



Coast Mail

News from the San Luis Obispo
Railroad Museum

Issue Number 63 – Spring 2018

San Luis Obispo, California

slorrm.com

The Museum is open every Saturday from 10 am to 4 pm. It opens other times for groups by arrangement. Contact media@slorrm.com.

It's curtains for the bland.

The most recent interior scheme of the Museum's 1926 Pullman car was colorful, to say the least: textured red, pink, and black floral patterns. Museum directors and volunteers have been developing an upgraded scheme suitable for the car's use as an event venue. An early step after removing deteriorated wallpaper and paint was to apply primer in a color neutral enough to serve as a base for more dramatic accents. But the winter holidays were fast approaching, and something festive was desired. So in November *in a northern California hotel room*, Museum Manager Diane Marchetti sewed curtains while her husband and Membership Chair John attended a railroad historical society meeting nearby.



New red curtains spice up La Cuesta's lounge area, while the Museum considers options for an interior remodel.

Glen Matteson photos

Meet Our Docent of the Year

On January 6 Bob Wilson was recognized for his service to the Museum, which has included helping to restore our bay window caboose, being its regular docent (below), and providing an interactive model train display during the fall railroad festival.



...and Our Intern

Tammy Nguyen (above), a Cal Poly architecture student, has been helping the Museum with graphic design tasks, including visual simulation of a proposed solar panel installation facing Santa Barbara Avenue (right).

413	Hillman, I. M.	Nov 28, 1946
414	Outland, R.	Dec 25, 1946
415	Rush, J. H.	Dec 25, 1946
416	Weston, H. G.	Dec 25, 1946
417	Holley, C. E.	Dec 25, 1946
418	Laws, R. J.	Dec 25, 1946
419	Chambers, C. L.	Dec 25, 1946
420	Ward, M. L.	Dec 25, 1946
421	Barger, C. L.	Dec 25, 1946
422	May, W. P.	Dec 25, 1946
423	Seiverson, E. C.	Dec 25, 1946

Happy Holidays!

We ran out of space in the Winter edition for this bit of holiday cheer. At left is a small piece of SP Club's 1947 *Railroad Time Record*, which lists in order of seniority all the engineers, conductors, and brakemen eligible to work on the Coast Division. Men were called to work in order of seniority, so the longer one had worked at a specific job, the more opportunities and the better choices of assignments. The right-most column is the seniority or "promotion" date. And yes, there were 423 locomotive engineers listed, the earliest seniority date being June 12, 1903 [article on first page of Winter 2017 *Coast Mail*].

Mr. Hillman and one other had been promoted on Thanksgiving. World War II had ended a year before: a time to celebrate.

The Museum is always glad to receive information on railroaders who worked on the Central Coast, and on request will try to find records that it has in its archives.

Ladies Afternoon

March 24, 3:00 p.m. Women in railroading presentation & women heroes of the rails vintage films.

Help Us Go Solar

For a couple years the Museum has been researching options to reduce its electricity costs. This spring we hope to move forward with city approval and donor funding to buy and install solar panels and associated equipment. A member has pledged \$5,000 toward the project. Can you help us match that amount this year?



**Preserving California's
Central Coast
Railroad History**

The San Luis Obispo Railroad Museum is a non-profit educational institution. Founded to preserve and present California Central Coast railroad history by collecting, restoring, displaying, and operating relevant railroad artifacts, photographs, models, and documents, its goal is to facilitate a better understanding of railroads' impact on our area's social, cultural, and economic history.

Board of Directors

John Marchetti*President*
Stephanie Hovanitz*Vice-president*
Norma Dengler Brad LaRose
Glen Matteson Duane Powell
Feride Schroeder

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Assistant Manager Stephanie Hovanitz
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Curator Brad LaRose
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Glen Matteson (newsletter@slorrm.com)
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Events Coordinator: Tom Mitchell
Model RR Superintendent ... Andrew Merriam
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Contact

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e-mail: info@slorrm.com
Website: www.slorrm.com
Mail: 1940 Santa Barbara Avenue
San Luis Obispo, CA 93401

DOCUMENTS AVAILABLE

Anyone may access the Museum's *By-laws, Collections Policy, Development & Operations Plan, Code of Conduct*, and other documents at slorrm.com. Or request a paper copy via info@slorrm.com.

Museum Store

To raise funds, the Museum offers several items for sale. T-shirts, baseball caps, belt buckles, mugs, enameled pins, embroidered patches, engineer hats, and videos are available through the Museum website www.slorrm.com. Click on **Company Store**.

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Become a member

Membership provides opportunities for anyone interested in today's railroads, railroad history, train travel, or model railroading to learn and experience more, and to share with others.

Individual members pay \$36 per year, a family \$60, and a sustaining member \$100. Junior memberships (ages 12-18) for the model railroaders are available (see Model Railroad Superintendent for details).

Application forms can be downloaded from the Museum's website and mailed with payment, or you can join online by clicking Membership and using PayPal. (Mailing and web addresses are in left-hand column.)

Membership benefits include free admission to the Museum and access to Members Only features of the website, including full current issues of *Coast Mail*.



Wine-Rail Excursions from San Luis Obispo to Paso Robles and return will run on the 3rd Friday of each month, April through October 2018. Cost will be \$85 per person (discount available for new members). Use contact information at left

TIMETABLE

These are the scheduled meetings of the Museum Board of Directors, held on the second Tuesday of each month at 6:00 p.m., at 1940 Santa Barbara Avenue, San Luis Obispo.

