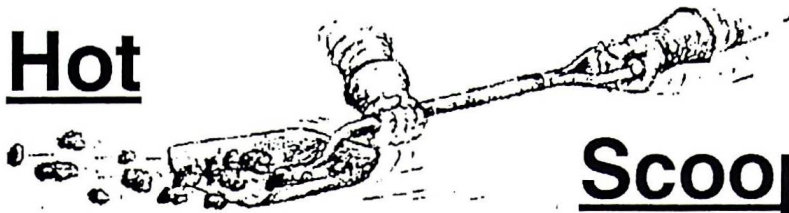


Hot



Scoop

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

April 1994
VOL VI NO IV

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Please send address or subscription changes to:

San Diego Railroad Museum
c/o Santa Fe Depot
1050 Kettner Blvd.
San Diego, Ca.
92101

DIRECTOR OF CAMPO OPERATIONS

Denby Jones

Conductors and Superintendents, CPR Classes:

The Museum has established the requirement that all Conductors and Superintendents be qualified in CPR. Qualifications must be completed by 1 May, 1994. Contact Lew Wolfgang for details.

Focus

When I was a boy, more years ago than I care to accurately remember, we used to go to the Tower Theater in my hometown of Fresno and pay 15 cents to watch the Saturday Matinee. They must have used that time period as a training time for projectionists because invariably there would be a multitude of voices yelling "FOCUS!!! FOCUS!!!" Well, with all we have coming up, I am again yelling FOCUS, because that is the only way that we are going to be able to accomplish the tasks that are ahead of us. I would like to set up a team principle, where one team under a team leader would take ownership of a project and complete all facets of it. Whether it be mechanical, restoration, clean up or whatever. It would be up to the various superintendents to lend their expertise where it is needed but it would be up to the team leader and his team to work the task. A classic example of the team concept is the Steam Team. Don Getz has offered to head up the Building Site team. This team will be responsible for the laying of tracks 7 and 8, moving the museum main line over and prepping the site for the new display building. This is a monumental task and we need focused people. Contact Don or myself. We need teams for passenger car repair, 1509 truck re-assembly and installation, Facilities work, grounds clean up, equipment maintenance to keep it running to support all these tasks, and keep up with our regular required maintenance and operations schedule. We, the Museum Staff and I are asking for a maximum effort, but we do not want the same problems we had during Rail Fair, where people got burned out and left. I feel that by using the team concept we can avoid that type of pitfall and still accomplish the tasks that have to be done.

The catch is, we need to commit today and start yesterday. So please, get together with the people that you like to work with, form a team, and pick a task. I will be the overall coordinator for the activity at Campo, so give me a call at 279-2419 or one of the Superintendents, Mike Reneau Operations, Jim Wilson Mechanical, Steve Wade Facilities, Ted Komweible Restoration, Rich Borstadt Interpretation, Richard Dick Steam Team and Lew Wolfgang Safety. As the old saying goes, "We have a long way to go and a short time to get there", so lets get started.

See you at Campo,

Denby

Notice

Richard Dick reports that a critical part of Locomotive 2353 (throttle lever) is missing. If anyone knows of its whereabouts, please notify Richard, the entire Steam Team will appreciate it.

From time to time we all bring parts down the hill for any of a number of reasons. If anyone has in their possession anything belonging to the Museum, please let Denby know so that we can start a proper inventory. [lew]



OPERATIONS DEPARTMENT

Maryanne Thompson

The ridership total for February was 1639 including school days, Tecate, and Legacy Ranch trips. We have started off well this year and I hope that it will continue to improve. Once again, thanks to all of the train crews that help to keep the trains rolling.

As you have heard by now, we have a lot to accomplish before November and the 75th Anniversary celebration. Help is needed in every department to complete our goals. If you have any spare time (I know, you're already maxed out just like I am), please contact one of the Superintendents and let them know how you could lend a hand. The big push of course is the completion of #2353. We also need to get the Lackawanna cars looking their best. Add to these two tasks the Display Building and the track work that needs to be accomplished to finish this, and you can see that we have enough work to keep us busy until the year 2000! But, we CAN do this if everyone participates. Any help would be greatly appreciated.

For those of you who recently completed the speeder class, you now need to arrange your hands-on training. If you have not yet completed the rules test, you must do this before your

training begins. Please contact Mike Reneau at 466-5402 to arrange either of these. If anyone is still interested in additional speeder classes, please contact me at 443-4418.

The next Operations meeting will be on Wednesday, April 20th at 7:00 p.m. at the Santa Fe Depot. All are welcome. Hope to see you there!

INTERPRETATION DEPARTMENT

Rich Borstadt

Special Tour of Kennecott No. 100

The Museum's newest gem of passenger rolling stock will be open for a Sunday tour on April 17. It is about to begin stabilization and restoration on the La Mesa Lumber spur. The tour group will gather at the La Mesa Depot for a briefing at 2:00 p.m. and proceed to the lumber yard property to view this turn-of-the-century business car once used by the Jackling interests. Join us.

