Dead Leg vs. Passthrough Lubricators

Original Topic URL: http://www.mylargescale.com/forum/topic.asp?TOPIC_ID=37456

Topic author: Dwight Ennis
Subject: Dead Leg vs. Passthrough Lubricators
Posted on: 10 Mar 2006 09:39:24

My new C-16 arrived yesterday. One of the first mods I want to make is to change the lubricator. Was talking to Bob Starr last night on the benefits of staying with a dead leg (not the stock one) as opposed to going with a passthrough type. I'm interested in comments from those with lots more experience and knowledge than myself (which doesn't take much).

One question that comes immediately to mind is, assuming there is a needle valve metering the amount of oil used, how does one know when they have too *little* oil - i.e. when the needle valve isn't allowing enough oil into the system?

Replies:

Reply author: Chris Scott
Replied on: 10 Mar 2006 10:06:30

Might help, thread on converting from K-27 & C-21 displacement to deadleg:

http://www.mylargescale.com/forum/topic.asp?ARCHIVE=true&TOPIC_ID=27158

Only have time to find this one, but I think there are more threads on this from the past.

Reply author: Dwight Ennis
Replied on: 10 Mar 2006 11:01:55

Part of what I'm interested in here is some theory of just how these lubricators differ operationally. Bob just sent me links for two dead leg lubricators from two different sources. The one from Sulphur Springs had both an inlet and an outlet pipe, while the other has a single steam line. I'm now confused because I thought dead leg types always have a single line.

Another email from Bob tells me the "outlet line" is actually a side drain. The web site makes it confusing.

I started a thread a few years ago which attempted to get those with such knowledge to describe the types of lubricators available, how they function, how they differ operationally, and the advantages and disadvantages of each. There were no takers. Part of what I'm doing here (besides getting specific info relative to the C-16) is to again try and promote such a generalized discussion. This is stuff I'd really like to know.

Reply author: Shaymaker
Replied on: 10 Mar 2006 11:07:47

> quote:
>
> *Originally posted by Dwight Ennis*
>
> One question that comes immediately to mind is, assuming there is a needle valve metering the amount of oil used, how does one know when they have too *little* oil - i.e. when the needle valve isn't allowing enough oil into the system?

Dwight,

Your Catatonk Climax has a metered lubricator. The Owner's Manual will tell you all.

For those who haven't yet got their Catatonk Climax, the answer is to look at the amount of water which drains out at the end of the run. Provided it's more than a few drops, the loco is getting enough oil. Most lubricators hold enough oil for several hours running - far too many of them supply too much.

Of course, if the loco stiffens up for no obvious reason, it's sensible to check that the lubricator a) contains oil and b) has some condensate at the bottom.

Mike Chaney

Reply author: Shaymaker
Replied on: 10 Mar 2006 11:11:41

> quote:
>
> *Originally posted by Dwight Ennis*
>
> I started a thread a few years ago which attempted to get those with such knowledge to describe the types of lubricators available, how they function, how they differ operationally, and the advantages and disadvantages of each. There were no takers.

When I retire (if they' let me!) I'll rewrite the article on the subject which appeared in the G1MRA newsletter a couple of years ago and offer it to SitG.

Reply author: David BaileyK27
Replied on: 10 Mar 2006 15:29:57

I have changed several Accucraft lubricators to Dead Leg with Needle Valve control, as I am unable to post pictures here, would any reader like me to send them off group so that they can be uploaded here?

We now fit all of our engines with Dead Leg Lubrication with Needle Valve control, The amount of oil being used can be seen in the chimney (stack) during running and can be adjusted so that only the minimum amount of oil is used.

David Bailey www.djbengineering.co.uk

Reply author: Dave Hottmann
Replied on: 10 Mar 2006 17:55:31

Dwight,

The C-16s have a way of using all 10ml of oil in a single run unless the line gets moved to the top of the oil tank. The other fix is to only put in 3ml per run instead of filling it. I kept the deadleg lubricators on my C-16s because the oil mixed with the steam after the superheater. It's also a good idea to remove the front brakes no matter how little the engine uses oil. What oil it uses eventually runs down the frame to the front brakes and drips oil directly on the rail.

Reply author: deWintonDave
Replied on: 11 Mar 2006 00:34:35

> quote:
>
> *Originally posted by Dwight Ennis*
>
> how does one know when they have too *little* oil - i.e. when the needle valve isn't allowing enough oil into the system?

Hi Dwight, Your website is great.

I have a metered pass-through lubricator on my newest engine. It's all about trial and error, start with an open setting and test from there, checking for condensed water after a run. It depends on the ambient temperature too, so you can't always use the same setting.

My other loco with un metered pass-through lubricator chewed through it's 1mL of steam oil in about 50 minutes today, and that's with a wire obstructing the hole a bit - far too much oil used IMHO.

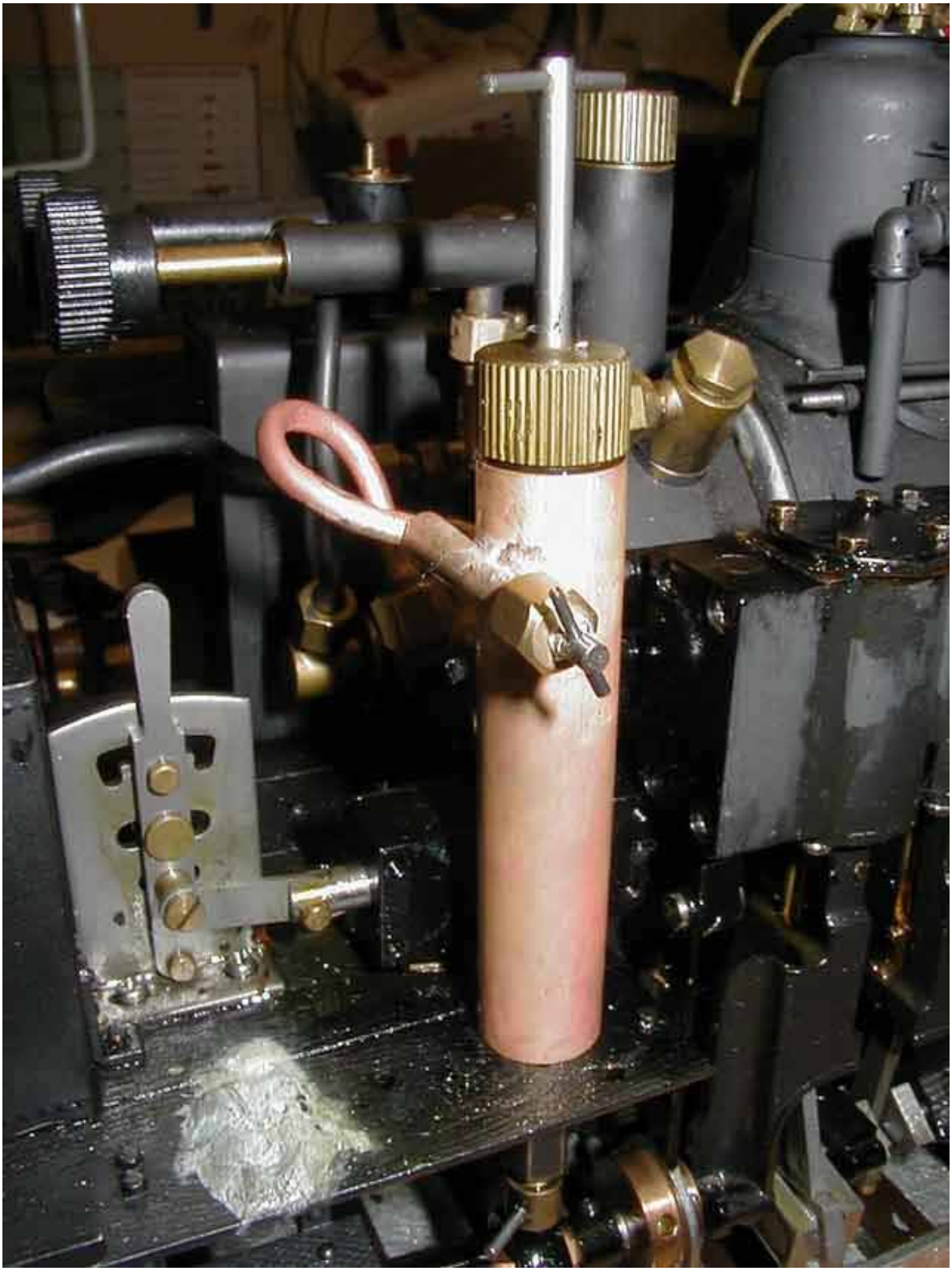
Steam oil is marvelous stuff, really tenacious, once the internals have a good coating it really sticks. Due to an inability to tightly grip and thread 1/8" dia stainless piston rods in my 3-jaw chuck I used mild steel instead (less torque required). Due to the steam oil there is no corrosion, and my first engine runs wet. I am using 600 weight cylinder oil.