- March 13 - Board action meeting
- April 10 - Public meeting
- May 8 - Board action meeting

For dates, times and locations of committee meetings, contact the Museum through the number or email at left.

Model Railroading topics will be presented the fourth Saturday of each month from 2:00 to 3:00 p.m. at the Freighthouse.

Also in this Issue

- 2017 Annual Report 3
- [Online: This train is tradition bound](#)
- [A weighty subject](#)
- [Street railways](#)
- [A tough job](#)

In Our Next Issue

More oil adventures, name game, and sacks of coke.

Annual memberships must be renewed by April 1 to continue receiving benefits such as free admission and newsletters.

New Directors

Stephanie Hovanitz is newly elected, while Norma Dengler and Feride Schroeder were re-elected. Brad LaRose, John Marchetti, and Duane Powell were elected after time away. Karl Hovanitz, Andrew Merriam, Dave Rohr, and Gary See were ineligible to continue under the Museum Bylaws' term limits.



S.L.O. Train Day May 5

Help us re-create some of the excitement from May 5, 1894, when San Luis Obispo celebrated opening of the railroad connection via San Jose to the national system. With no paved roads between population centers, it was a major event.

Our celebration will include tours, special presentations, food, music, and a swap meet. And of course passing trains, including our era's Amtrak *Pacific Surfliner*, which recently carried people around the Highway 101 debris-flow closure. Visit slorrm.com for a schedule of activities as the date approaches.



2017 ANNUAL REPORT



Visitors



The Museum had 52 regular open days and three special days, during which about 5,170 people came.

The Museum continues to host a wide range of groups, including some that are not focused on railroad history.

Our website averaged 450 visits per day, with a one-day peak of 723 during the Central Coast Railroad Festival. Online visitors were from 25 countries.

Restoration

The former Southern Pacific bay window caboose received additional weather sealing and paint. Our Pullman lounge car *La Cuesta* had work done on windowsills and interior finish. The tank car frame was straightened. Smaller items such as a wooden tool cart also received attention.


Events, Presentations & Outreach

Special programs at the Freighthouse occurred during Train Day in May, the Festival in October, for several gatherings for families or groups throughout the year, and for seasonal holidays –36 in total. We held our first Art After Dark open house. A series of talks on railway engineering and a movie afternoon were offered. The Boy Scout Merit Badge program continued.

Member volunteers represented the Museum 24 times at locations away from the Freighthouse, including two radio shows, three train excursions, and five visits to Cal Poly classes or events.

Exhibits & Facilities

Our interactive exhibit on the Santa Maria Valley Railroad was completed, as were one on Coast Line Connections and one on the Heroes of Honda.



Operations & Governance

About 25 active volunteers worked about 9,000 hours, including over 3,000 for the model railroad alone.

Three new Board members, and three who had served in previous years, were elected. The Board adopted a Code of Conduct with conflict of interest policies applying to all Board members and officers. The Board also adopted a statement of Core Values that's used to evaluate Board members, and a Director Commitment form covering participation and support.

S. P. MEN SAVE LIVES IN NAVAL TRAGEDY



2017 ANNUAL REPORT Continued

Publications

Ten issues of "From the Freighthouse" were distributed via email. Four issues of *Coast Mail* were published on a regular quarterly schedule, totaling 16 print and 39 digital pages.



Acquisitions

The Museum acquired a carpenter's wooden wheeled toolbox that was used in the San Luis Obispo roundhouse, and many books and documents, all as donations.



Library & Archives

Records were created for about 50 additional books, and for individual items or sets of: maps (15); plans (165); photos (30); and documents and objects of other kinds (100). A database with about 2,100 records of previous coastal region railroad workers was compiled. About 200 donated items were processed for addition to the collections, transfer to other nonprofit organizations, or sale to raise funds for the Museum.



Model Railroad

The Stenner Creek Trestle was made operational. The complex trestle for dumping sugar beets at Betteravia was constructed (right), and the helix allowing trains to travel between the lower and upper levels of the layout was wired. Also, modelers clarified policies and procedures for docents, including junior members, and for visitors.



Membership

The number of memberships remained at about 200, with several of those being families.



Financial Status

Beginning Cash Balance		\$154,711
Income		\$ 75,507
Memberships	\$ 11,113	
Admissions	\$ 10,375	
Events & Excursions	\$ 11,823	
Museum Store Sales	\$ 11,924	
Grants and Donations	\$ 26,623	
Restricted	\$21,016	
Unrestricted	\$ 5,607	
Expenses		\$ 81,124
Operating	\$48,825	
Capital	\$32,299	
Year-end Cash Balance		\$149,094

Some Central Coast Model Railroad accounting is separate. The Museum has no paid staff.