Trainman/Guide Course offering this month is the Museum Organization and Mission Class on Wednesday, April 13. This is an ideal session for a newcomer to begin active involvement with the Museum. Urge any new recruits to attend. Call Rich Borstadt (544-5875) or Mike Retz (466-8808) for more information and to sign up for the course, or just join us at the Depot.

Plans are being made for interpretation of the 1994 centennial of the La Mesa Depot and the Diamond Jubilee of the SD&A. If you would like to help with these plans and their execution, contact Superintendent Borstadt (above number).

Sunday 3

Easter Sunday (Normal Operation) Campo Depot
Transportation Corridor Structure Stone Store Archives
Field Survey (Photo Documentation) 10:00 a.m.

Monday 4

Staff Meeting Office 6:30 p.m.

Wednesday 6

Mountain Empire High School Career Day 8:00 a.m. - noon
Campo Wild West Days Planning Community Center Campo, 7:00 p.m.

Saturday 9

Puerto Peñasco Excursion Mexicali Border 8:00 a.m. Departure

Sunday 10

Border California Museum Assn. Stone Store Archives
Strategy Meeting 10:00 a.m.
Mountain Empire Historical Society Stone Store Archives
Board Meeting Noon

Monday 11

Special Staff Meeting Office 6:30 p.m.
75th Anniversary Celebration

Wednesday 13

Trainman/Guide Course Office 7:00 p.m.
Museum Organization and Mission

Friday 15

Copper Canyon Excursion, Mexicali
Saturday 16 Horse/Express Exhibit Hall Work Day
10:00 a.m.-4:30 p.m.

Sunday 17

Kennecott No. 100 Tour, La Mesa Depot Jackling
Business Car 2:00 p.m.

Monday 18

Staff Meeting Office 6:30 p.m.

Tuesday 19

School Day Excursion Campo, 9:00 a.m.

Wednesday 20

Operations Department Office 6:30 p.m. Business Meeting
Campo Wild West Days Planning Community Center
Campo, 7:00 p.m.

Friday 22

The Iron Horse, John Ford Silent Film Symphony Hall
Re-premiere w/original orchestral score 7:00 p.m.
Pre-show San Diego Symphony and Organ 8:00 p.m. Curtain

Monday 25

Special Staff Meeting Office 6:30 p.m. 75th
Anniversary Celebration

Tuesday 26

Special Board of Trustees Meeting San Diego T&S Bank
75th Anniversary Celebration Board Room 6:30 p.m.

Wednesday 27

Interpretation Department Office 7:00 p.m. Business Meeting

SAFETY CORNER

Lew Wolfgang

Adult Heartsaver Courses

Here are some more dates for the CPR class at Grossmont Hospital:

April 4, 6:00 p.m. to 10:00 p.m.

April 22, 9:00 a.m. to 1:00 p.m.

April 30, 8:00 a.m. to 12:00 p.m.

May 13, 9:00 a.m. to 1:00 p.m.

May 21, 8:00 a.m. to 12:00 p.m.

May 23, 6:00 p.m. to 10:00 p.m.

Phone 668-4226 to make arrangements.



Complacency

We operate at Campo within a fairly limited set of conditions. For example, run the train up the hill, run it down. Run it up again, down again, put it away. Same thing next time, and time again. These conditions can lead to a feeling of complacency. We tend to do our jobs by rote, without thinking about what is happening. Nothing grows better in a field of complacency than accidents.

For example: recently on a Sunday afternoon the Perry was used on the demonstration train for a charter. At the end of the day our normal sequence of tasks was disturbed by the requirement to place the Perry on the house-track. The locomotive was run-around first, then the Perry spotted on the house-track, followed by spotting the rest of the consist on the passing track. Because the consist was pointing in the right direction everything was secured and tied down at that point. Complacency then took over and everyone forgot that the train still had air and was effectively bottled. Normally, the consist is blown down by the locomotive separating, but this time it didn't have to separate, and everyone just walked away from it.

Of course, a skate was placed and hand brakes set, but the bottling removed one link in the chain of redundant safety devices that we must

have at all times in a mountain division. Does anyone recall a rule concerning this subject? A six-pack of root-beer to the first Operations Department member to tell me the rule. (I wonder if anyone ever reads these things)

The moral is that we can not tolerate complacency. We have to be awake at all times, aware of what we are doing and know what we must do next. And don't be afraid to check each other, two heads are better than none!

Spongy Tracks

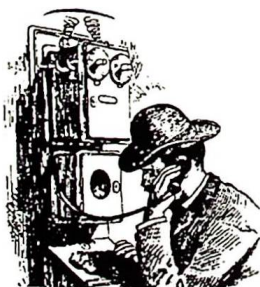
With the recent rains we have noticed a *slightly* increased propensity for locomotives to pop off of the tracks in the Campo yard. Guaranteed, this will happen when you can least afford it. So please take it easy in the yard. Go extra slow, especially in the turns, and continuously watch for that first wheel dropping off. It's easier to re-rail one axle than a whole three axle truck! (hint... yes, the tracks in the yard need work)

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

Daze 553-3106 Nites 662-9019



Gaylen Dyreng was laid to rest on March 10, 1994 at the Glen Abbey Cemetery in Bonita. The services were attended by well over 150 family and Museum members who shared in a moving and well-done experience. Several Museum member attended in uniform and served as honorary pallbearers. Grave side ceremonies included U.S. Navy pallbearers and a twenty-one gun salute over the flag-draped coffin. After the echo of the guns subsided, off in the distance could be heard the wail of a locomotive whistle sounding the grade crossing signal. Farewell, Gaylen, I am sure that we will all meet again at the top of the grade.