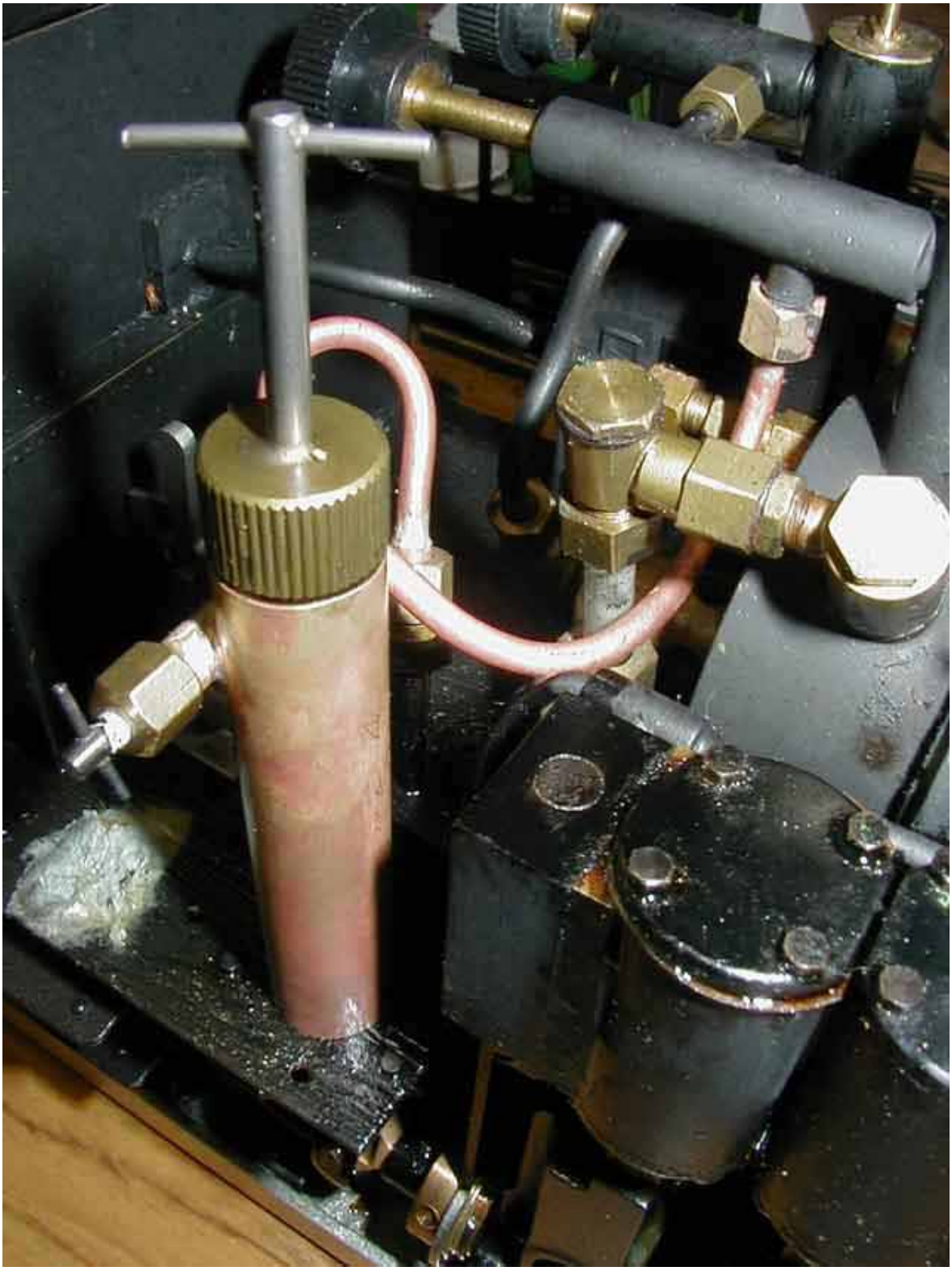
All the best,
Dave.

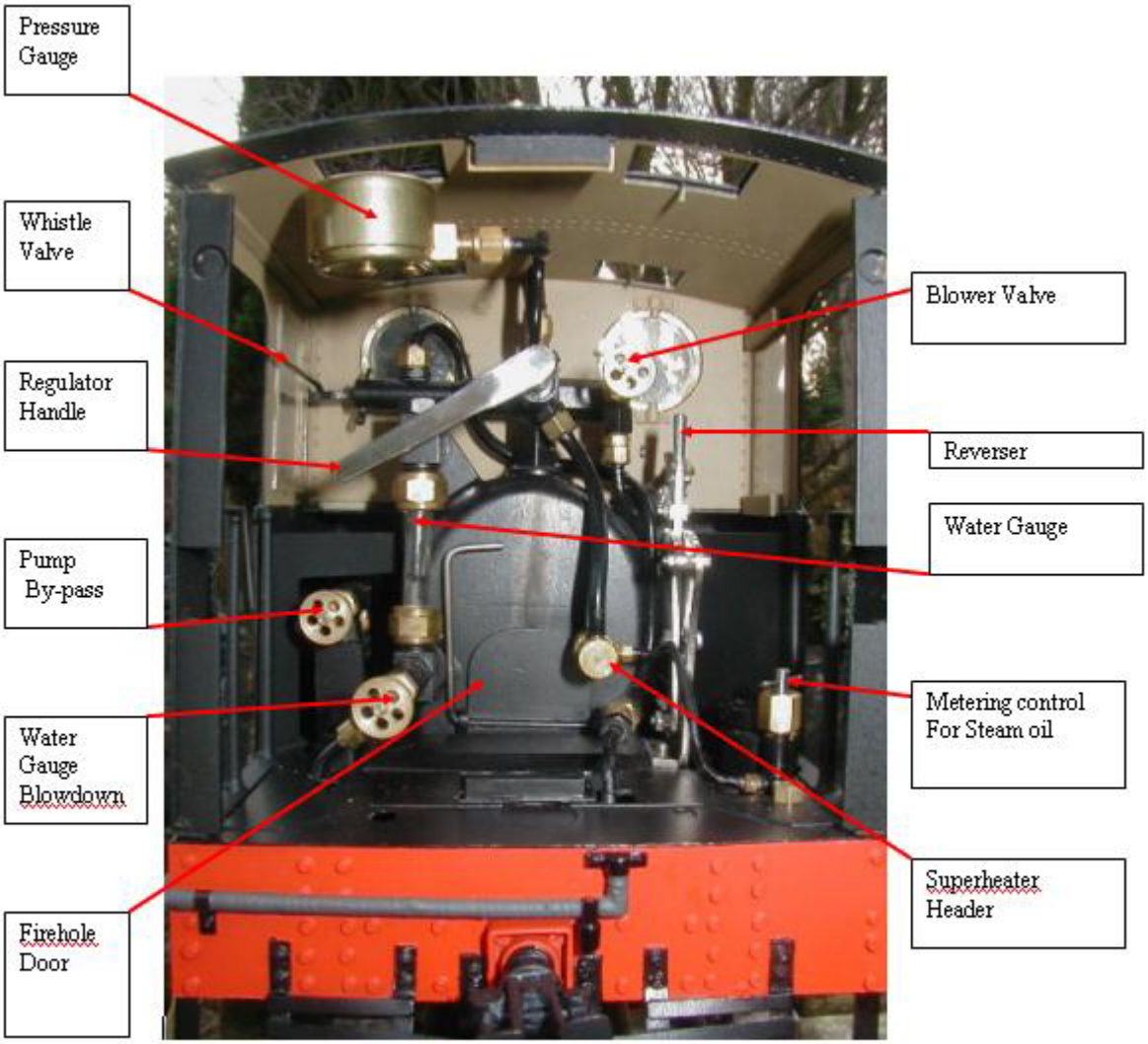
Reply author: David BaileyK27
Replied on: 11 Mar 2006 01:16:11

Thanks to all that offered to post my pics, Dwight has been sent some to upload.

From David's email - "Here are a couple photos showing the conversion of a 3 cyl Shay and one of the cab controls on our Lynton & Barbstaple 2-6-2 tank."







