Y**EAR 12 APPLIED TECHNOLOGY**

**WEEK 3**

**STRAND: MACHINES & ENGINES**

**LESSON 26: ADJUSTING CARBURETTOR**

**LEARNING OUTCOME: IDENTIFY THE PROCESS IN CARBURETTOR ADJUSTMENTS**

* A carburettor mixes fuel and air in the correct proportion for use by the engine.
* The three types of carburettors commonly used in small engines are natural draft, updraft, and downdraft.
* These names describe the direction that air flows from the inlet to the engine manifold.

Here's how to adjust the typical three adjustment carburettor:

* **Step 1**: With the engine running, open the throttle wide. Turn the high-speed adjustment needle forward and backward until the highest speed setting is found.

* **Step 2**: Move the throttle to the slowest running speed. Adjust the idle-speed needle until the recommended idle speed is found.
* **Step 3:** Once the idle speed has been set, adjust the idle mixture until the engine runs smoothly.

*To set the correct idle speed, turn the idle adjustment screw with a screwdriver*



**LESSON 27: ADJUSTING GOVERNORS**

**LEARNING OUTCOME: IDENTIFY THE PROCESS OF GOVERNORS ADJUSTMENT**

* A governor is a device that controls the speed of the engine as the load changes.
* As the load slows the engine down, the governor opens the throttle to return the engine to a set speed.

* Two types of governors are installed on small engines: mechanical and air-vane.
* A mechanical -- also known as a counterbalance or flyweight -- governor uses the centrifugal force of the engine's rotation to measure the load on the engine.
* **STEP 1**-You should do an inspection of the governor linkage and spring before trying to solve either of these problems. Make sure everything is operating freely and the spring is not damaged or stretched.
* **STEP 2**- Check the governor static adjustment to see that all free play has been removed between the spindle and carburetor. The best way to do this is to move the throttle from idle to full open and note the way the governor shaft moves. If it goes clockwise, then loosen the clamp screw and with the throttle wide open turn the shaft all the way clockwise and re-tighten the nut. Make sure the throttle moves from idle to full open freely after making the adjustment.
* **STEP 3**- After you have made the above check, restart the engine and see if the governor now operates correctly. With the engine at idle, move the governor lever with your finger to open the throttle and it should push the arm back toward idle if working properly.

* An air-vane governor uses the air from the rotating flywheel to determine the speed of the engine.
* The big problem with air vane governors is debris sometimes collects in the system blocking air flow. When this happens the engine will over speed. So, with an air vane system it is very important to keep the cooling fins clean so the proper amount of air can move through the engine. The governor spring is precisely calibrated for an engine that has full air flow going through it. If the air flow is blocked it can over speed the engine.

**REPAIRING IGNITION SYSTEM**

* An ignition system in a small engine produces and delivers the high-voltage spark that ignites the fuel-air mixture to cause the combustion.
* A small engine ignition includes the ignition controller (mechanical-breaker, capacitor-discharge, or transistor-controlled), spark plugs, flywheel, and wiring.

**LESSON 28: SERVICING NON BATTERY IGNITION SYSTEM**

**LEARNING OUTCOME: IDENTIFY THE STEPS IN SERVICING NON BATTERY IGNITION SYSTEM**

* A magneto applies magnetism to supply electricity in ignitions where there is no battery. The magneto is turned by the crankshaft, which rotates when the manual recoil starter is pulled.
* **Step 1**: Service magneto.
* **Step 2:** Service ignition controller.

* **Step 3**: Service spark plug(s).
* **Step 4**: Service flywheel.



**LESSON 29: SERVICING SPARK PLUG**

**LEARNING OUTCOME: IDENTIFY THE STEPS TAKEN TO SERVICE SPARK PLUG**

* The spark plug in a small engine must withstand high voltage, high heat, and millions of ignitions during its life.
* A new spark plug requires about 5,000 volts of electricity to jump the gap.
* A used spark plug may require twice as much voltage to function.
* **Step 1**: Disconnect the lead wire from the top of the spark plug.
* **Step 2**: Using the appropriate spark plug wrench, loosen the plug from the cylinder head. Before removing the plug, clean debris from around the spark plug base.
* **Step 3**: Note the electrode's appearance. Excessive buildup can mean incorrect fuel-air mixture.
* **Step 4**: Clean the spark plug surface with a soft cloth and the electrode with a wire brush or spark plug cleaning unit. If the electrode is worn or damaged, replace the spark plug with one of the same size and heat range to avoid any damage to the engine.
* **Step 5**: Using a feeler gauge, set the gap on the spark plug electrode to the manufacturer's recommendations.

**LESSON 30: MIXING FUEL-OIL FOR TWO STROKE ENGINES**

**LEARNING OUTCOME: IDENTIFY THE MIXTURE COMPONENTS & ITS METHOD OF MIXING**

* A two-stroke engine is lubricated by mixing oil with the petrol. This fuel-oil mixture can be purchased as such, or you can mix it yourself.
* **Step 1**: Check the manufacturer's recommendations for the specific ratio and grade of oil and fuel to be mixed.
* **Step 2**: In a vented gas can used only for mixing, pour a specified amount and petrol.
* **Step 3**: Add the correct amount of recommended oil for the fuel-oil ratio. A gallon contains 128 ounces. A fuel-oil ratio of 50:1 means 50 ounces of fuel should have 1 ounce of oil added, or you should add about 2.5 ounces of recommended lubricating oil to every gallon of recommended petrol. A 25:1 fuel-oil ratio requires about 5 ounces of oil per gallon of fuel. Also pour in any additives recommended by the manufacturer.

* **Step 4**: Make sure all caps are securely fastened to the mixing gas can, and shake it to thoroughly mix the fuel and oil.
* **Step 5**: Carefully pour the resulting fuel-oil mixture into the engine's fuel tank. Step 6: Whether you purchase fuel-oil mixed or mix it yourself, rotate the fuel tank in a circle a few times to remix the fuel and oil before each use.
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**ACTIVITY**

1. State the function of a carburetor
2. Identify the types of carburetor
3. What is used in the lubrication of a two stroke engine?
4. Name the two types of governors commonly used.
5. State a disadvantage of air vane governors