From the Archives by Glen Matteson

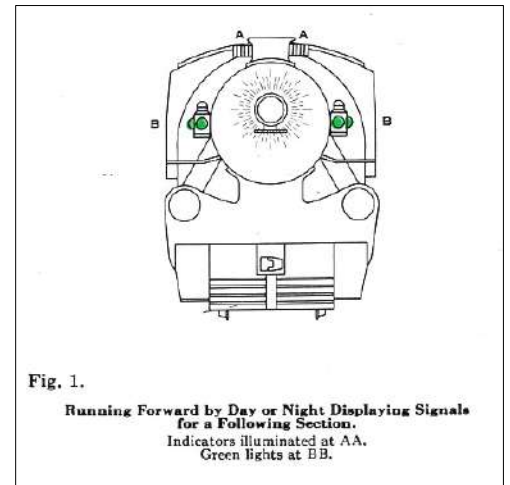
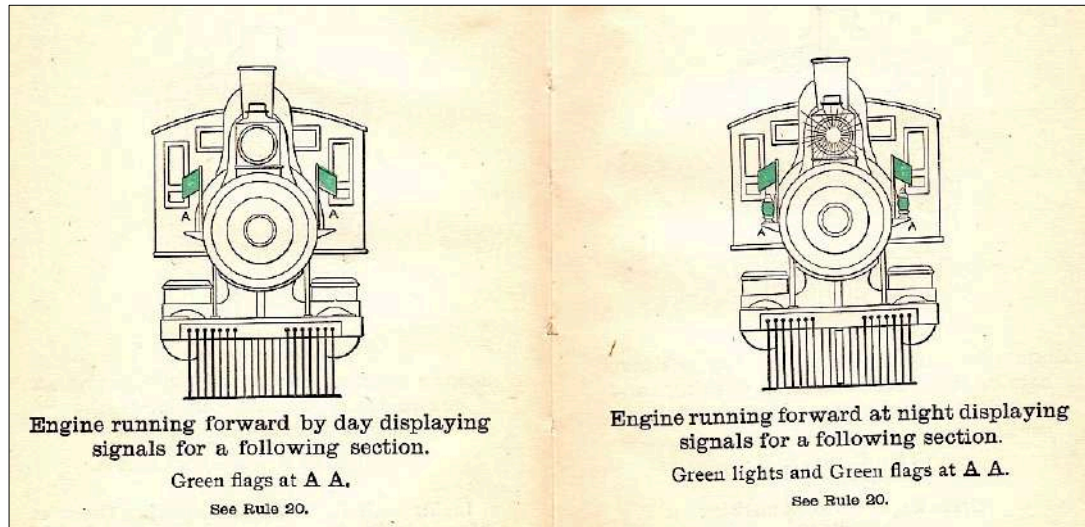
This train is tradition bound.

Railroads' basic organization and operation have a reputation for being slow to change, also conservative and militaristic. The latter are due to the need for a clear chain of command and strict adherence to rules, and to the railroads being heavily staffed by former Civil War officers during their expansive and formative years of roughly 1865 to 1900. A search through the Museum archives, looking for a rules source that would explain some employee timetable abbreviations [*Coast Mail Winter 2017*], found the Southern Pacific Company (Pacific Lines) *Rules and Regulations of the Transportation Department* effective July 1, 1960. You might think the whole railroad would be "the transportation department," transportation being the reason for the railroad's existence. But to most railroads of that era, the distinction was between those who operated trains (transportation) and all the others whose tasks included acquiring and maintaining cars and locomotives, building and maintaining track or bridges and buildings, or soliciting business.

An illustration in the above cited *Rules* drew attention because even at that date, after diesels had for several years displaced all steam locomotives, it was of a steamer. It prompted your archivist to compare illustrations with some from his grandfather's Lake Shore & Michigan Southern Railway Company browned and brittle rules books. *Rules for the Government of the Transportation Department* is dated 1904, and was signed for on June 27, 1905, by W. M. Chadwick, Operator. *Rules Governing the Use of Interlocking, Block and Train Order Signals* was undated, but was signed for on July 10, 1905.

SP images are from the SLORRM collection. LS&MS images are from Glen Matteson's collection.

Below is the LS&MS's 1904 equivalent, with the flags and lanterns on each side of the smoke box (front of the boiler). There were many permutations. An engine running



Above is an illustration from the 1960 SP rules. It shows a locomotive running forward, day or night, displaying green marker lights, which means another train, technically another "section" of the same train, is following. This was important because a train running in the opposite direction on single track may have taken a side track, with orders not to proceed until after the passage of Train Number 71 (for example). Both passenger and freight trains often ran in multiple sections during times of heavy traffic. There could have been a 1-71, a 2-71, and a 3-71 (section number always first, train number next). The train in the siding needed to wait until all three sections had passed. Each would have had its section and train number in the backlit indicator panels on each side of the smokestack. Different displays in terms of light colors, headlight on or off, and cloth flags on short poles, also on each side of the smokestack, had different meanings. Interestingly, the SP rules book shows flags only of the white variety, for "extra" trains (those not listed in the employee timetable, which included both scheduled freight and passenger trains). These days, virtually all freight trains on all railroads run as "extras" and are identified by the railroad name and the number of the lead locomotive. In the 1960s, the Santa Fe, among several railroads, also used green flags (on diesels) to indicate following sections.

backward at night also would have had red lights and flags. Not using the headlight by day made the flags more easily seen, because of the headlight glare. These days, the head-

lights of trains moving forward are always on (usually dimmed for approaching trains), and marker lights are typically not used on locomotives. Early diesels were built with integral marker lights, as opposed to brackets to hang lanterns, but current freight locos lack them entirely, and passenger units incorporate "taillights" as rear markers.

Article continues next page.

Tradition Bound (continued)

Unlike current freight equipment, Amtrak cars and locomotives must have "good markers" to proceed, and on all contemporary equipment they are part of the standard package. At left (top and bottom) are SP's 1960 versions, still showing lanterns. Note the different displays for different situations in terms of main line single or double track, sidings, and direction of movement.

At right, LS&MS 1904 version: about the only change in SP's illustration is the round top of the "heavyweight" passenger car rather than the clerestory roof of the 1904 wood car. Caboosees on freight trains had the same requirements and provisions for marker lights, with lanterns on brackets used into the 1960s, and some roads using built-in lights starting about then (see the Museum's bay window caboose on display, with lights permanently mounted on the roof). Today, virtually all through freight trains have no cabooses, instead using a telemetry device on the rearmost coupler to monitor airbrake pressure. It shows a single flashing red light when the train is moving.