PHONE NUMBERS

SDRM ADMINISTRATION CAMPO

Museum Phone.....	697-7762
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

MEMORANDUM:

DATE: March 16, 1994
TO: All SDRM BOARD and STAFF
FROM: Kay B. Carter
SUBJECT: A Night at the SYMPHONY

Friday, April 22nd - Famous silent film "THE IRON HORSE", directed by John Houston, accompanied by the San Diego Symphony and Organist
Film celebrates the completion of the transcontinental railroad.

We have been invited to participate as a group in this evening. Ticket prices will be pro-rated according to the number of guests in our group.

Ticket Sales:

Regularly - \$14 \$17 \$21

15-50 people 20% off - \$11.20 @ ticket (14)
51-99 30%
100+ 40%
500 50%

Evenings Schedule:

5:00 No-host cocktail reception at Dakota's Restaurant, corner 5th and E Sts.
Needs two costumed SDRM folks at door

7:00 P.M. Pre-show at Symphony "Iron Mule" silent spoof
Entertainment and door prizes

8:00 - Actual Show

Must let them know how many folks will be attending ASAP.

Chop Kerr from the SDRM to coordinate our portion 291-4787. Please call and reserve your seats with him. Cut off date April 15th.

We will also provide contest prizes - 10 pkgs of passes or excursion tickets

We have been invited to make a short presentation on 75th Anniversary at pre-show.

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 Borstadt 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. A small font is used to save duplication and mailing costs.



Subject: Re: Does water slosh move locomotives?

In article <1994Mar18.111538.23017@bradford.ac.uk>
J.P.Hole@bradford.ac.uk (JP HOLE) writes:

>Tony Lupton (lupton@ugli.cit.uz.oz.au) wrote: Wasn't
>there an accident on the Southern Railway in the 1920's
>involving 4-6-4T locomotives that was basically caused
>by surging in the tanks? The class of locomotives in
>question were converted to 4-6-0 tender engines as a
>result of this accident.

Correct. The class involved were the river class.
However, it is unclear whether the accidents were
caused by water movement, or by poorly maintained

permanent way, or possibly both.

The accident occurred at Sevenoaks on August 24, 1927. The 4-6-4 tank locomotive "River Cray" derailed at speed. Unfortunately, the derailed engine burst a set of trailing catch points (derailing the train) which piled up against an overbridge. Thirteen people died and 21 were seriously injured.

The accident was primarily caused by poor track foundation. The summary of the accident report in the Railway Gazette of February 3, 1928 stated:

[The] examination [...] of the down track in the vicinity of the scene of this accident, and the actual survey made of the gauge and level of the rails, lead him to conclude that there was an insufficiency of hard and clean ballast foundation, a lack of proper drainage, and irregularities in the level and gauge of the rails, sufficient to set up serious rolling and lateral motion on tank engines travelling at high speed. [...]

He finds, therefore, that the condition of the road, in respect of foundation and maintenance, was the initial cause of the rolling motion set up on engine No 800, which caused this derailment. [...]

The comments on the locomotive were:

Heavy tank engines of the "River" class are more susceptible to weakness in foundation, and to irregularities of track, than tender engines of the "King Arthur" type. This susceptibility is largely due to the fact that they are more lightly sprung, and the springs, being more resilient, react more readily to inequalities in the track. Their side tanks (capacity 500 gallons each), wide apart, and higher above rail level, have the effect of making rolling movements across the track slower and easier, but the movement, for the same reason, being more difficult to damp out, is likely if not checked to attain greater amplitude. A longer wheelbase, and the attachment of a heavy tender, may assist in checking the liability of an engine to roll. Speed is also a factor determining the liability, first, for this rolling movement to set up, as the result of uneven support of the sleepers, low rail joints or other track irregularities, and secondly, for the amplitude

of the movement to increase and become dangerous. The result of the experimental trials at high speeds of two of these tank engines on sections of the main line of the London & North Eastern and Southern (Western Section) Railways justifies, in his opinion, the conclusion that on roads where the ballast foundation and drainage are good, the gauge is correct, and the level of the rails - including the cant upon curves - is within reasonable limits properly maintained throughout, as was the case on the London and North Eastern Railway, no rolling movement, at any speed likely to be attained by these engines, will develop and increase in amplitude sufficiently to cause derailment. On the other hand, when these conditions do not obtain, movements of this nature may, if unchecked, rapidly become dangerous on tank engines travelling at speeds of 60, or even less, m.p.h. On a curve, particularly, some other lateral movement of the engine frame, synchronising with the rolling, may result in derailment.

The comments on the tests is interesting. While both tank locomotives and the King Arthur class locomotive ran perfectly smoothly on the LNER line, it was a different matter on the ex LSWR line, where Gresley (CME, LNER) commented that the rolling of "both" tender and tank engines at 70 m.p.h. was unsafe.

