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## THE CARE AND MAINTENANCE OF POWER SAWS(1.1)

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### MAINTAINING POWER SAWS

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The task of maintaining the power saws (both chain and circular) on our apparatus at LFRA is essential in assuring that the tactical operations that employ them are safe and efficient. We use several different models of saws at LFRA. Currently in our chainsaw inventory we have Stihl model numbers 038, 044 (MS-440), 046 (MS-460), and MS-200T. In our circular saw inventory we have Stihl TS-400, Husqvarna (Partner) K-960, Partners K-950 and K-970. The following sections address the basic maintenance and adjustment for each of these saws.

#### **Fuel**

Proper fuel is important in keeping a saw in good running order. Both of our major saw manufacturers recommend using gasoline with an octane of 89 or greater and an ethanol content of no more than 10%. All of the LFRA rescue saws use a fuel mixture of 50:1 with the exception of the concrete cutting chain saw on the Heavy Rescue which uses a mixture of 25:1. It is recommended that a name brand 2 cycle oil (Stihl or Husqvarna) be used in the mixture due to blending by the manufacturer for the ethanol content in the gasoline that we use. The fuel should be mixed per the directions on the oil container. A good quality fuel stabilizer should be added to the fuel mix as to prolong its shelf life. Both companies recommend that fuel should not be stored over three (3) months even with the addition of a fuel stabilizer.

**Note:** Due to our limited use of fuel mix on a day-to-day (week-to-week) basis, we should be mixing our fuel one (1) gallon at a time for storage on the apparatus and not in larger quantities for storage in the stations. The fuel should be kept in sealed storage containers (gas cans) that are air tight.



## **Daily Maintenance**

1. Visually inspect the saw. Look for signs of use or damage. If either of these are found then go to the After Use section of this manual for a more detailed maintenance. If not continue with the daily maintenance.



Figure 1

2. Check fuel and oil levels on chainsaws and top off as needed.





Figure 2

3. Check fuel level on circular saws and top off as needed.
4. **Tighten the caps by hand to avoid damaging the caps and gaskets.**



Figure 3



Figure 4



## Weekly Maintenance

The weekly maintenance on the power saws starts with the daily check and continues with a more detailed inspection.

**Note:** Always wear gloves when performing the weekly maintenance.

## Chainsaws

### **Chain Inspection**

1. Remove the bar cover (sheath) and inspect the chain. Check the sharpness of the cutting teeth on the chain. The carbide teeth on the ventilation saws and arbor saws should be sharp with a clean edge. The cutting teeth on the forest fire saws should be extremely sharp. The teeth on top of the bar should be pointing toward the tip of the bar (see Figure 5 and 6).
  - a. Carbide chains - replace the chain if it has **12 or more** teeth broken or missing **4 or more** teeth in a row.
  - b. Arbor saw – replace the chain if it has **8 or more** teeth broken or missing **4 or more** teeth in a row.

Notify the saw maintenance personnel if the teeth are dull or damaged. The repairs or sharpening shall be completed by a qualified person.



Figure 5



Figure 6

2. Check the chain tension. The chain should fit snugly against the bottom of the bar. With the chain brake off it must still be possible to pull the chain along the bar by hand. If not, re-tension the chain.



Figure 7



## Adjusting the Chain Tension on the Chainsaw

1. Loosen the bar nut(s) using a screwdriver (see Figure 8).
2. Hold up on the tip of the bar and use the screwdriver end of the screwdriver to tighten or loosen the chain as needed (see Figure 9).
3. Tighten the bar nut(s) while still holding the bar.
4. Re-check chain tension (see Figure 7).



Figure 8



Figure 9

The photos below show the location of the adjusting screw on the other two models of saw we use. The rest of the adjustment procedure is the same for all of the chainsaws.