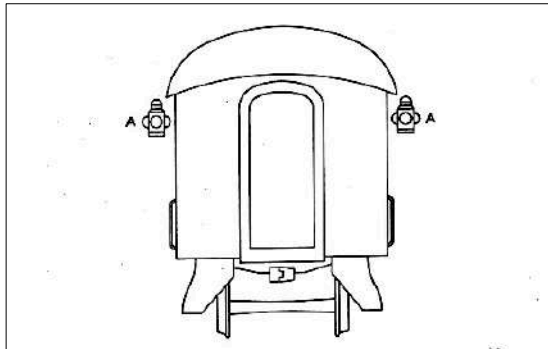


Fig. 5. Rear of Train by Day. Marker lamps not lighted at AA as markers.

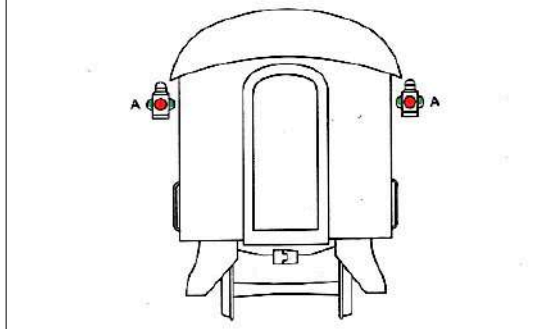


Fig. 6. Rear of Train by Night While Running on Single Track, and With the Current of Traffic on Double Track. Lights at AA as markers, showing green to the front and side and red to the rear.

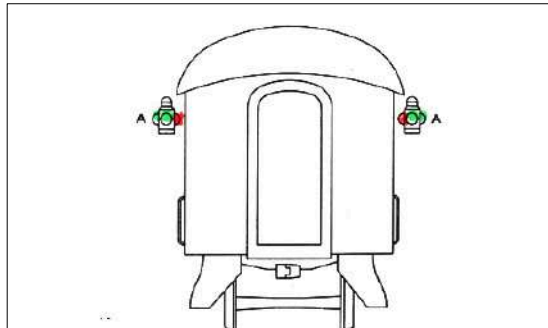


Fig. 7. Rear of Train by Night When on Siding to Be Passed by Another Train, Outside of Block System Limits. Lights at AA as markers, showing green toward engine, side and to rear.

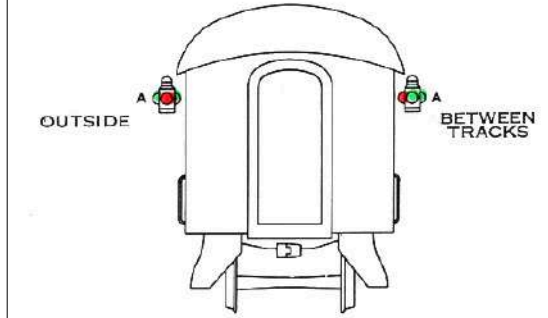
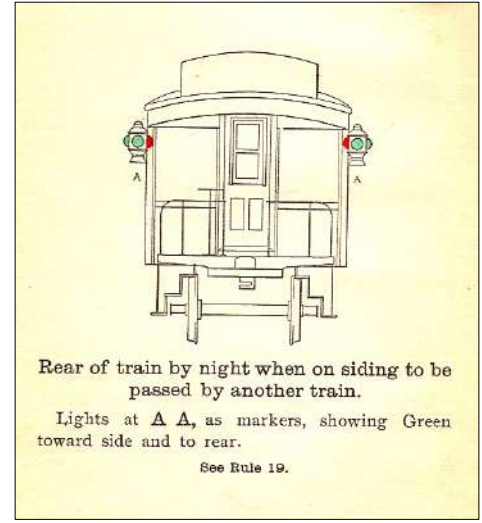
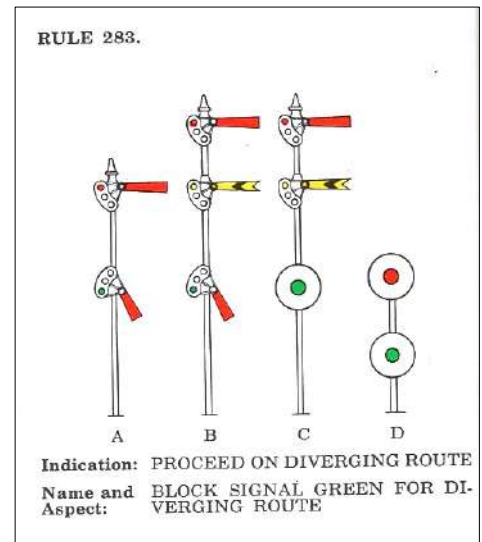
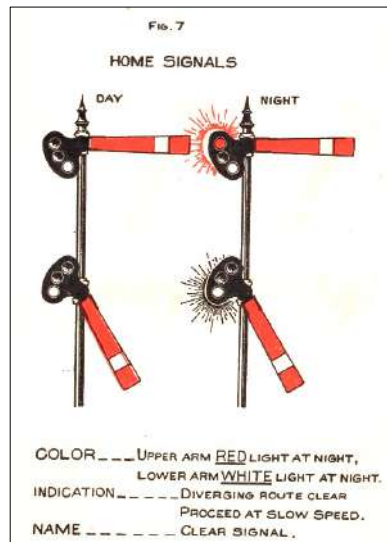


Fig. 8. Rear of Train by Night, Turned Out or Running Against the Current of Traffic, on Double Track. Lights at AA as markers, showing green to front and side and green to the rear on the side next to the main track on which the current of traffic is in the direction the train is moving and red to the rear on the opposite side.



