TOOL FACTS

TF-001

PROPER MAINTENANCE OF AIR TOOLS

By Andrew Mayer

Proper maintenance of any air tool is essential to insure the efficiency the tool was designed for, provide the safest working environment for the operator, and keep repair costs to a minimum. The best program usually begins with the shortest steps, as is the case here with initial inspection. The operator should begin by inspecting the tool for any loose nuts, bolts or screws. If any are loose, they should be tightened before the tool is run. Also, all parts of the tool should fit snugly together with no cracks or broken pieces. If there is a whip hose, all bands and fittings should not show any cracks or excessive wear. There should be no air leaks in the tool, fittings or whip hose.

When planning an air tool maintenance program, it can be thought about in two ways; from a rental fleet perspective and from the standpoint of maintaining a contractor's own fleet of labor-saving tools. Let's take a look at both situations:

RENTAL FLEET

If you are renting tools out on a daily basis, your maintenance plan is heavily influenced by time. By this, we mean, when a tool comes back off rent, you want to turn it around in the shortest time possible so that it's ready to rent again. In this case, you will mostly be interested in a few key points:

- Inspection - Inspect each tool closely after every rental for anything loose, cracked or damaged.

- Operation - If possible, run the tool for about 10 seconds and ask the customer how the tool performed, or if any problems developed.

- Flushing - While testing the tool, you should flush it out with a solvent by pouring about a capful into the inlet before running it. Be careful to direct the exhaust away from you, so the solvent will be blown through the tool without causing harm or damaging anything in its way. Flushing will help to remove accumulated dirt and build-up.

- Lubrication - After flushing, be sure to run some 10W oil through the tool to re-lubricate it.

If, during this process, a tool does not perform well, the tool should be torn down and all internal parts inspected for damage after going through a cleaning tank. Any damaged parts should be replaced, then all moving parts oiled. Now you can reassemble and test before putting the tool back on the rental line.

The above steps, with some practice and training, will help maintain your rental fleet of tools and assure the minimum turn-around time and the maximum rental time during your busiest periods.

CONTRACTORS FLEET

If you are maintaining a fleet of your own tools, you should be able to set your own schedule for maintenance. In this case, we recommend that each tool be torn down completely at least once a quarter, if being used intermittently. If the tool is in a period of heavy use, we recommend that it be torn down once a month. This will help you achieve preventative maintenance with the goal of spotting a part that is starting to fatigue before it fails and spreads the damage.

TOOL FACTS

TF-002

AIR TOOL LUBRICATION

By Andrew Mayer

As a manufacturer, let us start by stressing how important proper lubrication is to a tool. Without a sufficient amount of the proper oil, you can very easily shorten the life of an expensive air tool you have just purchased.

In the field, we often come across situations where the wrong amount, or type, of oil is being used, or where no lubricator is in use at all, either the integral "built-in" reservoir or a line oiler. Furthermore, even when a line oiler is in use, it can have the wrong setting or too much hose between it and the tool to be effective. There are many things to look for when trying to adequately lubricate air tools to insure efficient operation and low maintenance costs.

While discussing lubrication, we would also like to stress the importance of a clean and dry air system. It should be regulated for proper pressure at the onset. Also, it should be mentioned that our meaning of proper pressure relates to the pressure at the tool (not the compressor gauge) while the tool is running. The best way to check for proper air pressure is by using a needle pressure gauge.

To move on to the subject of proper lubrication, we would like to discuss two main points; those being the type of oil used and the lubrication system itself:

TYPE OF OIL

We recommend a fairly light oil for percussion type tools, such as Chippers, Rivet Busters, Clay Diggers, Paving Breakers and Tampers. This oil should be a 10W oil or equivalent. When we say "equivalent", we mean you can also substitute a good grade of "ATF" fluid, or even a 10W automotive type oil as long as it is light enough or has a low viscosity to make it easier to flow thru a line oiler. There are also some good specific "Air Tool" oils on the market . These oils generally have rust and oxidation inhibitors included in their formula to reduce the negative affects of moisture in the air line reaching the tool. This Air Tool oil also has a soluble property to it. Because it is a soluble oil, it mixes with water very well while retaining its lubricity. Also, we would like to point out that oil with all the right properties for air tool usually generally costs more but the additional cost is negated through the reduction of maintenance costs.