Cab Controls on Coal Fired L&B LEW by DJB Engineering

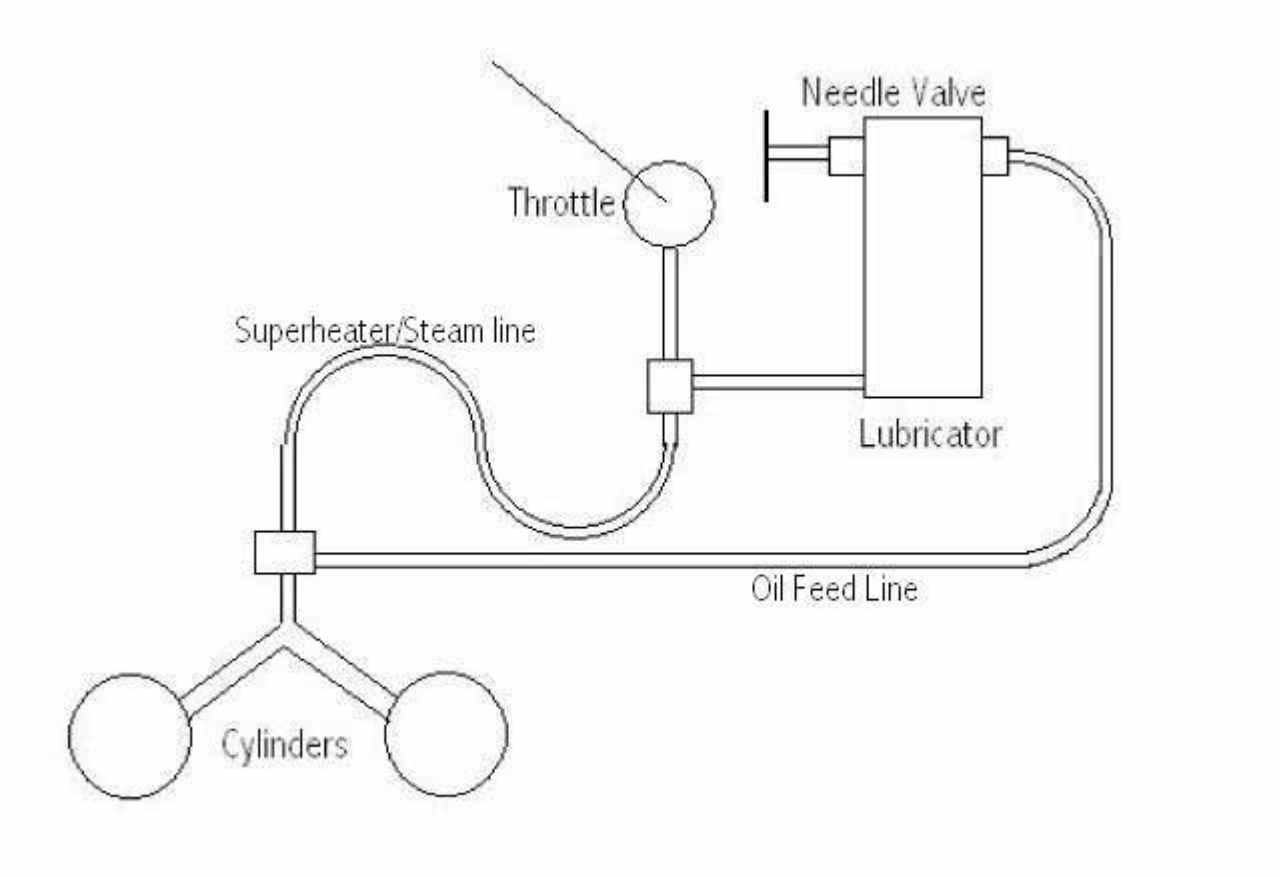
Italic text and photos inserted for David by Dwight

I can supply a modification service for Accucraft engines, contact me off group for details.

David Bailey www.djbengineering.co.uk

Reply author: fkrutzke
Replied on: 11 Mar 2006 08:26:31

Below is a diagram of the plumbing used by David B. and myself when we separate the oil feed from the superheater and add a needle valve. A small steam line, 1/16 OD pipe, goes from the main steam line, right before it enters the superheater, to the bottom of the lubricater. Oil is taken off the top of the lubricater through a needle valve, then by way of a 1/16 OD pipe to a junction with the main steam line in the smokebox right before it splits to go to the cylinders.



Torry

Reply author: Dwight Ennis
Replied on: 11 Mar 2006 09:23:55

I really appreciate all the responses so far. However, I'd really like to also solicit some comments about the theory and advantages and disadvantages of different types.

> quote:
>
> *Originally posted by Dwight Ennis*
>
> Part of what I'm interested in here is some theory of just how these lubricators differ operationally.
>
> I started a thread a few years ago which attempted to get those with such knowledge to describe the types of lubricators available, how they function, how they differ operationally, and the advantages and disadvantages of each. There were no takers. Part of what I'm doing here (besides getting specific info relative to the C-16) is to again try and promote such a generalized discussion. This is stuff I'd really like to know.

David and Torry - Since you have an active steam feed off the throttle, they aren't "dead leg" lubricators, right? What you've essentially done is to add a metering valve and add the oil to the steam line downstream of the superheater (which makes total sense). I'm curious why you chose this design over a dead leg design which (if I understand this stuff correctly), wouldn't include the active steam line.

From the photos and diagram, it appears that David stays closer to the Accucraft passthrough design while Torry splits the steam line and injects the steam into the bottom of the lubricator. Is there any significant operational differences to these two approaches or is it simply a fabrication choice?

Forgive my ignorance, but unless I ask questions, I'm going to remain ignorant. hehehe

Also, do you buy the needle valves or make them yourselves (if I may ask)?

Reply author: Bob Starr
Replied on: 11 Mar 2006 10:24:06

David and Torry, thanks for sharing your designs with us, they are quite interesting. I understand how yours, David, works as a deadleg and is quite an ingenious design using Accucrafts lubricator. A question for you Torry; doesn't the steam line coming in the bottom essentially just pushing oil into the system as opposed to atomizizing with the steam as other lubricators do?
Dwight, A dead leg is on the active steam line. It is merely teed off the line. Anyway, both these systems are on a bypass line and the main flux of steam comes thru the superheated line.

Reply author: David BaileyK27
Replied on: 11 Mar 2006 11:22:23

No, Tory has got it wrong as far as my new engines are concerned, my batch opf K27's had the same system as tory describes, but my new engines have dead legs as in the pictures.
David Bailey

Reply author: Dwight Ennis
Replied on: 11 Mar 2006 13:13:15

> quote:
>
> *Originally posted by David BaileyK27*
>
> but my new engines have dead legs as in the pictures.
> David Bailey

Again, I'd be curious to know why? Is one type operationally superior to the other or is it more a matter of ease of fabrication?

Reply author: ripperj
Replied on: 11 Mar 2006 13:42:11

Dave H? if the C-16 uses all it's oil in 1 run and you reduce the oil in the lubricator by 1/3 wouldn't it run out of oil in the first 1/3 of the run? Keith who is not sure!

Reply author: Dwight Ennis
Replied on: 11 Mar 2006 14:58:08

Keith - Accucraft locos all use a lot more oil than they really need. Reducing the oil by 1/3 is fine if excess oil consumption is reduced as well.

Reply author: Dwight Ennis
Replied on: 11 Mar 2006 15:17:07

I'm going to try and point this in the direction I had in mind. I was talking to a buddy today and he said he's not sure anyone really understands the physics of how a dead leg lubricator actually functions with a single steam line. I don't know if that's true or not, but since no one if offering any explanations, I'm going to take a crack at it (sort of).

What he said got me to thinking and what popped into my mind is the old waterbed drains I used to use 20 years ago. The drain consisted of a tee... one end hooked to your garden hose, and the other was open. The tee hooked to a second hose which was inserted into the waterbed matress. When the water was turned on, the water flowing through the first hose and squirting out the open end created a vacuum in the tee and sucked the water out of the matress.

It occurred to me that a dead leg lubricator is hooked up to the steam line in the same manner. So following that same logic, I came up with the following...

When the intake ports are closed, steam flows through the dead leg line into the lubricator, condenses in the normal manner, and water is displaced by oil. When the intake port opens, the steam flowing through the steam line into the cylinders and past the tee creates a vacuum in the lubricator line similar to the waterbed drain and sucks oil back into the cylinders. Whether the oil atomizes in the lubricator or in the tee when it meets the steam line I have no idea. I also have no idea why this arrangement needs air space in the lubricator unless the atomization process does take place in the lubricator in that air space.

Actually, I have no idea if this whole thing is indeed correct, but it seems logical. I hope others will either correct my errors or confirm my suspicions. A few of my friends I've talked to are also interested in such information and in learning the science and mechanisms behind lubricator function. 

Reply author: Pete Thornton
Replied on: 11 Mar 2006 15:25:18

Dwight,

As you have a C-16, I can offer that the oil cylinder on my #42 came with its feed at the top, unlike the 268/278 versions. I have run it continuously for more than 1 1/2 hours while testing the Reppingen check valve water feed (I got hungry and stopped for lunch.) After the 1 1/2 hrs the oil was just about exhausted. A normal 30+ minute run results in my extracting water equivalent to about 1/4 to 1/3 of the tank capacity.

> quote:
>
> I also have no idea why this arrangement needs air space in the lubricator

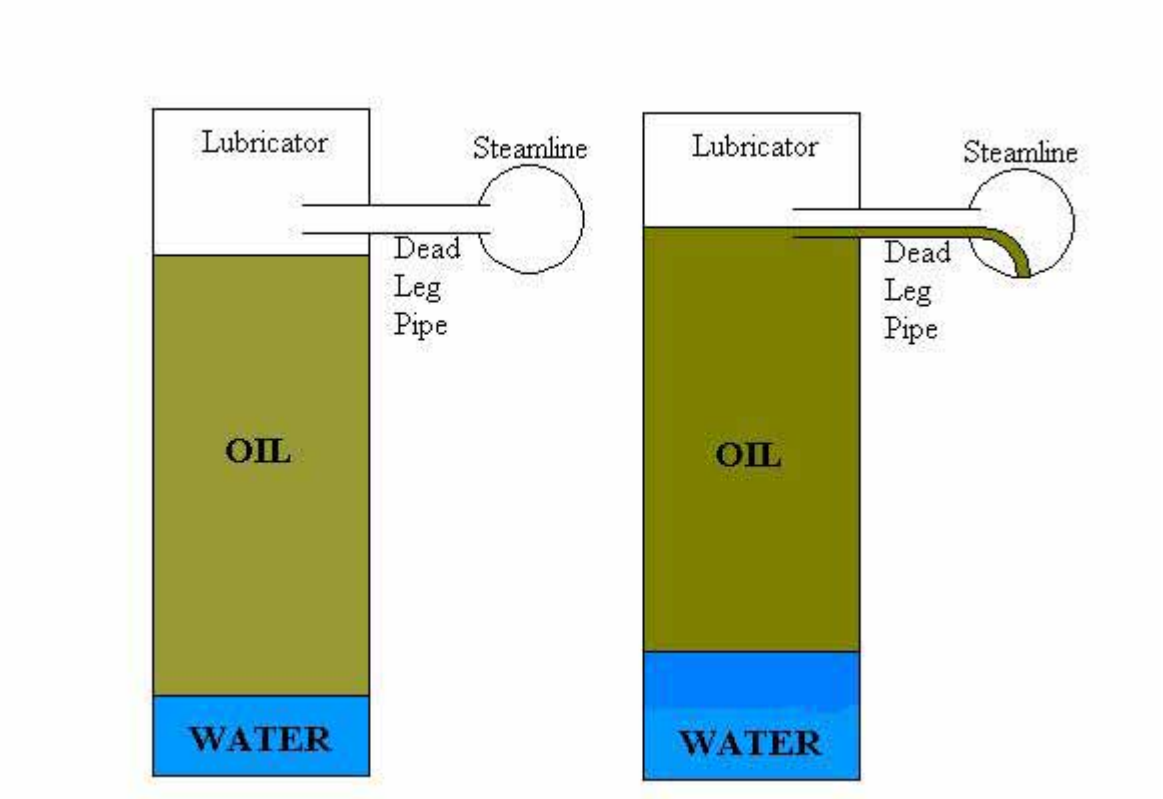
I didn't think my lubricator needs air space - the cap has a proper sealing ring. The condensing steam fills all the available space vacated by the oil, does it not?