Below right is the 1960 SP illustration of trackside signals showing the semaphore style then still widely in use, as well as the color light (or "target") style which had been the new standard for several decades and would remain so until about 2000. The upper arm or light shows the status of the direct route ahead (in this case, don't take it) while the lower arm or light shows the status of the diverging route (clear). Of course the engineer has no choice of route, which is determined by the track switch. But the engineer decides whether to stop or to proceed through the indicated route at an appropriate speed (which for a diverging route through a track switch is nearly always much lower than the through route).

Notes on the below left '04 LS&MS illustration are on the following page.



Tradition bound (continued)

Referring to the 1904 LS&MS illustration on the previous page, the semaphore signal is telling a train to proceed slowly through the diverging route. Here's an interesting fact: In the early days of both hand-operated and automatic signals, white lights meant clear or proceed, while green often meant stop. One explanation is that it was hard to make red or yellow glass reliably with consistent color.

At right top is the 1904 LS&MS example, which uses a horizontal arm and a green light to mean proceed with caution, often requiring reduced speed and also indicating "be prepared to stop before passing the next signal." A "distant" signal was linked to the operation of the "home" signal, generally the one at the next station or side track (that being considered "home"). So the "distant" signal was meant to be seen first by the approaching engineer. It was closest to him (these days it also could be her). Confused yet?

At right bottom is a 1960 SP rule, with semaphore and color light examples, having the same basic meaning as the LS&MS example: proceed with caution being prepared to stop before the next signal. But this indication was called "approach" rather than "caution." Other flavors such as "advance approach" (flashing yellow light) communicate track conditions even farther ahead.

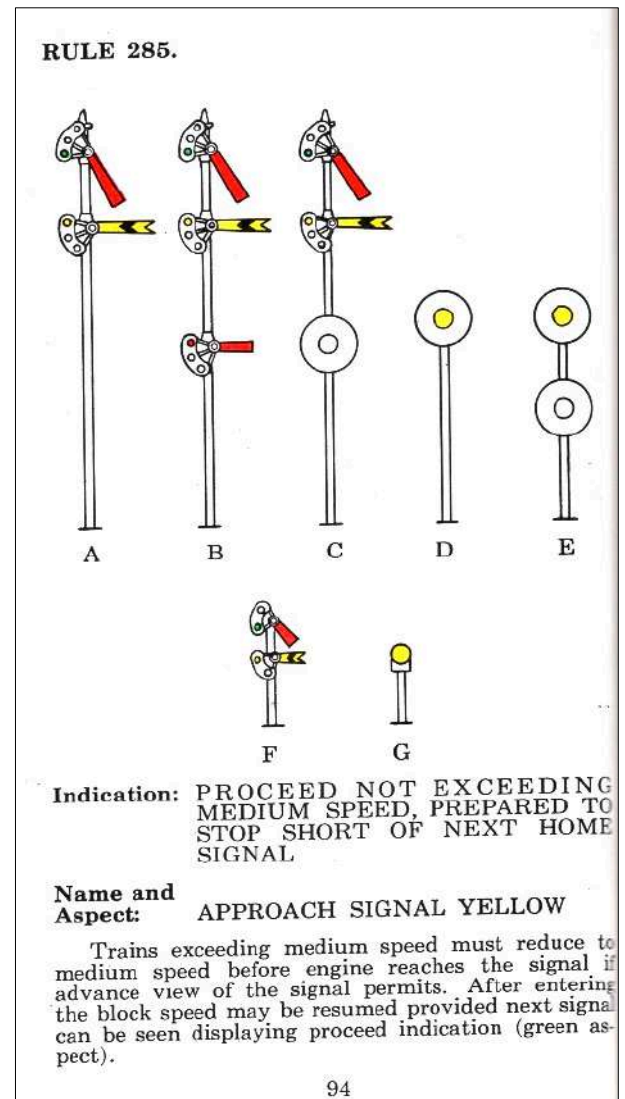
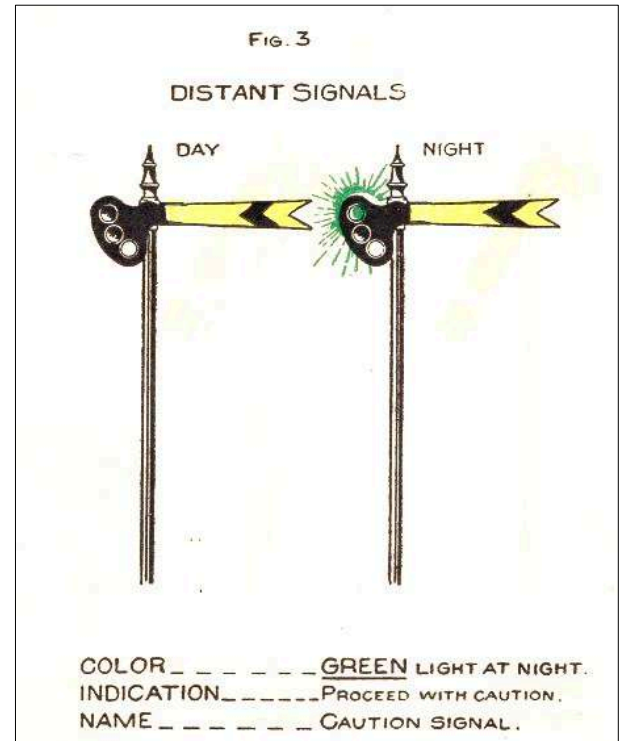
With different railroads using different signal styles and somewhat different names or aspects to convey the same instruction, or worse, the same name for different instructions, the effort to standardize them has extended across decades. The more densely developed and heavily trafficked eastern lines also often had more intricate aspects and rules, especially signal-governed speed restrictions through complex "interlocking" arrangements where tracks of the same or different railroads crossed each other. As railroads have consolidated [Coast Mail Summer 2016] and as work to standardize has proceeded, the variety of signals has declined along with many other aspects of railroading. U.S. railroads in the northeastern states use the Northeast Operating Rules Advisory Committee (NORAC) system, nearly all others the General Code of Operating Rules (GCOR). With implementation of the federally mandated Positive Train Control (PTC) on most lines [Coast Mail Spring 2016 and Summer 2016], interoperability throughout the country is still an issue. But if PTC is successful, in particular *reliable* in all weather and operating conditions, it may eventually mean the end of flags, lights, number boards, and trackside signals.