The River class tanks were perfectly suitable for express service on well maintained track. But, as the designer must have been aware, the tracks of the ex LBSCR were not well maintained.

One final point, it doesn't seem to be well remembered but an exactly similar accident had happened four days previously when a Margate train, hauled by a River class tank derailed at Beasted. Fortunately, this time, the train stayed in line and no one was injured.

andrew waugh

Subject: Re: What's so great about ALCO's?

In article <2msvtp571@somnews.intel.com>, jalev@frx602.intel.com (jalev) writes:

>I was wondering why there is so much fascination with >ALCO diesel locomotives. I've read a lot of hoopla >here about "the so-so RR still ran ALCOs until 1979", >and so forth. There is even a big deal about CP or CN (I >forget) bringing their ALCOs out of mothballs. Finally, >one of the railroad magazines has a series on "ALCO >hunting" in North America. What's the big deal? I >don't hear the same kinds of emphasis placed on >Baldwins or Fairbanks-Morse. Are ALCOs somehow >more "romantic"? I hope that this thread doesn't >degrade into the common "The crews liked the ALCOs >better than EMDs because..." I want to know why ALCOs are popular with RAILFANS, not ENGINEERS >and FIREMEN (except of course when the latter are >also the former (foamer?)). Thanks for helping me to >understand.

Partial answer:

They're RARE - relatively

There are far fewer ALCOs still running than GE or GM(EMD). That accounts for part of the interest. Another part probably comes from the fact that ALCO is descended directly from the American Locomotive Company, a builder of steam locomotives ever since Noah got out of the Ark. GE and GM never (or at least almost never) built any steam locomotives; they're not "traditional" railroad equipment builders.

Baldwins and Fairbanks-Morse units are almost completely, if not absolutely completely extinct in the U.S. and Canada. If there were any still around, you can bet your farm that there'd be plenty of interest in them.

Also, ALCO in at least some of its locomotive designs paid some attention to the aesthetics of the business. In most people's opinion (not everyone's obviously), ALCOs just "look better" than GE or GM.

Because very few have been made recently, any that are left tend to be older, and to many people, "old" equates to "interesting".

ALCOs typically (I've seen some technical reasons for this posted here, but they're way over my head) smoke a lot. Thus they "sorta look like" steam engines, especially when starting. The ALCO PA passenger locomotive and its FA freight cousin or the FFA freight units with steam generators (CN) are thought by many people to be the most aesthetically attractive Diesels ever built. The PA in particular is often called an "honorary steam engine" because of its good looks and its habit of smoking.

These are some of the reasons people like Alcos. Not everyone would care about all of these points; some people probably don't care about any of them, but others do. And that's what makes the hobby interesting: "Different strokes for different folks". (Different bores too, but

that's another point.)

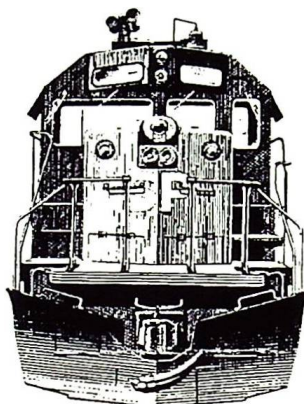
Len Bachelder

m00209@mbvms.mit.edu.org

Subject: The News From Here 3/19

1 - Freight follies Department: Track was restored last night after the derailment of CSXT R103. As a result of the grade crossing accident/derailment Amtrak trains 52, 88, 53, 87 and the West Palm Beach special derailed via Raleigh. Delays ranged from 4 to 13 hours on those trains. Also CSXT R413 became disabled yesterday at Weldon NC. Amtrak trains 79, 90, 89, 88 and 52 were delayed from 7 minutes to over two hours as result. Recently, a Wisconsin and Calumet freight train was crossing the Wisconsin River when the bridge collapsed sending four cars in the river.

2 - Continuous Carnage Department: VIA/Amtrak 365 struck a truck north of Port Huron MI damaging VIA unit 6446. Passengers were bused to Chicago, delaying them six hours, partially because of heavy snowfall. Also Amtrak 3 struck and killed a trespasser east of Albuquerque NM, delaying the train over two hours. 3 - Statistics Department: In February, railroad car load traffic was 5.2 per cent higher over the same period in 1993. For the year, traffic is up 1.1 per cent. Intermodal traffic increased 13.7 per cent, and it is running 8.9 per cent over last year, for the year. Coal traffic increased 8.4 per cent. The



Burlington Northern now has 200 coal train sets operating, and increase from the 170 it was running last year at this time. The Santa Fe is operating over 7000 trailers/containers a month now over the BN from Arvada to Birmingham AL. BN grain traffic is down 21 per cent from last year, because of poor export corn demand. Primarily because of the weather Conrail had a decrease of 5.1 per cent in coal movement, while CSXT had an 8.5 per cent increase, and NS had a 13.6 per cent, primarily for domestic consumption. The Santa Fe experienced an amazing 10.4 increase in traffic for the month of February.