Reply author: fkrutzke
Replied on: 11 Mar 2006 16:55:50

All of the lubricators we use in our small scale steam engines work on the same principal, displacement.

Imagine a glass of water, full to the brim. Now start dropping in small stones. Each stone takes up some of the space in the glass that had been occupied by the water. The water has to go somewhere, so it flows out of the glass over the top or brim.

Our lubricators work exactly the same way. See the below diagram.



This is a cross section of a lubricator attached to the steam pipe by a short leg of smaller tubing, ie, a "dead leg connection." In fact this leg of tubing can be so short that it is nothing more than the hole in the steam pipe as the steam pipe passes through the lubricator, a "pass through connection." The lubricator is closed on the top, unlike the glass of water it has no brim, but it does have a hole in its side, the tube leg.

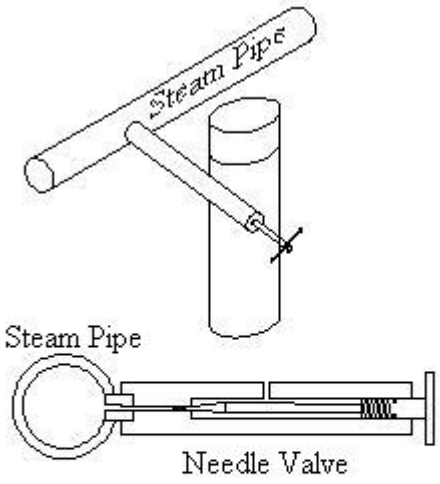
Because the free space in the lubricator, the pipe leg and the steam pipe are all full of steam, and exposed to the same pressures, we can ignore steam pressure, as it has no effect on the system. They only need to all be interconnected by unoccupied free space where steam can exist.

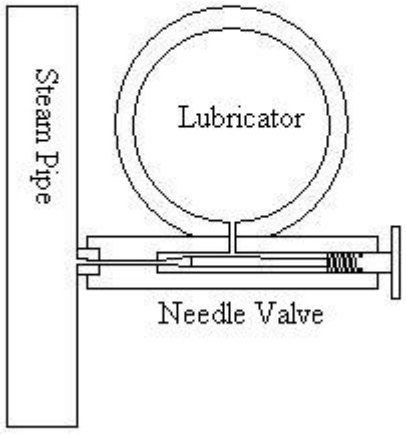
Now imagine that we start putting something into the bottom of the lubricator that displaces the oil. In our glass of water example the stones displace the water and it flows over the top, or brim, of the glass. In the displacement lubricator, the water in the bottom, which comes from condensed steam, takes up space formerly occupied by oil and the oil rises on the layer of water and flows out the tube leg. The rate at which steam condenses in the lubricater controls the rate oil is delivered to the stream line. Typically, the smaller the ID of the dead leg or the smaller the hole in the steam pipe, the smaller the rate of oil delivery. In fact, instead of a hole or dead leg pipe, you can use a needle valve, then you can control delivery to meet specific need.

Torry

Reply author: fkrutzke
Replied on: 11 Mar 2006 19:01:48

Here is a drawing of how to add a needle valve to your Accucraft lubricator.





Torry

Reply author: Dwight Ennis
Replied on: 12 Mar 2006 08:12:22

Thanks for that Torry. So much for my suction theory. hehehe

When designing a dead leg system, is there any limit on or concern about the length of the leg? I ask because I want the leg to bypass the superheater and join the steam line just ahead of the steamchest. Does that have anything to do with your putting an active steam line into the bottom of your lubricators?

Reply author: David BaileyK27
Replied on: 12 Mar 2006 10:11:22

Dwight, the leg needs to be as short as possible, it will not work with a long leg.

David Bailey

Reply author: Pete Thornton
Replied on: 12 Mar 2006 10:21:52

> quote:
>
> the leg needs to be as short as possible, it will not work with a long leg

David,

While I appreciate that is the correct engineering response, I would point out that my C-16 #42 has the oil tank under the running board just in front of the cab, and the oil pipe runs forward to the cylinder block. The pipe is 8" +/- long and we all know how much oil those darned C-16s throw out!

I guess that once the pipe gets filled it works at any length(oil going out, steam coming in?) I can see a problem the first time you run the loco until the oil flows down the pipe. But even then, an empty pipe will fill rapidly with steam and then oil will rapidly flow down to the cylinders?

> quote:
>
> I want the leg to bypass the superheater and join the steam line just ahead of the steamchest

Dwight,

On my #42 the oil pipe feeds directly into the cylinders - about where the steam pipe arrives. I don't have the other version handy, but I'm surprised if they have anything different - the oil tank on the #2x8 is forward near the cylinders, isn't it?

Reply author: Bob Starr
Replied on: 12 Mar 2006 11:31:58

I don't want to put words in David's mouth, but I think that he is refering to the leg that the lubricator is attached to. You guys are confusing the issue a bit. The bypass is a steam line, plain and simple. The lubricator on the C-16 is a pass thru lubricator as supplied from Accucraft, no matter where is. The piping that connects the lubricator is simply an auxillary steam line that is not getting cooked by the superheater and therefore not crusting steam oil to the inside of the line.

Reply author: Pete Thornton
Replied on: 12 Mar 2006 12:55:46

> quote:
>
> The lubricator on the C-16 is a pass thru lubricator as supplied from Accucraft

Bob - I'm pretty sure that a passthru lubricator has a steam pipe going in and a pipe coming out - like my Roundhouse loco. The C-16 #42 has only one pipe - coming out. Have they changed them on the latest locos?

Reply author: Dwight Ennis
Replied on: 12 Mar 2006 13:34:58

> quote:
>
> *Originally posted by Pete Thornton*
>
> > quote:
> >
> > The lubricator on the C-16 is a pass thru lubricator as supplied from Accucraft
>
> Bob - I'm pretty sure that a passthru lubricator has a steam pipe going in and a pipe coming out - like my Roundhouse loco. The C-16 #42 has only one pipe - coming out.

That's what I thought too. This is indeed a somewhat confusing subject.

Reply author: fkrutzke
Replied on: 12 Mar 2006 13:42:33

The C-16 is a true single leg lubricator. The dead leg comes off the cylinder cross pipe between the cylinders that the superheater pipe stubs into. This dead leg pipe is about 7 inches long and with an inside diameter of about **.005** in. (see correction below)

Edited to correct the underlined and bolded above, **this should be .050, or fifty thousandths inside diameter: overall outside diameter is .076.**

Torry

Reply author: David BaileyK27
Replied on: 12 Mar 2006 13:58:40

Surely you mean .050" not .005" this would be a very small diameter tube.
All the dead legs I have made with long legs did not work well, what has Accucraft got that works?

David Bailey

Reply author: fkrutzke
Replied on: 12 Mar 2006 15:17:48

David:

You are right, fifty thousandths, **I APOLOGIZE** for the typo, and will edit the above to reflect so.