Help avoid confusion

Make sure the Museum has your current contact information (it's never shared), and contact the Museum if you have any questions about activities or membership benefits (see page 2).

The image above was modified from a photo by Jersey Mike's Rail Adventures of the BNSF signal bridge over that railroad's six-track arrangement in San Bernardino.



From the Library by Glen Matteson

Details Run Amok on a Weighty Subject

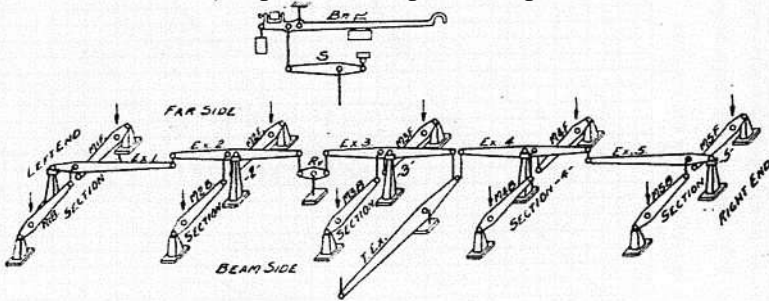


A couple years ago Librarian Chris Hurd handed your Archivist a book, Railroad Track Scales – Specifications and Capacity Ratings (Preliminary Issue), published in 1916 by the U.S. Bureau of Standards. Once the Librarian determines a book’s call number, the Archivist has the important job of sticking on a label. And your Archivist sometimes gets to look through the book before it goes on the shelf. This book was opened to a random page, where there appeared Part VII, setting standards for the case used to keep and carry the weights employed on a balance arm. (Those who remember the days before digital scales may recall the weights –one large and one small—that slid along bars when being weighed in a doctor’s office.)

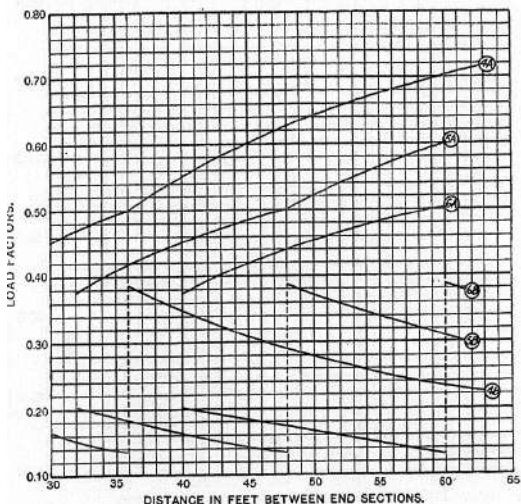
“The case...should be of oak, suitably designed and finished...” And, “A separate case fitted within the large case should be provided for the weights having values of 0.005 pound and under.” That’s not a typographical error. The table above that quoted text has a list of weight “denominations,” ranging from 20 pounds to 0.0001 pound. Even allowing for a factor of 1000 in mechanical leverage, that last denomination would correspond to one-tenth of a pound, or the amount of dirt that might have clung to a single fairly clean sugar beet [*Coast Mail*, Summer 2017, page 4].

The authors thought of everything. “The weights should be so distributed in the case that the case will be balanced when carried by the handle.”

The book is an engineer’s delight of diagrams like this:



And graphs like this, with “Load Factor” on the vertical axis and “Distance in Feet Between End Sections” on the horizontal axis:



The smaller numbers below the car number (4406) of this Texas & New Orleans nominal 70-ton hopper car show its capacity, load limit, and light (unloaded) weight in pounds. The car was built in 1946 for this SP subsidiary. “HO 6 58” means it was last weighed in Houston in June 1958.

Images are based on an original photo by Bob Lorenz and posted on modelingtheSP.blogspot.com, which also provided interpretive information.

CAPY 140000
LD LMT 161500
LT WT 48500 HO 6 58

And formulas like this:

$$W_c = \frac{S}{(DM + D'M')R} - W_p \frac{(dM + d'M')}{(DM + D'M')}$$

Why all this concern with track scales?

Freight rates were, and are, determined by a combination of weight, value, distance, special handling requirements (such as refrigeration, or wide loads that can travel only on certain routes), and volume (in the sense of both space taken in a freight car and the total amount to be shipped). How do you find the weight of a shipment? If it’s 200 cases of broccoli and you know the weight of a typical case, you can make an informed guess. What if it’s scrap metal and the shipper does not have a scale or you don’t trust the scale he has?