**Note:** the 044/440 saw is the same as the 046/460.





## Chainsaw Operation Test

1. Don safety glasses and hearing protection.
2. Start the saw.
3. Release the chain brake and run the saw to full rpm for approximately 10 seconds.
4. Slow the saw to idle and re-engage the chain brake.
5. Set the saw on a **non-concrete** surface and allow it to idle for 5-10 minutes.
6. When the idle is complete, release the chain brake and run the saw to full rpm for approximately 15 seconds. During this time check to see that the chain oiler is working by placing the tip of the bar next to a flat surface and watching for a trail of oil to appear on that surface.
7. Slow the saw to idle and check to see that the chain fully stops at idle.
8. Re-engage the chain brake and shut the saw off.
9. Wipe off any excess oil and top off the fluids.

## Circular Saw

### Cutting Wheel

1. Make sure the cutting wheels turn freely without any binding.
2. Check the belt tension.

### Blade Inspection

1. Check carbide blades for chips and cracks in the teeth and blade (see Figure 10).



Figure 10



## Composite Blades

1. Check composite blades for chips and cracks, the cutting edge should be relatively smooth.
2. Check for oil or fuel spilled on the blade.
3. If it has been contaminated or is damaged then replace it with a new one.



Figure 11

## Circular Saw Operation Test

1. Don safety glasses and hearing protection.
2. Start the saw.
3. Run the saw to full rpm for approximately 10 seconds.
4. Slow the saw to idle and set the saw on a **non-concrete** surface. **Caution:** the circular saw does not have a blade brake. Allow the blade to come to a complete stop before setting it down.
5. Allow it to idle for 5-10 minutes.
6. When the idle is complete, run the saw to full rpm for approximately 15 seconds.
7. Slow the saw to idle and check to see that the blade stops at idle.
8. Shut the saw off.
9. Wipe off any excess oil and top off the fluids.





## **After Use Maintenance for Power Saws**

The maintenance of a power saw after it has been used varies in the type and length of the usage. For example, a chainsaw that has been used to cut one pallet for training will probably not need as extensive of a cleaning and maintenance as one that has been used for ventilation or overhaul at a structure fire. Likewise, a circular saw used to cut off a piece of rebar will not need the same cleaning and maintenance as one used to cut concrete during an all-day SOT training. The point is that a saw does not need to be completely torn down and re-assembled every time that it is used. The condition of the saw should determine the amount of tear down needed to clean and inspect it.

The main items that must be addressed after any use include

- Air filter system
- Cutting system and its drive components
- Air intake and cooling fins
- Starter
- Safety components.

It is acceptable to wash these units off with a degreaser and hot water. Remember to keep water out of the muffler and air filter systems. After you are done washing use compressed air to dry the parts before re-assembly. After you are done start the unit and run it to operating temperature. Once you are done re-assembling the saw you should do a weekly maintenance check to make sure that saw runs and is adjusted correctly. This will allow the heat from the engine to dry any excess water to help prevent corrosion and to lubricate any moving parts that were degreased during the cleaning.

Please reference the following hyperlinks to Power Points that outline the detailed after use maintenance for the particular saws that LFRA utilizes.

### **After Use Maintenance for Chainsaws**

#### **Stihl 038**

<V:\Fire\Training Division\LFR Training Materials\Power point presentations\Power Saw Maintenance\Stihl 038 Maintenance AU.pptx>

#### **Stihl 044/MS440 & 046/MS460**

<V:\Fire\Training Division\LFR Training Materials\Power point presentations\Power Saw Maintenance\Stihl 440,460 Maintenance AU.pptx>

#### **Stihl MS200T**

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### **After Use Maintenance for Circular saws**

#### **Stihl TS400**

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#### **Husqvarna/Partner K950-K970**

[V:\Fire\Training Division\LFR Training Materials\Power point presentations\Power Saw Maintenance\K950 thru K970 Circular Saws\\_AU.pptx](V:\Fire\Training Division\LFR Training Materials\Power point presentations\Power Saw Maintenance\K950 thru K970 Circular Saws_AU.pptx)

### **REFERENCE INFORMATION**

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- Instructional materials reference from Stihl, Husqvarna and Partner corporate user manuals.
- The safety requirements and instructions for implementing a training session on this subject are included in the lesson plan which can be found at the following link.
- <V:\Fire\Training Division\LFR Training Materials\Lesson Plans\MISC Lesson Plans\Power Saw Maintenance.doc>