Subject: Re: Train wreck in "The Fugitive"

In article <2n47e9ck9@toads.pgh.pa.us> field@cs.pitt.edu writes:

>Hi, I rented and watched "The Fugitive" last night and >found the train wreck scene very intense and realistic >Does anyone know how they made it?

I know what you mean: I didn't take a complete breath from the moment the bus went out of control (I had heard what came next) until sometime after the train's wheels stopped spinning. But then, the whole movie is like that.

The crash was filmed on the Great Smoky Mountains Railway in North Carolina. The lead unit is ex-CSX U188 1901, the "slug" is a flatcar with some boxes piled on it, the third unit is ex-N&W GP30 536. Both of the locomotives were nothing but empty shells purchased by the movie company for scrap value. The wreck was the real thing, only a one-time deal, with the train pushed along by GSMR GP7 777. All units (including 777, which never appeared in the film itself) were painted in the rather attractive "Illinois Southern" red-gray-yellow paint scheme. Modifications to 1901 included a camera mounted in its cab, a studio floodlight mounted in its old nose Mars light casing (which was used as the "headlight" in the scene), and a liberal application of a napalm-type

gel smothered over its nose and sides to produce the pyrotechnics. In order to "improve its nighttime appearance" the 536's headlight was moved to the center of the high nose, and a Mars light was installed over the number boards (Didn't help though, "cause only one of sealed-beam lights was on during the crash, anyway.)

The scenes where Harrison Ford jumps off of the bus, and when he's chased along the ground by the derailed 536 (IMHO the best shot of the wreck; made me want to jump out of my seat and run, too) required a new, very convincing, type of cinematic superimposition (saw it on ET last week).

For the people involved in the Locomotive Direction thread, I noticed on the pre-wreck roster shots of the locomotives in Issue 98 of Extra 2200 South that 536 has the "F" painted on the short-hood end (though they were built set up long-hood forward) and 1901 has the "F" of the long-hood end (they were all short-hood forward, of course). Better get new consultants...

All in all, though, it was a very impressive scene and is worth the rental price itself. Not only that, but the entire movie is worth seeing, even without the train wreck. Either way, check it out!!

Subject: Pollution Train vs. Auto

IS THE AUTOMOBILE BETTER FOR THE ENVIRONMENT THAN THE TRAIN?

A special computational report constructed by the BRASS KEY, Portland Oregon. Calculations and preparation by Glenn Laubaugh.

BRASS KEY, Volume 1, Number 6, March 28, 1994

PROLOGUE

In recent months, there has been much talk and much rubbish posted to the internet newsgroup rec.railroad about air pollution caused by trains versus air pollution caused by automobiles. Most of this seems to have originated from someone in California who seems to think that rec.railroad is the place to post his opinions that the automobile is more fuel efficient and less polluting than any other form of transportation. He also quotes some obscure source that claims to have proven that automobiles do consume less fuel and generate less pollution than commuter trains. Since I am currently laid off, and am getting quite bored, I have decided that for lack of better things to do with myself, I would run through a few calculations just to see what kind of assumptions need to be made in order to "prove" the automobile is all this source claims it is.

No references are given by computations. This is done because it would appear to me as if this person is trying to get someone to do research for them. A list of references is given at the end of the report.

CONTENTS

SUMMARY INTRODUCTION GENERAL ASSUMPTIONS AND A NOTE ON UNITS AUTOMOBILE ASSUMPTIONS ASSUMPTIONS AND FORMULAS FOR THE TRAIN (THE TRAIN FROM HELL) COMPUTATIONS RESULTS CONCLUSION AND DISCUSSION REFERENCES

SUMMARY

It is never a good idea to start with a conclusion and then gather data to try to prove that conclusion. It has a nasty habit of ruining the objectivity of the data collection.

However, that is what is done in this case. It is assumed that the automobile is better for the environment than the train. Every possible legal and illegal means of mathematically proving this is then made.

In order to produce numbers that can be compared easily, the results are in the form of grams of particulate matter per passenger per mile.

The results are that a train carrying only 30 passengers per passenger car emits about half as much pollution as an automobile carrying 4 passengers.

A more realistic comparison is then made between a reasonable train and an automobile carrying 2 people. In this case, it takes only 7 passengers in each passenger car to make the train produce less pollution per passenger than the automobile.

The results are as follows:

An automobile with four passengers produces 0.03 grams of particulate pollution per mile per passenger.

The absolute worst commuter train that can be developed with any stretch of the imagination carrying only 30 passengers per car produces 0.028 grams of particulate per mile per passenger.

A more realistic automobile assumes 2 passengers per auto on average. This comes to 0.1 grams of particulate

per mile per passenger.

A more realistic train computation reveals that the train need only carry 7 passengers per car to be better than the automobile with 2 passengers and 13 passengers per car to be better than the automobile with four passengers.

INTRODUCTION

OBJECTIVE: To determine what assumptions were made in proving that the automobile is more fuel efficient than any railed form of transportation.

This is certainly not designed to be a detailed examination into the pollution and energy consumption issue. Quite simply, no one has gathered the needed data since experiments performed in the 1920's.