Then you roll the loaded car onto a section of track that can move up and down, like the standing surface of the scale in the doctor’s office. Only the object you’re weighing is 40 or 50 feet long and the many tons of weight may not be distributed evenly. The load may even slosh around. Freight cars have their unloaded weights stenciled on the side, so that can be subtracted to get the weight of the load; and empty cars can be weighed to verify the stenciled weight. This is a tricky business to get right.

And it’s more than a matter of the charge for a shipment. The weight of an individual car is important for that car’s bearing and suspension systems and brakes, and for the track and bridges it can use. Total train weight is important for assigning locomotives and operating the brakes. At least one tragic runaway on a mountain grade has been partly attributed to incorrect records of train weight (mineral loads on Cajon Pass).

There was a scale track in the San Luis Obispo yard, on the easterly side, where South Street would meet Bishop Street if it were extended (which was proposed in the 1970s). Track layout drawings actually show the scales on the spur that was used to unload tank cars into the railroad’s huge oil storage tank for steam locomotive fuel [*Coast Mail* Spring 2017, page 7].



How Many Horses in Your Horse-Car Town?

In the late 1800s, what did Santa Barbara, Paso Robles, and San Luis Obispo have that Atascadero and Santa Maria did not? Answer: A street railway using mule- or horse-drawn cars, to carry passengers to all the places that mattered –around downtown and to the railroad depot.

Santa Barbara’s lines went beyond the central business district, up to “the Queen of the Missions.” Of the three street-railway cities, Santa Barbara’s system has the most historical information available, probably because part of that system survived into the electrified trolley era. The book *Mule Car and Trolley* by Everett and Coombs (1984) is a good source. Your reporter remembers as a child seeing rails of Santa Barbara’s system peeking through the pavement, not because he’s so ancient but because in a few spots the asphalt laid over the rails was shallow and had eroded. There also must have been times that city utility workers met some steel resistance when digging trenches to work on water or sewer lines.

El Paso de Robles, as a world-renowned hot-springs resort (1800s promoters’ words) had a tidy little line. The Museum displays a photo of its two-horse car [*Coast Mail* Winter 2015, p. 9].

S.L.O.’s system encompassed about two route-miles. One source says it had five cars and nine horses. Depending on source, it’s said to have lasted until 1897 or 1901. Apparently conversion to electricity was discussed but not done, since the system had never made a profit. Some systems were cut back bit-by-bit, and that may have been the case locally, with individuals remembering when the part most useful to them ceased. The one-horse cars could be pulled from either end, so no turning facilities were needed.

Santa Maria did have railroad tracks within some of its streets, but they were not parts of a street railway system. The standard gauge Santa Maria Valley Railroad had track in the middle of Jones Street. And the narrow-gauge Pacific Coast Railway had an electrified line carrying freight and passengers, mostly workers at the Betteravia sugar refinery and Guadalupe, with some street trackage in Santa Maria.

Report, S.L.O. photo, and map by Glen Matteson.

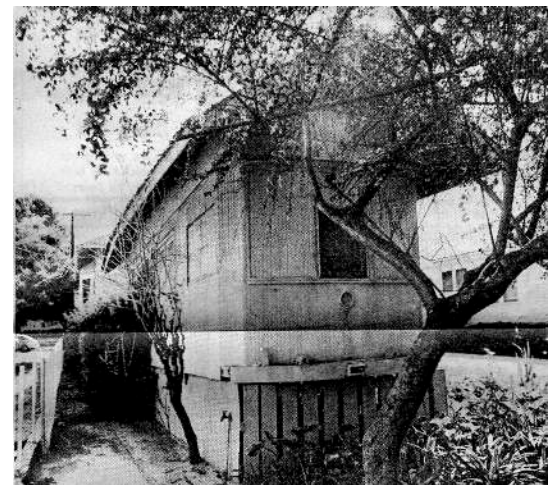
San Luis Obispo Street Railway Routes Mid-1890s



Above, S.L.O. Street Railway car preserved on the grounds of the Dallidet Adobe. Below, “Santa Barbara & Suburban Railway Co.” electric car No. 24 poses for an unknown photographer, shown in the S.B. News-Press column cited below.



Below, former Santa Barbara horse car #16, notorious for crashing with loss of life having run away downhill near the Mission. As a storage shed on Bath St., it looked something like the Museum’s 1200-series boxcar before its roof was restored. This photo by Rafael Maldonado appeared in a News-Press column by Barney Brantingham (unknown date).



At left, a schematic map of the S.L.O Street Railway routes. Apparently the three-foot gauge track ran in the middle of the street (map lines offset to show street names). It’s not known if there were passing tracks. Sources disagree on whether the line connected Higuera and Monterey via Chorro or via Court Street. Broad (unlikely due to grades) and Upham are included in one source’s route description, but not in another. Base image is from Google Maps.

You think you have a tough job?

Maintaining steam locomotives was a labor-intensive business. The shop forces at San Luis Obispo's round-house did a lot of it from the 1890s through the 1950s. To help them remember how to find or make the correct replacement parts, and put everything back together, they had a vast collection of technical drawings. Some drawings of this type survived and are in the Museum's collection. The one below (possibly from the Sacramento shops) is titled "Instructions For Breakdowns of Middle Main Rod and Valve Gear on SP Class Locos," and is dated September 16, 1949.