Torry

Reply author: fkrutzke
Replied on: 12 Mar 2006 15:37:45
Message:

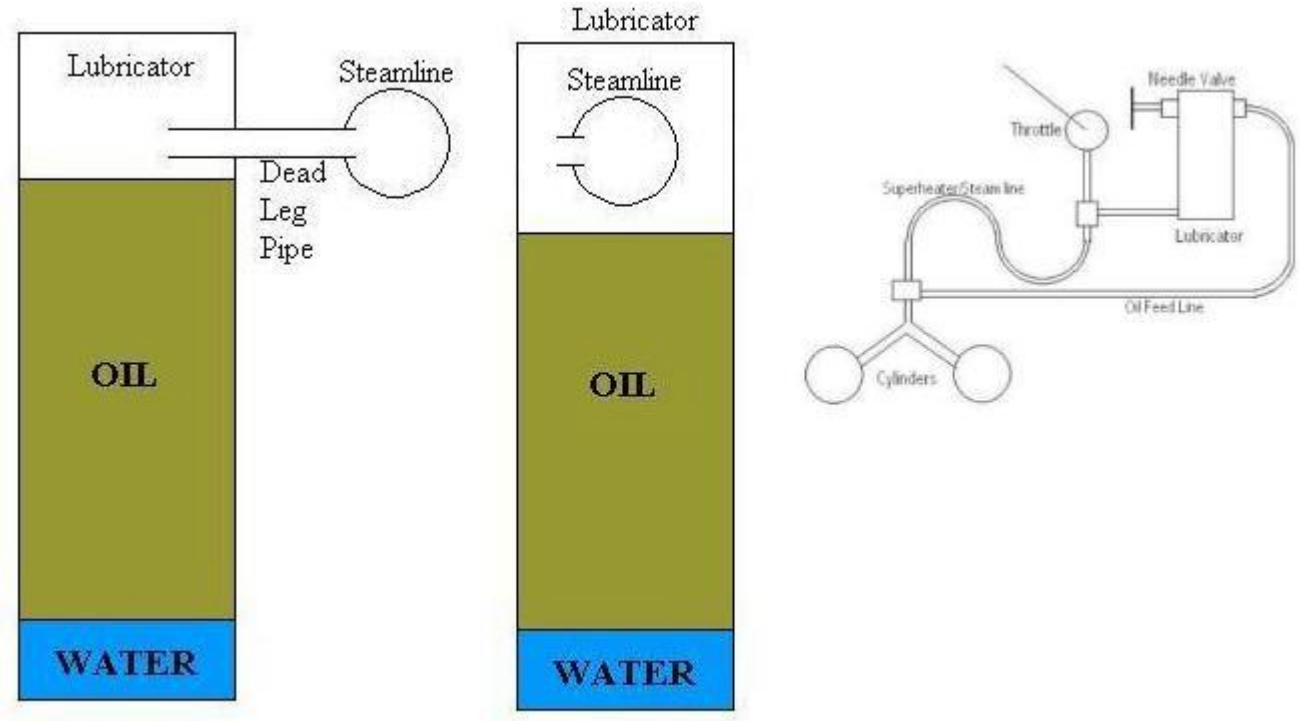
What I have seen as to lubricator types reflects 3 separate layouts.

1. A "dead leg" lubricator, where the lubricator is attached to the main steam line by a single dead leg pipe, or in a variation where the main steam pipe passes along the side of (exterier to), and is attached to the lubricator, with a small hole connecting the steam pipe and the inside of the lubricator.

2. A "pass through" lubricator, where the main steam line physically passes through the lubricator, and the line has a small hold in it along the section of the steam line that is interior to the lubricator.

3. A "flow through" lubricator, where there is a very small steam supply pipe that connects from the main steam line to the lubricator, typically entering the lubricator at the bottom, and a second small pipe that comes off the top of the lubricator and caries the oil to the cylinders.

See diagrams below.



Torry

Reply author: Chris Scott
Replied on: 12 Mar 2006 15:38:43

Looking at the pictures and graphic drawing it seems to me the two difficult parts of adding a needle valve (at least Accucraft's lubricators) is attaching the needle valve directly to the lubricator (as pictured/drawn) and the needle valve itself if you have to make it.

Question, Anyone know a source for needle valves? Or is anyone about to go into the needle valve business, independent of shipping lubricators all over the world for customer modification? Not that I'm against shipping, it's just that it's less time consuming, less loco down time and lower shipping cost if it's just the needle valve.

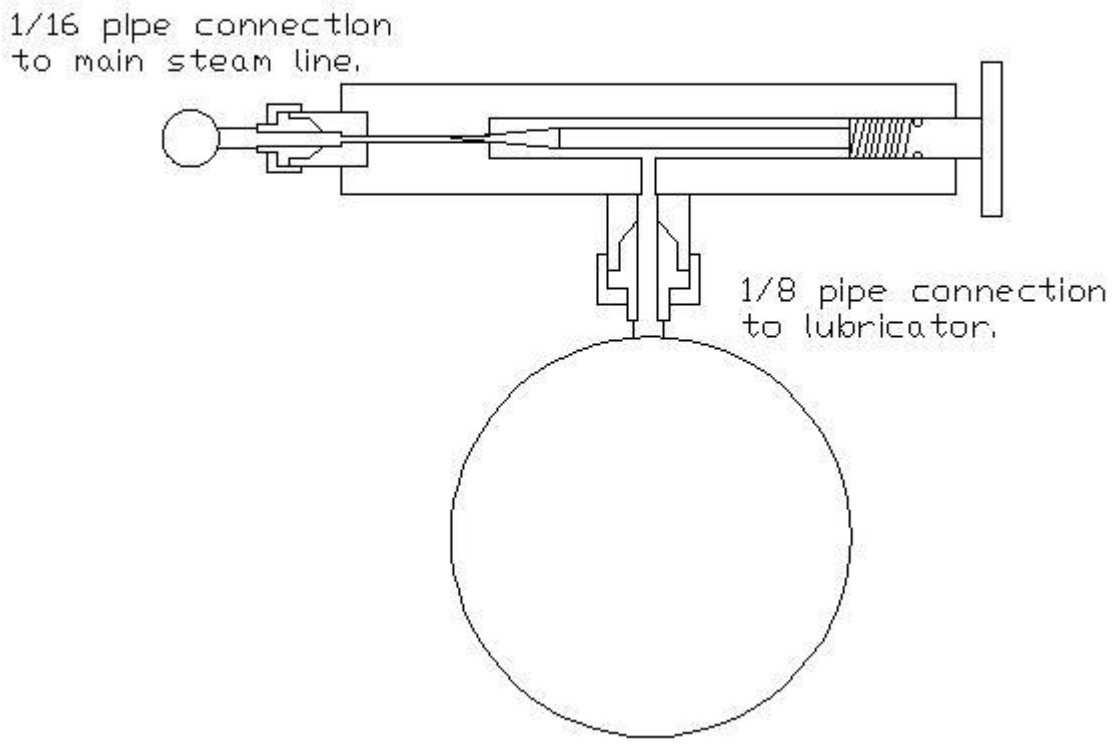
From David's pictures and Torry's drawing the difficulty in adding the needle valve is the small openings of the needle valve vs soldering it to the Lubricator and the steam line. Could a needle valve not have a threaded pipe connection at the two connecting points shown in Torry's drawing? The connection at the side of the valve could then connect to the lubricator with a short length of pipe. The end of the needle valve connected to the steam line either with a Tee, or directly in line when bypassing the superheater, this method would require a steam line into the lubricator be present.

So back to my question, anyone know of a source for needle valves? Or is anyone willing to supply needle valves of the type pictured in Torry's drawing only with pipe fitting connections? Or without pipe fitting connections if that is preferred by most.

Reply author: fkrutzke
Replied on: 12 Mar 2006 15:59:11

Chris:

This could be easily done without the need for a second pipe.



Torry

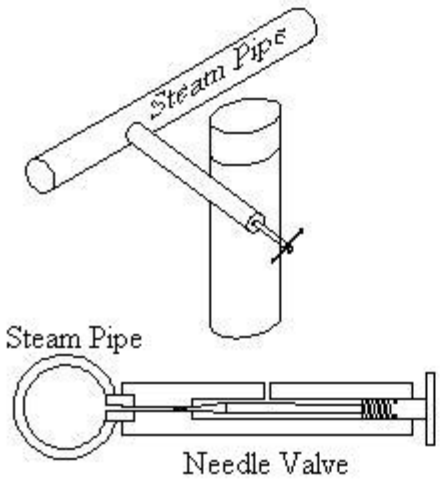
Reply author: Dwight Ennis
Replied on: 12 Mar 2006 16:33:28

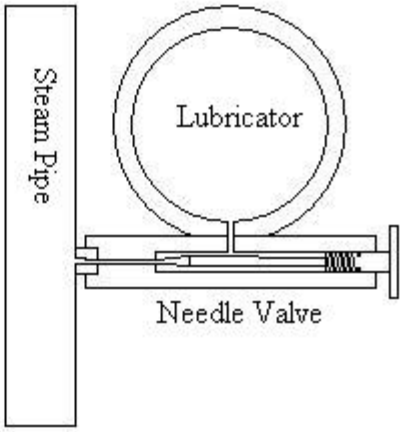
Correct me if I'm wrong, but all three types you showed are "displacement" lubricators, correct?