GENERAL ASSUMPTIONS AND A NOTE ON UNITS

This particular writer prefers using the metric system. However, the formulas that deal with rolling friction of various railroad equipment were developed before the metric system was officially recognized in the United States of America. Therefore, all calculations have been done in the most convenient units available.

The other initial assumption that was made was that it is necessary to show the automobile in as positive a light as possible. Therefore, all formula usage and calculations should be done in such a way as to make the automobile look as environmentally sensible as possible without any blatant mathematical errors or unreasonably low train ridership assumptions.

Because particulate emissions are a major source of urban air problems, these computations were performed with this emission in mind.

AUTOMOBILE ASSUMPTIONS

In order to make the automobile competitive with the train, it is assumed the average automobile journey consists of four passengers. It should be noted that this is a little high, but there is a chance that it might happen in cities that are very crowded.

In the second set of calculations, where some simulation of reality is attempted, it is assumed that the average automobile contains two passengers.

The pollution standards for the automobile is set using the "Federal Test Procedure" (FTP), and specifies the number of grams per mile of various items the automobile is allowed to release during the test. In order to calculate the amount of pollution per passenger per mile, the amount is simply divided by the total number of passengers in the car.

The automobile is assumed to be moving at about 50 miles an hour.

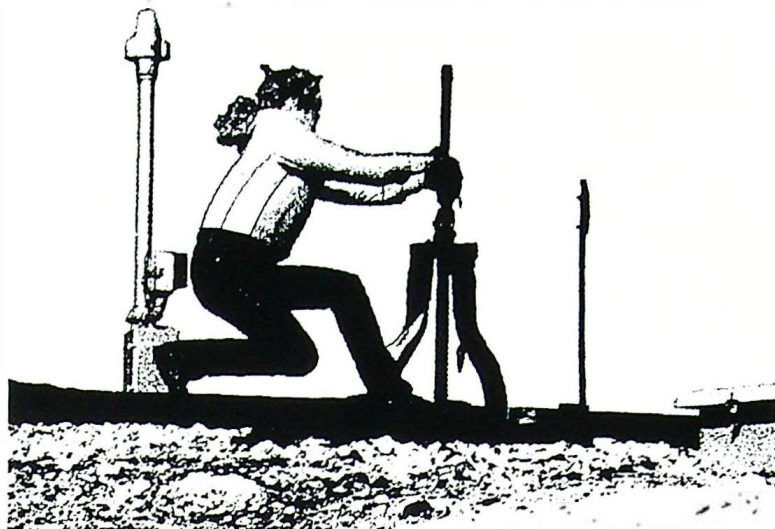
ASSUMPTIONS AND FORMULAS FOR THE TRAIN (THE TRAIN FROM HELL)

The general assumption is that the train is to American Association of Railroads standards. This means that it is a standard railroad train used for intercity and long distance commuter service. Because of the heavy weight for this type of train, it is less energy efficient than heavy rail transit (subways and elevateds) and light rail transit (modern streetcar). It is necessary to ignore these types of railed systems because the Federal Railroad Administration, the Association of American Railroads, and the Interstate Commerce Commission do not consider them to be railroads. Therefore, one simply can't include them in any kind of computation that seeks to compare railroads to the automobile. Also, it is not possible to compare rail transit to the automobile because no one has ever bothered to calculate how much energy is needed to move such equipment.

It is also assumed that this is a diesel hauled train. The fact is that electric trains have an unfair advantage over the automobile because the source of energy (the heaviest part of the system) is stationary in an electric railroad system. Therefore, this assumption adds some 100+ tons to the train formulas, and therefore maintains a fair comparison to the automobile.

The train is assumed to consist of one General Motors constructed F40PH (common passenger locomotive) and five passenger cars. The F40PH weighs 116 tons. Each passenger car is assumed to be 70 tons each because that is the maximum allowed by the Association of American Railroads for cars that have 33 inch wheels. This restriction is for fully loaded freight cars, and therefore this high weight will allow the automobile a great advantage.

It is also assumed that the passenger train resistance follows the Davis formula. This formula was developed in the 1920's to determine what force is necessary to move a train. This is long before low friction bearings or most other energy efficiency measures were made on railroad equipment. Also, in the 1920's the average



weight of rail tended to be lighter than today. This increases the energy needed to move the train because the light rail tends to sag, and produce the effect that the train is constantly running up a hill.

It is also known that the Davis formula gives high results for speeds above 40 miles an hour. Therefore, in order to give the automobile a better advantage, it is assumed that the train is moving at 50 miles an hour.

Furthermore, because the Davis formula was developed specifically for freight trains, it takes into consideration such items as open boxcar doors, open top hopper cars, and box cars placed behind flat cars. These types of conditions cause the drag force to increase substantially because each represents a new frontal area for the air to hit. This does not happen on passenger trains.

Streamlining didn't appear until the 1930's, and besides the Davis formula deals with unstreamlined freight trains, so there is no need to worry about any unfair advantages given to railroad equipment designed to reduce wind drag.

The larger the surface area of the equipment, the larger the force needed to move the train. Therefore, in order to give the automobile the edge, it is assumed that the equipment is the maximum size permitted by trackside structures. One source recommends using 12 feet wide by 17 feet high in clearance cases where equipment must enter buildings. This is some 40 square feet larger than the equipment profile recommended by the Association of American Railroads plate B specifications. Therefore, the automobile definitely has an edge in this case.