Another oil, which we have not talked about, is Rock Drill oil. This is a fairly thick oil with high lubricating properties in it. It is formulated this way because of the way that heavy Rock Drills are used. Some are put on jack legs for mine drilling, and others are installed on dowel hole drilling machines. These drills, when used in those situations,

undergo a lot of stress and friction and thus a heavier oil is required. This type of oil mixes very well in wet situations. If water is introduced, either through the air line or from the environment, it keeps its lubricating capability. This is because of the special make up of the oil. It is designed to stick to the surface of the parts, as well as being a rust and oxidation inhibitor. We recommend this oil only be used with rock drills because of its unique viscosity and solubility properties.

For smaller rock drills in the 9 lb. to 15 lb. class a regular 10 W oil or equivalent should be used. Rock Drill oil as described above should only be used on heavier models.

THE LUBRICATION SYSTEM

There are basically two types of lubricating systems. The first being the integral "built-in oilier system". This means there is a reservoir built into the tool itself. The capacity of these reservoirs is usually about a 1 ½ ounces, which gives you about 2-4 hours of operating time before refilling. If you are going to use this type of oiling system, you must make sure the reservoir is checked about every 2 hours of operating time. Also by using this "built-in" system, there are no adjustments that you can make as to how much oil is emitted into the tool.

Second, there is the line oiler. When using a line oilier, the reservoirs are available in larger capacities. They can range from 3 ounces to 1 fluid pint. The larger the capacity, the longer the operation time you have before refilling. Also, the line oilers come equipped with a metering screw inside the reservoir. This allows you to adjust the oil flow from light to heavy mists of oil. When using a line oiler with a tool, the ideal situation for operation would be to install the oiler about 8 feet away from the tool. A whip hose can be used, which is normally sold in 8 foot lengths. Attach the oiler end to the air supply hose, and the other end to the tool, using standard hose fittings. Take care to insure the lubricator is installed in the right direction for proper flow by looking at the indicator arrow on the side of the lubricator.

To find out what specific number that manufacturers such as Mobil Oil, Texaco, Gulf, Shell and others recommend for air tool use, please consult with your local dealer.

TOOL FACTS

TF-003

ALL ABOUT WHIP HOSES

WHY USE WHIP HOSES? WHAT PURPOSE DO THEY SERVE?

By Andrew Mayer

These are the two most commonly asked questions. Usually they are installed on tools for comfort. The whip hose allows you to drop down in size and weight from the standard ¾" compressor hose. What we mean by "*dropping down*" is the ¾" inch air hose being so heavy, a smaller diameter, ½" whip hose is installed to reduce the overall weight of the tool. If you have ever tried running a tool for any length of time you know how beneficial any reduction in weight can be.

Whip hoses can be made using different diameter hoses. For construction tools, the whip diameter should be ½". This size allows you to run all of the small to medium size tools made. For the larger tools, such as the 60 lb. and 90 lb. Breakers, they can be run directly connected to the ¾" primary line coming from the compressor. The bigger tools always should be run with the larger hose because they require (demand), a larger volume of air.

Air Volume is measured in C.F.M. or Cubic Feet per minute. Small to medium tools will always receive the air volume they need using ½" diameter whip hoses.

WHAT TYPE OF HOSE SHOULD BE USED TO MAKE WHIP HOSES?

If at all possible, an oil resistant hose should be used. If a non-oil resistant hose is used, the oil from the in-line oiler or from the compressor penetrates the hose and pretty soon the rubber becomes soft and distorted. When this happens, bits and pieces of the rubber break off, ending up inside the tool causing the tool to fail. Using an oil resistant hose will eliminate rubber deterioration and help keep a free flow of clean air to your tools.

When selecting your whip hose, length is also important. For construction tools, whip hoses should be made up at lengths of about 6' to 8' feet. This is normally the standard length, however, you can choose different lengths. There will be times in which the customer will insist on a specific length. When this happens, and you get a request for anything shorter than six feet, you should recommend against it. The reason for this is whip hose should be comfortable as well as accommodating. If you were to make the length under six feet, and the user were to hold the tool waist high or over his head, you

now would be adding the weight of the primary ¾" hose, and likely also, an in-line oiler. The additional weight would become very cumbersome to the user.