Reply author: Chris Scott
Replied on: 12 Mar 2006 16:48:47

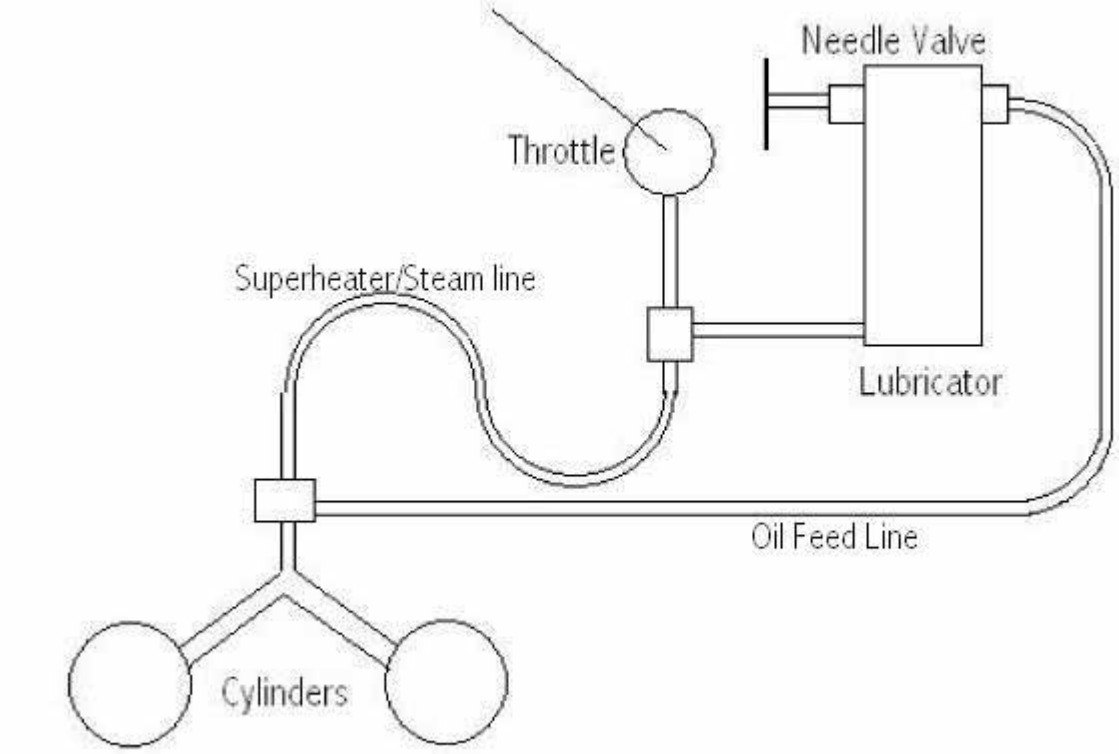
Torry:

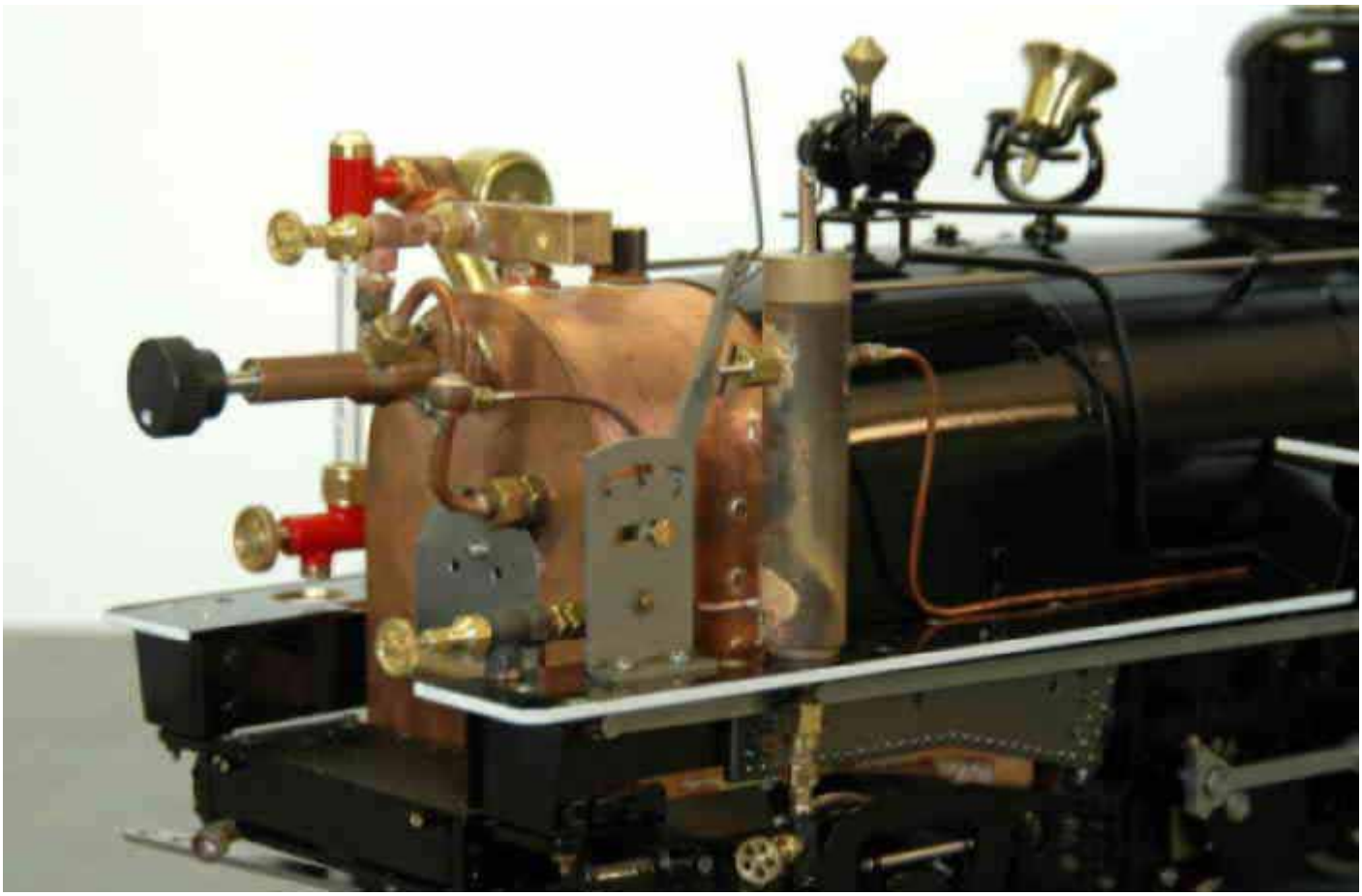
I beleive what you are showing is another view of this drawing only with pipe fittings; toe 1/6" steam line is a Tee fitting and the configuration is:





My impression is that this works for all applications except when the superheater is being bypassed. When the superheater is being bypassed (K-27) your drawing below shows a steam line into the lubricator at the bottom and the oil line directly connected to the end of the needle valve.





But my point was, A needle valve with 2 male pipe makes either installation possible. You only need one needle valve design.

Dwight,

I think all lubricators are displacement; Steam oil is displaced by water as oil is sent to the cyclinders. All the other terms are simply methods or slang for how you connect the steam lines to the lubricator.

Reply author: fkrutzke
Replied on: 12 Mar 2006 17:03:56

Chris / Dwight:

All the lubricators we are talking about are hydrostatic/displacement: ie. the oil is moved out of the lubricator tank by the condensation of steam in the lubricator tank that displaces the oil.

Chris, in larger scales and in some full size applications the oil is physically pumped into the cylinders or steam line. This, in 3/4, 1 and 1.5 inch scales, is typically done by a small, single acting, oscillating cylinder pump that sits in the oil tank and pumps the oil to either the steam line at the "Y" pipe or into the steam chests. The oil pump is usually ratchet driven by a link from the crosshead, each round trip of the crosshead moves the ratchet one tooth. The number of teeth in the ratchet determines how fast the oil is delivered, ie. if you have 50 teeth, then 50 revolutions of the crank equals one revolution of the ratchet and 1 stroke of the pump ram.

It should be pointed out that hydrostatic/displacement lubricators are not unique to our miniature locos. Full size engines can also be found to use these style lubricators. In full size practice, the lubricators are more

complex, more adjustable and nearly always have a sight glass configured such as to see the rate of oil delivery. Nearly all traction engines have these, as well as a very significant percentage of the locomotives that were ever produced.

Torry

Reply author: Charles
Replied on: 12 Mar 2006 17:07:13

> quote:
>
> *Originally posted by David BaileyK27*
>
> Surely you mean .050" not .005" this would be a very small diameter tube.
> All the dead legs I have made with long legs did not work well, what has Accucraft got that works?
>
> David Bailey

David,

Of the Accucraft locos that we own, the GS-4 has a good funcioning Dead-Leg. 3/4 of all Aster locomotives use dead-leg lubricators and a few, including the Berkshire have extremely long legs. On the first few runs of the Berk, the lubricator was sluggish to start, but after 5 hours break-in, the lubricator works wonderfully. (Note: none of the aster Dead-Leg's are metered.)

Reply author: fkrutzke
Replied on: 12 Mar 2006 17:19:24

By the way, lubricators of the type shown above with the pipe fittings on the needle valve (first post on this page) are available commercially fron ACS Engineering. These could be plumbed directly into a "tee" on the main steam line.

They also have numerous other items for the home builder, including butane tanks, water gauges, ISO 460 steam oil,RC throttles, steam engines, boilers, etc., etc.

See http://www.acs-engineering.co.uk/id22.htm

Torry

Reply author: David BaileyK27
Replied on: 13 Mar 2006 01:20:45

I have supplies of the Needle Valves shown in my photoes.

David Bailey

Reply author: Pete Thornton
Replied on: 13 Mar 2006 06:57:42

> quote:
>
> the Berkshire have extremely long legs. On the first few runs of the Berk, the lubricator was sluggish to start

Charles,

That sort-of confirms my theory that a long dead-leg will be tough until it gets full, but after that it will 'start-up' instantly. Maybe it would be good practise to fill the pipe with oil before the first run?

Reply author: Charles
Replied on: 13 Mar 2006 07:23:35

Pete

One other fact could have effected the run: cold weather.