All that said, it is time to introduce the Davis formula:

$$R = 1.3W + 29n + 0.045WV + 0.0005AV^2$$

where R is the train resistance in pounds per car, W is the weight per car in tons, V is the speed in miles per hour, n is the total number of axles, A is the cross sectional area in square feet, and V² represents the square of the speed.

Acceleration, climbing hills, and curvature increase train resistance. However, they also increase the computational difficulty. Therefore, it is determined that the automobile has enough advantages with the computations as they are now.

In order to give even more advantage to the automobile, it is assumed that the cars and locomotive have two frontal areas. In other words, there is a large enough gap between the locomotive and the cars to make the train act like two separate objects.

It is difficult to create an estimate of the power demanded by the various other equipment. The eventual computation determined that there is about 1,000 horsepower required to move the train. This was then doubled to 2,000 horsepower to leave no doubt in anyone's mind that there is more than enough energy being consumed by the various miscellaneous power demands.

One of the more difficult areas to deal with is in translating the force required to move the train at a given speed into an engine horsepower. One general rule that has been around for years is that multiplying the diesel engine horsepower by 308 and dividing by the speed in miles per hour yields the force the locomotive is

providing. This formula was modified to yield horsepower from the tractive effort.

For the first calculation it is assumed that the train carries an average of 30 riders per car.

For determining the pollution generated by the engine, it is assumed that the engine is allowed to pollute at the federally allowed maximum for heavy diesel equipment as specified by the EPA Transient Engine analysis test.

COMPUTATIONS

Computations for the Automobile:

The regulations permit autos built past 1987 to emit 0.20 grams of particulates per mile.

0.20 grams/mile divide by 4 passengers = 0.05 grams per mile per person

divide by 2 passengers = 0.1 grams per mile per person

Computations for the Train from Hell:

12 ft. wide x 17 ft. high = 204 sq. ft.

number of axles = 4 axles per car x 5 cars = 20 total

$$R = 1.3W + 29n + 0.045WV + 0.0005AV^2$$

where R is the train resistance in pounds per car, W is the weight per car in tons, V is the speed in miles per hour, n is the total number of axles, A is the cross sectional area in square feet, and V² represents the square of the speed. $R = 1.3W + 29n + 0.045WV + 0.0005AV^2$

where R is the train resistance in pounds per car, W is the weight per car in tons, V is the speed in miles per hour, n is the total number of axles, A is the cross sectional area in square feet, and V² represents the square of the speed.

Force to move locomotive:

$$R = 1.3 \cdot 116 + 29 \cdot 4 + 0.045 \cdot 116 \cdot 50 + 0.0005 \cdot 204 \cdot 50^2$$

$$R = 782.8 \text{ lbs.}$$

Force to move passenger Cars:

$$R = 1.3 \cdot 70 + 29 \cdot 20 + 0.045 \cdot 70 \cdot 50 + 0.0005 \cdot 204 \cdot 50^2$$

$$R = 1,083.5 \text{ lbs per car}$$

Total to move Train:

$$R = 5 \text{ cars} \cdot 1,083.5 \text{ lbs.} + 782.8 \text{ lbs. locomotive}$$

$$R = 6,200.3 \text{ lbs.}$$

$$\text{Tractive Effort} \cdot \text{mph} / 308 = \text{horsepower required}$$

$$6,200 \cdot 50 / 308 = 1,006.5 \text{ horsepower}$$

Round this figure up to 2,000 horsepower to make it easier to work with, and to compensate for miscellaneous power consumption.

$$5 \cdot 30 \text{ passengers} = 150 \text{ total passengers}$$

$$2,000 \text{ hp} / 150 \text{ people} = 13.3 \text{ hp per passenger}$$

Operate for 1 hour at 50 miles per hour:

$$13.3 \text{ hp per passenger} \cdot 1/50 \text{ mile per one hour} = 0.26667 \text{ hp/hour/pass.}$$

Federally allowed standards for particulate

$$0.1 \text{ grams per brake horsepower per hour}$$

$$0.1 \text{ grams/hp} \cdot \text{hour} \cdot 2000 \text{ hp} / 150 \text{ passengers} \cdot 1/50 \text{ hour per mile}$$

$$= 0.0267 \text{ grams of particulate per mile per passenger}$$



Briefing Note No. 12

La Posta Microwave Site

The La Posta Microwave Space Research Facility, perched on a ridge east of Campo, was a development of the Naval Electronics Laboratory Center (NELC)* which was located 70 miles west on Point Loma, San Diego, California. La Posta design proposals were submitted on September 30, 1962. Initial operations began in March 1968 and the site was decommissioned in 1981.

A sister facility was built at Waldorf, Maryland, it was decommissioned during 1993. NASA had a same-design facility at Wallops Island, Virginia.