SHOULD WHIP HOSES BE MOUNTED WITH IN-LINE OILERS?

Certainly not in every case are in-line oilers needed to be included onto whip hoses. But, it does become very necessary when the tool you are using does not have a built-in oil reservoir. Running the tool without oil increases friction and wear and becomes very costly. But, by adding an oiler to the whip hose, you now provide the tool with a constant supply of oil which is needed to ensure you get the maximum performance and life that should be expected from your tool.

Remember, whip hoses were designed to make getting the job done easier. When selecting a whip hose keep in mind what we have discussed earlier, and by all means take the time to find out if the tool is equipped with a built-in oiling system or not. If not, be sure to order your whip hose with an in-line oiler.

TOOL FACTS

TF-004

ALL ABOUT SIDE ROD SPRINGS

By Andrew Mayer

A very common question in the construction tool industry is… How much should side rod springs on Paving Breakers be tightened? Well, in this edition of "*Tool Facts,*" your question will be answered.

There are many myths about how to tighten these springs. One common way is to tighten them down so there is about two hacksaw blade's width in between the coils. By the way, this is how I was taught to do it, when I started with APT, 16 years ago. Some of the myths are probably true, but in this *Tool Facts* you will find the exact measurement to use when checking for proper tightness.

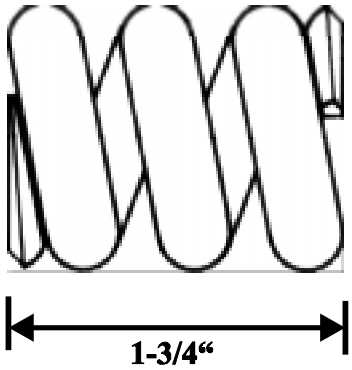
First, let's talk a little about why the springs should be tightened to an exact measurement at all. The reason is, if the springs are not tightened enough this will allow energy to escape (in other words, the tool will appear to have no power at all), and it can also cause damage to the tappet and the fronthead. If the springs are over tightened, too much pressure is put on them. Spring manufacturers tell us that for every additional fraction of an inch you tighten the springs past the specified limit, you put hundreds of additional pounds of stress on them. If you've ever experienced broken springs before, it's likely been caused by over-tightening. To sum it up, when you add the stress of over-tightening to the common force of prying the concrete that's often magnified by taking too large a bite, you get broken springs. So, proper spring tension is very important to your tool life and measurement is how you check it.

Why do paving breakers have springs, anyway? For over 75 years of time tested application this design has been industry proven, and perfected, to be the overall best combination for maximum power, durability, and ease of repair. Some manufacturers have chosen to go with a "one-piece" design, viewed by many as a cost saving design. The tools have fewer moving parts, therefore thought to be less costly to repair. Well, having less moving parts may be true, but because of the one-piece design, it can set up a costly repair bill if something were to get lodged inside the cylinder and scar it. The APT "traditional" design has a tappet, tappet bushing, side rods and springs - features that prevent damage to the cylinder. It is also a fact that the springs serve as shock absorbers for some of the energy that is being developed.

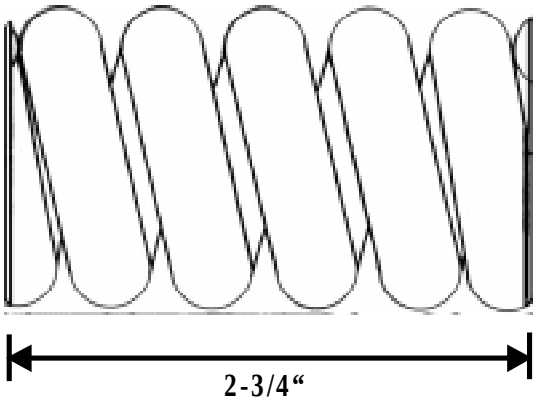
Remember ..... keep springs tightened to the correct length and you will prolong the life of your Breaker. You should also remember that the tools are not pry bars, so please try to break up reasonable pieces of concrete at any one time.

Now, the answer you've been waiting for: How tight should the side rod springs be?