Reply author: Chris Scott
Replied on: 15 Mar 2006 23:49:07

> quote:
>
> *Originally posted by fkrutzke*
>
> By the way, lubricators of the type shown above with the pipe fittings on the needle valve (first post on this page) are available commercially fron ACS Engineering. These could be plumbed directly into a "tee" on the main steam line.
>
> They also have numerous other items for the home builder, including butane tanks, water gauges, ISO 460 steam oil,RC throttles, steam engines, boilers, etc., etc.
>
> See http://www.acs-engineering.co.uk/id22.htm
>
> Torry

I wrote to ACS asking about their Lubricators shown below:

I assumed these acted as I believed all did, the needle valve provides metering control of the amount of oil that combines with the Steam. But the reply I received from ACS below describes two of their lubricators as actually steam throttles, metering the amoung of steam to the cylinders with a constant volume of steam oil added to the steam. Their lubricator body is 2" x 5/8"dia, add 1/2" for either the drain or virtical control wheel, with both the total heigth is 3":

> quote:
>
> ACS Description:
>
> The operation of the lubricators is very simple...a small amount of steam enters the top of the lubricator, via a tiny hole in the cross tube, and condenses into water which sinks to the bottom of the lubricator (oil is lighter and floats on water) thus displacing the oil upwards (hence the name...Displacement lubricator). when the oil reaches the level of the small hole, no more steam can enter and a small amount of the oil is passed out through the same small hole back into the steam line and carried into to your engine. When the oil level falls to below the small hole more steam is allowed in and the process repeats.
>
> This process is maintained so long as the engine is running, or the oil runs out. Approx 30 - 60 minutes, depending on engine size.
>
> The vertical model is identical to the horizontal one, except that the steam stop/control valve is turned through 90 degrees so that the handwheel is at the top, rather than the side. See attached picture of the prototype 'Sidewinder' engine which is fitted with this version.
>
> **Just to clarify a possible misunderstanding....the control valve fitted to the vertical and horizontal lubricators is not for adjusting the oil flow, but serves as a steam control/stop valve.**
> **The oil (on all versions) is delivered via a fixed orifice of 0.025" dia on the 1/8" pipe versions, and 0.030" dia on the 5/32" pipe versions.**

So it appears not all lubricators with needle valves are metering the steam oil. ACS Eng.'s lubricator is a steam throttle with a contant steam oil volume flow.

Reply author: livesteam5629
Replied on: 16 Mar 2006 18:32:12

David Bailey;

On your post of 13 Mar 06 (above) you say you have needle valves in stock. I cannot find them on your website under parts. Am I overlooking them? If not how much are you asking for them to include postage from GB?

Thanks
Noel SA#5629

Reply author: David BaileyK27
Replied on: 17 Mar 2006 01:16:15

Noel, if you contact me off group I will send picture and details

David Bailey

Reply author: Steve S.
Replied on: 18 Mar 2006 10:24:14

Don't know if this does anything or not, but after I fill the lubricator's on the Mike and Berk I leave the lubricator cap off and roll the engine a few feet. My thinking (that's a scarry thought) is that it might pull some oil through the line to the cylinder's. What do you all think

---

Reply author: deWintonDave
Replied on: 24 Mar 2006 18:29:35

> quote:
>
> *Originally posted by Steve S.*
>
> My thinking (that's a scarry thought) is that it might pull some oil through the line to the cylinder's. What do you all think?

Hi Steve,

It can pull oil through if they are pass-through lubricators and you shut off the throttle.

All the best,
Dave.

Reply author: rodblakeman
Replied on: 26 Mar 2006 09:41:01

David Bailey has converted the lubricators on my Accucraft 3 Cylinder Shay and Mogul to "Dead leg" style and fitted his needle valve metering system as shown in his photo's posted above. Both work excellently and now use much less oil per run.

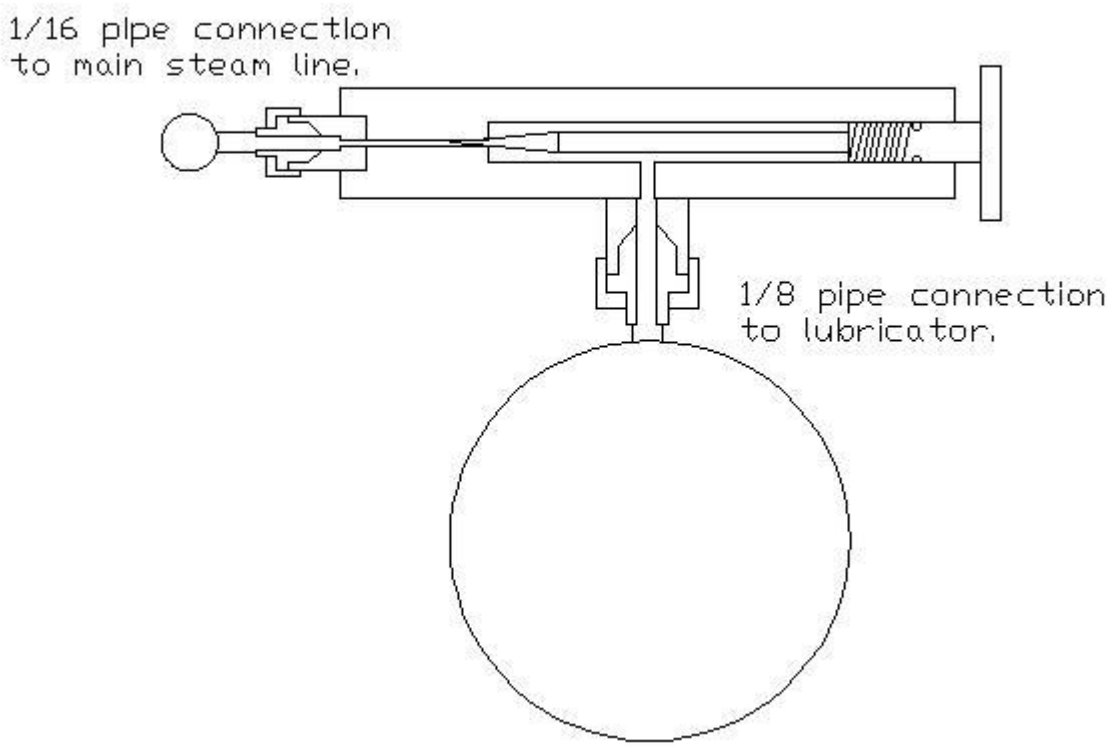
I improved my #268 C16 by inserting a small (2mm OD X approx 8mm long) brass pipe into the standard oil output pipe of the oil reservoir tank. This has the effect of, A, reducing the size of the oil exit hole and, B, moving the output hole to just under the top of the a oil reservoir tank. This has been very successful and I have also done the modification to a friends C16 #278.

Reply author: Chris Scott
Replied on: 26 Mar 2006 15:06:17

Commercially available metered displacement lubricators have the needle valve through the center, which I don't suppose makes any difference compared to mounting the needle valve on the side

Do you need any larger than 1/16" connection between the Lubricator and Accucraft's standard steam line or up to a 1/8" Steam Line (whether the needle valve is on side or through the center of the lubricator)

Needle Valve on the side of lubricator:



Needle Valve through the center of lubricator:

Reply author: Chris Scott
Replied on: 22 May 2006 11:07:45

I ran across this and thought it made for interesting reading after all the discussion this thread went through. It turns out many of us are using Roscoe Lubricators : The Not So Real McCoy. I think this same reference might have come up during a similar lubricator discussion many moons before.

Searching for info on an related topic I happened across The Home Machinist message board, which evntually lead to the above link. But along the way one thread in particular Roscoe Displacement Lubricator. Althought I beleive they are talking aobut generally larger models, 3/4" and above scales, nevertheless it raised some surprising issues concerning lubricators including the following:

> quote:
>
> Originally posted by gwrdriver:
>
> ...but it is a known phenomenon (as yet unexplained scientifically) that when lubrication is introduced in the steam supply line before the split to the cylinders, the oil will tend to favor one direction (ie. one cylinder) and the other cylinder will tend to be starved, or at least get less oil. The same is true even if the oil lines from a single lubricator are split to supply each cylinder individually; the oil will tend to favor one side over the other.

I might be able to accept fluid mechanics would apply and explain this, but does this really matter with our scale models?

...and there's more:

> quote:
>
> Originally posted by Bill Shields
> .
> .Rules of thumb:
>
> Water is heavier than oil.
>
> Steam tends to condense, displacing the oil, out into the stream.
>
> Oil that sits in a line in the smokebox for a long period of time tends to solidify and become non-flowing, so I don't like oil lines in smokeboxes.
>
> The line from steam line to the lubricator should typically not run up-hill to get there. Level is OK, down into the lubricator is my preference.
>
> Other than that, put it some place that you can get to easily. You wil have to fill / drain.
>
> Another option:
>
> Use a piece of copper pipe with an o-ring sealed piston inside it. Needs end-caps that can be removed..
>
> One end of the pipe is fed steam from somewhere, typically the turret.
>
> The other end of the pipe has a needle valve for oil with a line leading to the steam line to cylinders.
>
> Put steam in one end of the pipe, oil comes out the other end.
>
> The principle is that the steam pressure from the turret is always higher than the pressre going to the cylinders, so the oil is pushed out the other end into the cylinders.
>
> Caution must be taken because if you put steam on the lubricator and don't open the throttle (for a long time), there is the possibility of putting a bit too much oil into the steam line.
>
> I take no credit for this...comes from Bill VanBrocklin about the time I got into this hobby.
>
> Dummy it up as an air tank and you are good to go.....
>
> Using this design, you don't have to worry about which way the lines go (up / down / across / zig-zag) because it works on pressure differential.
>
> I have even thought of using feedwater from the pump to push the piston rather than steam (it all turns to water anyway)...

