of the equipment, on all districts, trains had to be stopped and inspected by trainmen every 30 miles. Top freight train speed was 24 or 30 mph, depending on the type of engine, except Pasadena to Los Angeles, which was 20 mph. (So, much for the romantics who wrote about the swift approach of an onrushing, wind-generating locomotive.) From Barstow up to San Bernardino yard (which had Rule D-151 double main track), the 80-mile joint track was single and dark, under Rule S-71. That short stretch of double track was the beginning of the double tracking of the entire 80 miles. The timetable's average speeds of regular freight trains, Barstow to "San Berdoo," were 11 to 13 mph and for the "varnish" (passenger trains), 20 to 30 mph. Talk about velocity.

On April 27, 1921 the UP acquired the 50 percent of the LA&SL owned by the Clark interests and began pouring many millions of dollars into the property. One engineer told me that before the UP took full control of the Salt Lake Line, "You could tell when you 'went

on the ground' [derailed] because bumping over the ties made for a smoother ride [than previously]." By 1922, speeds for the "varnish" were as on similar railroads. LA&SL passenger trains with Mountains (4-8-2s) and Mikados (2-8-2s) could not exceed 45 mph and Consolidations (2-8-0s) 40 mph but Pacifics could do 50 mph. Freight trains and light engines could not exceed 30 mph. All freight trains had to stop for inspection at Ontario, Sands, Kelso, Desert, Leith, Rox, and either Dry lake or Carp. Plus westward (not *westbound*) trains had to stop 10 minutes for inspection and to cool their wheels at Chase, Jessup, and Kelso (LA&SL Timetable 62, November 1922, p. 7).

By 1935, the kerosene lanterns marked "LA&SL" on the clear glass globe and used for hand signaling were in a phase of replacement by battery-powered lanterns. "At any point," the maximum speed for passenger trains was 60 mph and for freight trains, 40 mph, except second class and inferior trains still had to move at restricted speed within yard limits, as in previous decades. However, engines other than Mountains and Pacifics were restricted to 40 mph in passenger service (LA&SL Special Rules No. 2, April 1935, pp. 2, 4).

That's about it for this time of "old heading" it in the switchmen's shanty. Running under "smoke orders," you ask? Well, that's a long excursion into Rule S-71 traffic control, something that would take quite a while. We have not even touched upon the kinds of rail traffic control. You just don't get on an engine and go, as they do in the movies. -30-