THE MODEL 140 PAVING BREAKER:



THE MODEL 160 & 180 PAVING BREAKERS:



TOOL FACTS

TF-005

IN LINE LUBRICATORS

By Andrew Mayer

Because of their design characteristics all percussion air tools require some form of lubrication to reduce the friction and heat that can lead to premature wear of internal moving parts and/or possible failure of those parts. For construction and rental applications the most common device used to provide lubrication is the in-line lubricator or oiler.

In-line oilers were designed to efficiently lubricate air tools and other pneumatic equipment downstream from the compressor. The oiler provides lubrication that allows the moving parts such as pistons, tappets and valves to operate freely with a minimum amount of friction. This reduced friction allows parts to perform to their design specifications eliminating the possibility of premature wear and failure that can occur from heat build up. The flow of lubrication also acts as an internal cleansing system that deters natural dirt and contamination, which is found in most air systems, from easily becoming stuck on internal surfaces and interfering with the performance of the tool. This natural cleansing affect of lubrication is important for all tools and can be further enhanced greatly by periodic flushing of the tool with some form of low flashpoint solvent.

In most typical air systems a lubricator is installed right after the compressor and it “mists” the airflow with oil on its path to the tool. While each construction or rental air system tends to be unique, it is very important to pay close attention to it. The size and condition of all hose and fittings, the pressure setting of the compressor (measured at the panel gauge), the length of hose being used, and the location of the in-line oiler all help to reach the optimum objective of having 90 PSI of clean, well lubricated air at the tool, however far downstream from the compressor it may be.

How many different types of in-line lubricators are there? In this edition of “Tool Facts” we will discuss the two types, “pressure feed” and “constant feed” oilers, and how they both work.

PRESSURE FEED PNEUMATIC LUBRICATORS

Pressure feed pneumatic tool lubricators have the shape of a small football. They consist of an aluminum housing that contains two large reservoirs with a large filler hex cap that is located on the topside. Directly inside the hex filler cap you will find a metering valve. The valve is numbered to indicate different settings that allow for adjustments to the amount of oil being emitted into the system and the tool itself. There is also a sight glass on the side of the unit to let you see when the oil is getting low.

The two reservoirs are the most important part of the whole system. The upper chamber where the metering valve is also holds the oil. The metering valve controls the amount of oil entering the air system and also allows air to enter the upper chamber and pressurize it to the same pressure as the rest of the system. The lower chamber is simply a passageway for the air to enter and exit the lubricator.

The lubricator works in this manner. The upper chamber is pressurized to the same pressure as the lower chamber. When the tool is turned on, by depressing the throttle, the air rushes through the lower chamber of the lubricator. When air flow is sufficient the pressure in the lower chamber drops. This difference in chamber pressures allows the oil in the upper chamber to be pushed into the lower chamber and into the air stream, which sends lubrication to the tool. After a short time with the tool running and the air flowing the pressure in the two chambers will equalize again and at that point oil will no longer enter the air stream. This is why pressure feed of oilers are well suited for tools that are periodically cycled on and off.

CONSTANT FEED PNEUMATIC TOOL LUBRICATORS

At this point you may be asking, "What is the difference between pressure feed and constant feed lubricators?" And, "Where do we use constant feed lubricators?"

Constant feed lubricators are used on continuous running air tools such as rock drills and air motors. These tools are run continuously and not constantly cycled on and off. Because these tools run for extended lengths of time they require more lubrication. A constant feed lubricator is designed to push oil to the tool "constantly".

While constant feed lubricators look the same as pressure feed units and have the same metering valves that can be adjusted they do differ in design and operation. The difference is that a constant feed lubricator is equipped with a check valve that connects the upper and lower chambers. When the air supply is shut off, meaning the throttle to the tool is closed, both the upper and lower chambers will equalize to the line air pressure (90 PSIG). As long as the two chambers are at equal pressure no oil will be emitted. So, the purpose of the check valve is to insure that the upper chamber is at an even pressure of 90 PSIG.

When the throttle is open, and air starts to flow to the tool, the lower chamber pressure drops to 85 PSIG, lower than the upper chamber. This allows the upper oil filled chamber, which remains at 90 PSIG, to push oil into the lower air chamber and into the air system and this will continue as long as the throttle is open or until the oil chamber is empty.

Hopefully this short explanation of in-line oilers is informative and will help you understand the necessity of using in-line oilers to maximize your tool performance and cut down on repair bills.