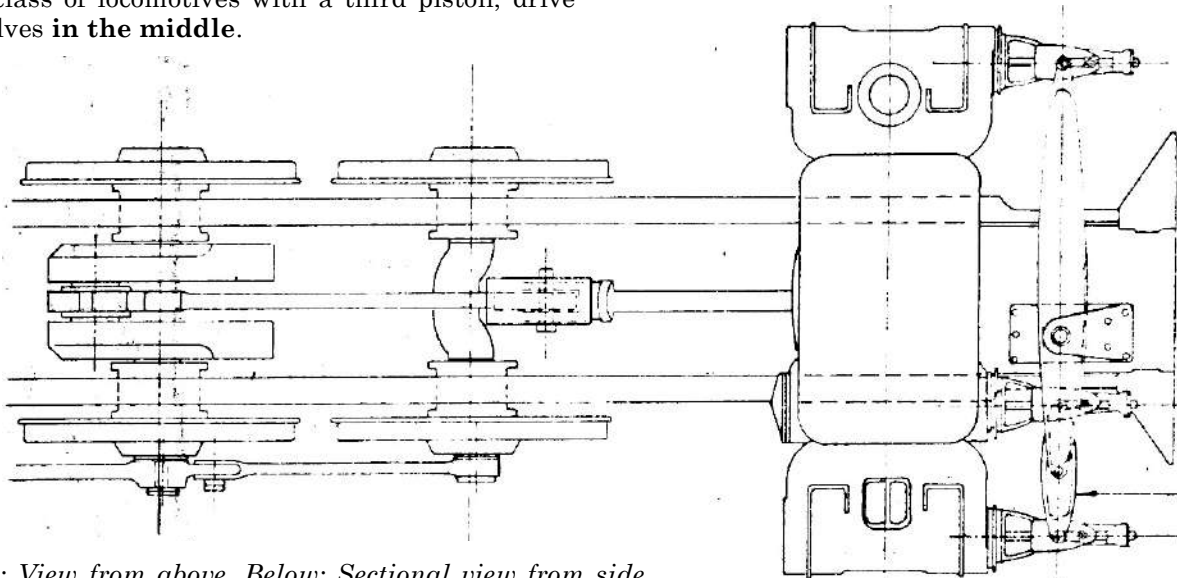
The term "breakdowns" is ambiguous, but either meaning fits: the results of broken components, or taking them apart for maintenance. The 15 numbered steps (not shown) reflect dealing with five types of broken pieces, but in fact describe how to separate them from their neighbors, so maybe both meanings apply.

Steam locomotives' thrashing drive and connecting rods and valve gear out in full view put on a fine show. But in its quest for more pulling power from a given steam production capacity, the Southern Pacific decided to build a class of locomotives with a third piston, drive rod, and valves **in the middle**.

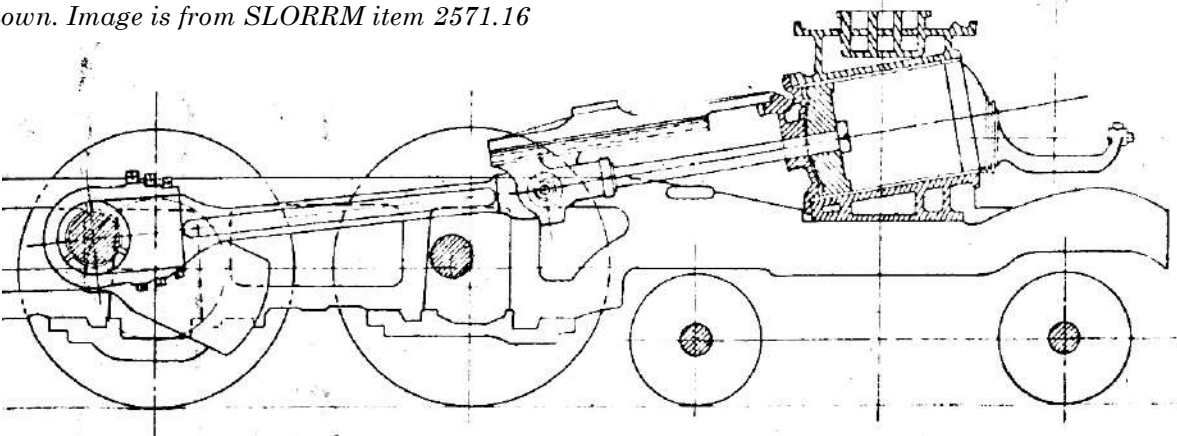
Anyone who's changed spark plugs or oil knows it's nice to have them easily accessible. And with a car's distributor wires, it's important to connect them with the right plugs. There were two big disadvantages with the middle-cylinder loco models. All those moving parts were hard to inspect and repair. And, like the order and timing of cylinders firing in a car, the relative positions of steam locomotive cylinders during their cycles were critical to not stalling and to not working against each other (with disastrous results).

So, middle-cylinder locos were not widely popular. Smaller booster devices on the normally unpowered locomotive trailing wheel assemblies and on the tenders' wheel assemblies, an advantage in starting, were used on some locomotives of this type, and on other types of steam locomotives. They had similar access issues. And they were dead weight once a train got up to speed and steam to them was shut off.

Originally built for SP's line over the Sierras, these 4-10-2 type locomotives (class name "Southern Pacific") were not often used on the Coast Route. However, their 2-10-2 "Decapod" (or simply "deck") cousins were regular freight haulers and helpers over Cuesta Grade.



Above: View from above. Below: Sectional view from side. Note the "bent" alignment of the front axle to clear a moving linkage, and the eccentric-rod crank form, and massive counterweights, of the second axle. Not all driving wheels are shown. Image is from SLORRM item 2571.16



SECTION THROUGH CENTER OF ENGINE