Purpose

The La Posta facility was intended as a tool for Research and Development (R&D) on a variety of communications tasks. A few of the tasks were:

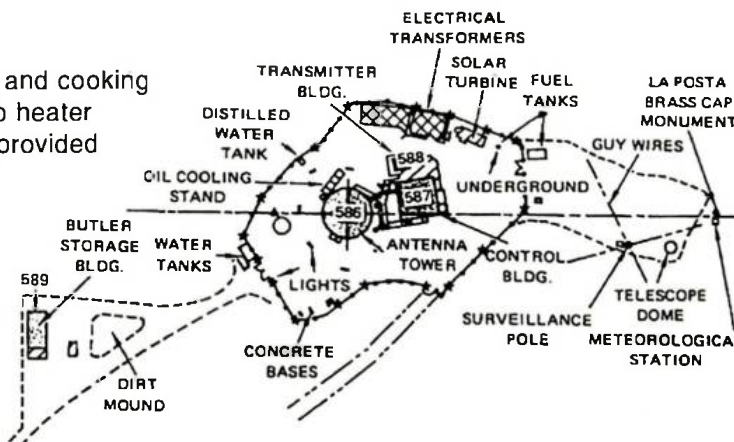
- Passive Satellite Communications Research
- U.S. Navy Microwave Space Relay (MISER) Program
- NASA ATS-3 satellite for propagation measurements in the upper atmosphere

La Posta and Waldorf were originally designed to communicate with each other by bouncing signals off the Moon to each other. This was later changed to using man-made satellites.

The Facility

Water was supplied for drinking and cooking requirements. A 24,000 Btu strip heater and 12-ton air-conditioning unit provided climate control.

The transmitter building is 16 x 20 feet and a small astronomical observatory building has a telescope dome 10 feet in diameter.



* NELC is now (1994) called Navy Command Control and Ocean Surveillance Center (NCCOSC), Research and Development Division (NRAD).

TECHNICAL EQUIPMENT

Mount and Antenna

- Antenna, reflector dish, azimuth-elevation mount design, total weight of 105 tons.
- Antenna uses a 60 foot diameter solid surface reflector with a Cassegrainian feed, operating at frequencies up to 10 GHz, and has satisfactory performance into the millimeter band.

Additional Systems

- A 25-Kilowatt, X-Band Transmitter
- A Boresite Optics System
- Closed-Circuit, Television Surveillance Systems
- Main Control Console
- Meteorological Instrumentation

A calibration site and tower at Tierra del Sol (Hi Pass) 6.856 miles from La Posta was used until June 1975.

An interesting observation for comparison with current technology is that the 1960s digital computer control system for the research facility consisted of six large electronic racks of vacuum-tube and transistor components. Present-day, desk-top PCs have much more computing power.

Current Status

Shortly after NELC terminated operations in 1981 the property was declared surplus and picked up by the U.S. Border Patrol. The Border Patrol used the site, but not the antenna, as a border surveillance command post.

The Border Patrol terminated their use in 1992. The General Services Administration is now trying to find a metal scrapper to buy the antenna structure, which is composed of high-grade steel and aluminum. Removal of the antenna would possibly make the site more attractive to potential buyers. Meanwhile, U.S. Navy Seals use the site from time to time as a survival training camp.

Note: Some of the above information was obtained from one of the original researchers, Mr. Norman Ortwein, via telephone interview.

- Compiled by H. Chalmers Kerr

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Suggested Reading:

THE HISTORICAL GUIDE TO THE BACK COUNTRY, Mountain Empire Historical Society, Campo, 1988 (Revised 1994)

Voss, P.L. and Ortwein, N.R., *LA POSTA MICROWAVE RESEARCH FACILITY*, Naval Electronics Laboratory Center (NELC- now NCCOSC Research and Development Division), San Diego, 1970

SDRM TimeCard

[illegible]

April 1994

3/29/94 4:15 pm

wolfgang@rigel

Sun	Mon	Tue	Wed	Thu	Fri	Sat
March 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	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				1 Steam Team Workday	2 Steam Team Workday 0830 Train Crew 1000 Library 1300 La Mesa Depot Op
Steam Team Workday Happy Easter NORMAL OPS 0830 Train Crew 1300 La Mesa Depot Op	4 1830 Staff Meeting SFD	5 1900 Library	6	7	8 Steam Team Workday	9 Steam Team Workday Puerto Penasco 0830 Train Crew 1000 Library 1300 La Mesa Depot Op
Steam Team Workday 0830 Train Crew 1300 La Mesa Depot Op	11 1830 75th Special Meeti	12 1900 Library	13	14	15 Steam Team Workday	16 Steam Team Workday 0830 Train Crew 1000 Library 1300 La Mesa Depot Op
Steam Team Workday 0830 Train Crew 1300 La Mesa Depot Op	18 1830 Staff Meeting SFD	19 1900 Library	20 1900 OPS Meeting SFD	21 Steam Team Meeting	22 Steam Team Workday 1900 The Iron Horse	23 Steam Team Workday 0830 Train Crew 1000 Library 1300 La Mesa Depot Op
Steam Team Workday 0830 Train Crew 1300 La Mesa Depot Op	25 1830 75th Special Meeti	26 1830 Board Meeting 1900 Library	27 1900 Interp Meeting SFD	28	29 Steam Team Workday	30

Month view by Calendar Man

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

(April 1994)