BTW:

Harry is correct...no matter what you do, if you introduce the oil BEFORE the steam line Ts to the cylinders, there will be a tendency for one cylinder to get more oil than another.

Starvation is also a real possibility, so whenever possible, 2 lubricators or injecting before the T is a good idea.
.
.
(Why the need for the piston?....)

the piston is the separator from steam-wather to oil.

without it, you would get a mix of either coming out the other end.

With the piston, what you get is pure oil....

of course, i have only seen it done with the tank horizontal...the idea is to disguise it as an air tank...

I was simply wondering how these might apply or if they do to our 1:20.32, 1:32, etc. scale models?

Has anyone ever used a McCoy type lubricator with a piston (Bill Shield describes) in our small scales?

Reply author: Brooks
Replied on: 22 May 2006 11:22:03

When I ran this winter, I could see twin trails of oil in the snow, on either side of the track, thus proving that the cylinder oil was reaching both cylinders. I did not try to measure any differential in delivery. You could do the same thing, for your summer-time edification, by putting paper towels down along the 2 sides of the track. I would suggest anyone who modifies their oiler system (to reduce oil usage, for example) perform some sort of confirming experiment to ensure you are not starving one side, per Chris's post above.

Reply author: Chuck K
Replied on: 22 May 2006 14:16:53

After a 2 yr. wait last Friday I received my #42 Accucraft C-16 from Royce and it has some improvements over the old C-16s. The lubricator is no longer under the running board on the engineers side but is in the cab on the firemans side which will leave plenty of room for R/C servos. Also the the boiler fill is now in the cab instead of under the front dome. The lubricator looks just like the one in my 2 cylinder shay except it has a nice brass knurled knob instead of that goofy T handle thing on the shay.

Dwight is your new engine of this configuration? I've been trying to find a post from the past where someone added washers inside the lubricator to cut down on oil discharge. Can't seem to locate it, but will keep trying to find it. I think it was for the 2 cylinder shay if a remember correctly. This might be an easier interim fix until you add a needle valve.

I have not had the chance yet to fire up the #42 but will let everyone know when I do, and if it leaves the dreaded oil slick of doom on the rails. My good friend Don Beach has voluntered his Lock Stock & Barrel R.R. in Cimmaron Colorado as the test site. He has a new, old style 268 Bee with the tank under the running board so we can do a comparison. Should be interesting.

Chuck Kolinski SA#22

Reply author: Dave Hottmann
Replied on: 22 May 2006 19:01:55

That would be an old post of mine. Luckily I still have a picture. On the left is an oil restrictor cap for a K-27 where the ID of the oiler is Larger that the more common oilers. It is made from a 10X.5M bolt. The one on the right is for the smaller ID oilers like Rubys, Shays, and C-21s. It has 4-40 nuts and a screw added to the OEM cap. Pictured is 4 nuts. Depending on the engine, steam oil, and running conditions I use 3 or 4 nuts. I have not yet seen the new C-16s so I don't know what would be best.

Reply author: HMeinhold
Replied on: 24 May 2006 13:43:35

> quote:
>
> *Originally posted by Dave Hottmann*
>
> Depending on the engine, steam oil, and running conditions I use 3 or 4 nuts. I have not yet seen the new C-16s so I don't know what would be best.

Dave,

can you please describe how the extended stem affects the oil flow ? More cooling ? Flow restriction ?
Regards

Reply author: Chris Scott
Replied on: 24 May 2006 21:19:09

> quote:
>
> *Originally posted by HMeinhold*
>
> > quote:
> >
> > *Originally posted by Dave Hottmann*
> >
> > Depending on the engine, steam oil, and running conditions I use 3 or 4 nuts. I have not yet seen the new C-16s so I don't know what would be best.
>
> Dave,
>
> can you please describe how the extended stem affects the oil flow ? More cooling ? Flow restriction ?

The thread Snap, Crackle & Pop ??? includes Dave's description of the oil restrictor operation and effects.

Reply author: HMeinhold
Replied on: 25 May 2006 09:02:12

> quote:
>
> *Originally posted by Chris Scott*
>
> > quote:
> >
> > *Originally posted by HMeinhold*
> >
> > *Originally posted by Dave Hottmann*
> >
> > Depending on the engine, steam oil, and running conditions I use 3 or 4 nuts. I have not yet seen the new C-16s so I don't know what would be best.
>
> The thread Snap, Crackle & Pop ??? includes Dave's description of the oil restrictor operation and effects

Sorry, I still don't understand how it works. As I design/build my own lubricators I am of course interested in all the parameters which affect oil delivery. So far I am aware of the diameter of the hole (or setting of a needle valve) and the amount of condensing steam (e.g cooling area/location of lubricator). But the effect of the nuts is still a mystery to me...

Reply author: bigsteam
Replied on: 27 May 2006 16:12:32

If I understand the science of condensate driven lubricators, ie. "Displacemanty Lubricators," correctly, the addition of nuts or using an extended cap as shown in the photos above, only reduces the total available volume of oil that can be displaced over the course of time. Less oil, less running time. If this is what you want to do, reduce the total volume of oil avaiable, you could also drop a few ball bearings into the tank or use a smaller tank.

THE ONLY WAY TO REDUCE THE RATE OF FLOW IS TO REDUCE THE RATE OF CONDENSATION. This can be done most effectively by using a smaller orifice in the line that delivers the oil to the cylinders. If your lubricator uses separate steam supply and oil delivery lines, you could also use "theoretically" a smaller oriface in the steam supply line. I say "theoretically" because it is much harder to control the flow of steam, a gas, through an orifice than oil, a heavy liquid.

The absolute best approach is to use a needle valve on the oil output line of the lubricator, as is done by "The Masters", Mike Chaney, David Bailey, Torry Krutzke and a few others.

John

Reply author: Chris Scott
Replied on: 27 May 2006 20:22:18

John:

I'll walk a plank in a different direction of explanation as I get it. Dave originally explained that on his Shay and K-27 they used way too much oil and that it created a mess, not to mention the Snap, Crackle and Pop caused by excess steam oil being shot out the exhaust pipe and burning, exploding, as it hit the hot wall of the smokebox and stack.

So Dave wanted a way to reduce the amount of oil that was being introduced into the steam as it passed the displacement lubricator. The cause of the excess steam oil being traced to too large an opening in the steam pipe where it connect to the lubricator.

Here's the walking out on a limb part. Dave said the modification restricted the amount of oil and the result was the Snap Crackle and Pop and amount of steam oil used was much less. He believed his modification restricted the amount of oil introduced into the steam line. The reason for this I think is that the modification places an obstruction in the path of the displacement hole in the steam line connection to the lubricator. An action which reduces the amount of steam oil that can be combined with the steam.

As I see it, with your description of reducing the total amount of oil available it would not necessarily reduce the amount of oil introduced into the steam line which is the key feature of adding a needle valve to meter the steam oil flow. Dave's modification I think is a crude but experience has shown effective means of metering the amount of steam oil does used. But even with the reduction in the total amount of steam oil I believe Dave experienced the same if not longer run times. As less oil was used, introduced into the steam line, the same amount of steam oil would go farther.

The key is that the length of Dave's modified cap is long enough to partially block th steam pipe hole at the lubricator connection. There are two ways to reduce the amount of oil introduced into the steam; 1, a needle valve or 2, reduce the size of the opening through which steam and oil flow, one is reducing the amount of oil by a fixed amount versus a needle valve which would enable variable oil flow metering.

Anyway, that's my theory. Guess we'll just have to wait until Dave gets around to seeing this to settle it. But there is theis paper on the history of the steam engine lubricators that makes for interesting reading. The Home Machinist message board, which evntually lead to the link: The not-so-real McCoy and the along the way one thread in particular was very interesting Roscoe Displacement Lubricator.

One man's speculation and opinion.

Reply author: Dave Hottmann
Replied on: 30 May 2006 00:24:30

The nuts reduce the amount of oil available at the steam hole. In my experience the amount of oil at and above the hole plays as big of a role, if not bigger, than the hole size. This mod is simple, cheap, and can be removed.

Reply author: bigsteam
Replied on: 30 May 2006 08:51:55

Notwithstanding Daves' experience, findings and expertise on Accucraft matters, other than at the time of the original filling, oil will never be above the level of the hole. Also, any under filling will be fairly quickly brought up to the level of the oil hole.

All displacement lubricators work on the principal that oil floats on water. In our small scale lubricators, steam condensing in the lubricator causes the oil level to rise to the level of the hole where a small stream of the oil weeps out the hole into the, in the case of a dead leg lubricator, the lubricator's oil/steam line. The oil then weeps down this line into the main steam line. The rate at which oil weeps out the hole is dependent upon the rate steam condenses into water and raises the oil level. In the case where the main steam line passes through or along side the lubricator, the oil weeps directly into the main steam line.

When the oil level is above the hole, the oil will be delivered at an accelerated rate until the oil level matches the bottom of the oil delivery hole, at which time the delivery rate will match the rate of condensation. If the oil is below the level of the hole, no oil will be delivered until condensation raises the oil level to the level of the hole.

John
