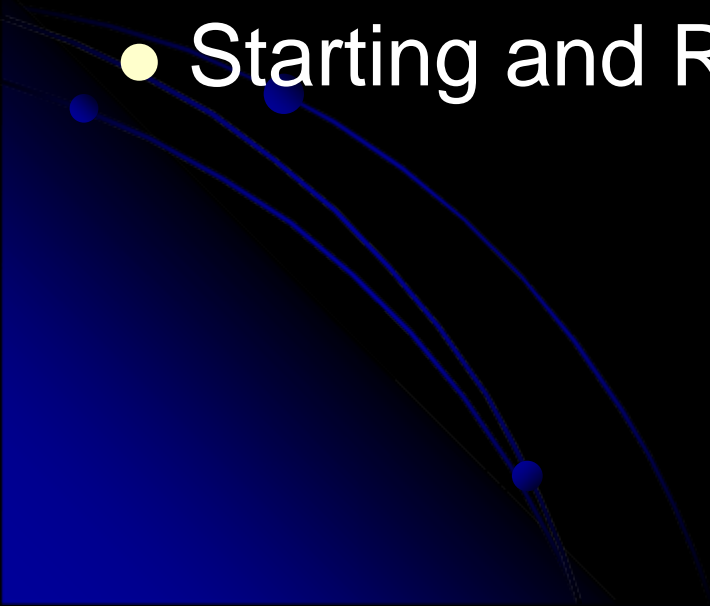


Model Airplane Flight School

Topic 4 – Engines

Engines

- **Parts of an Engine**
 - Engine Size and Number of Cycles
 - **Choosing an Engine**
 - Fuel
 - Starting and Running a Model Engine
- 



Like motors, engines come in all sizes.



Parts of an engine.

The Parts You See



Crankcase or block



Cylinder head and glow plug



Carburetor



Muffler

The Parts You Don't See



Cylinder liner



Piston

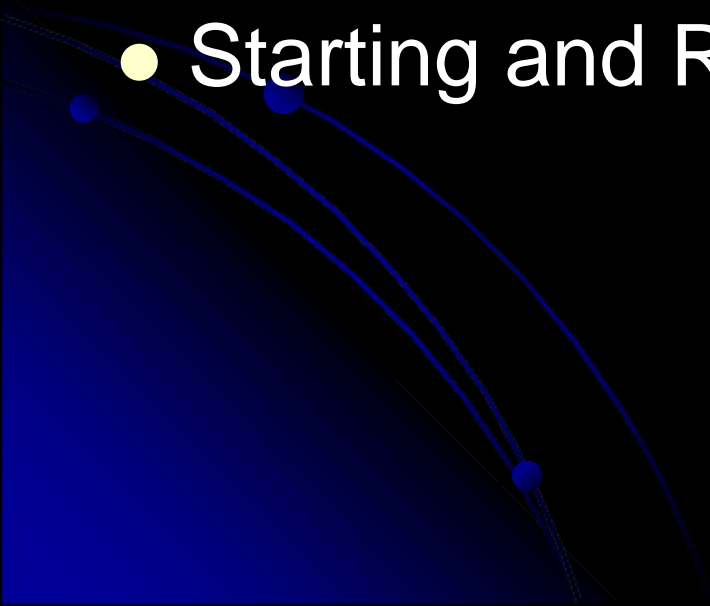


Crankshaft



Bearings (and prop driver)


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Engine Size

- Size is typically measured as displacement.
- Displacement is the internal size of the cylinder.
- For example a “40” size engine is .40 cubic inches of displacement.
- A “60” size engine measures .60 cubic inches of displacement.
- Typical engine sizes for trainer aircraft are in the .40 to .60 range.
- Generally, the larger the displacement, the more power is created.

Cycles or Strokes

- Most engines for model airplane use are considered either “2 cycle” or “4 cycle”.
 - This means the engine incorporates either 2 or 4 strokes per cycle.
 - The strokes refer to number of piston movements per combustion process.
- 

4-Stroke Engine

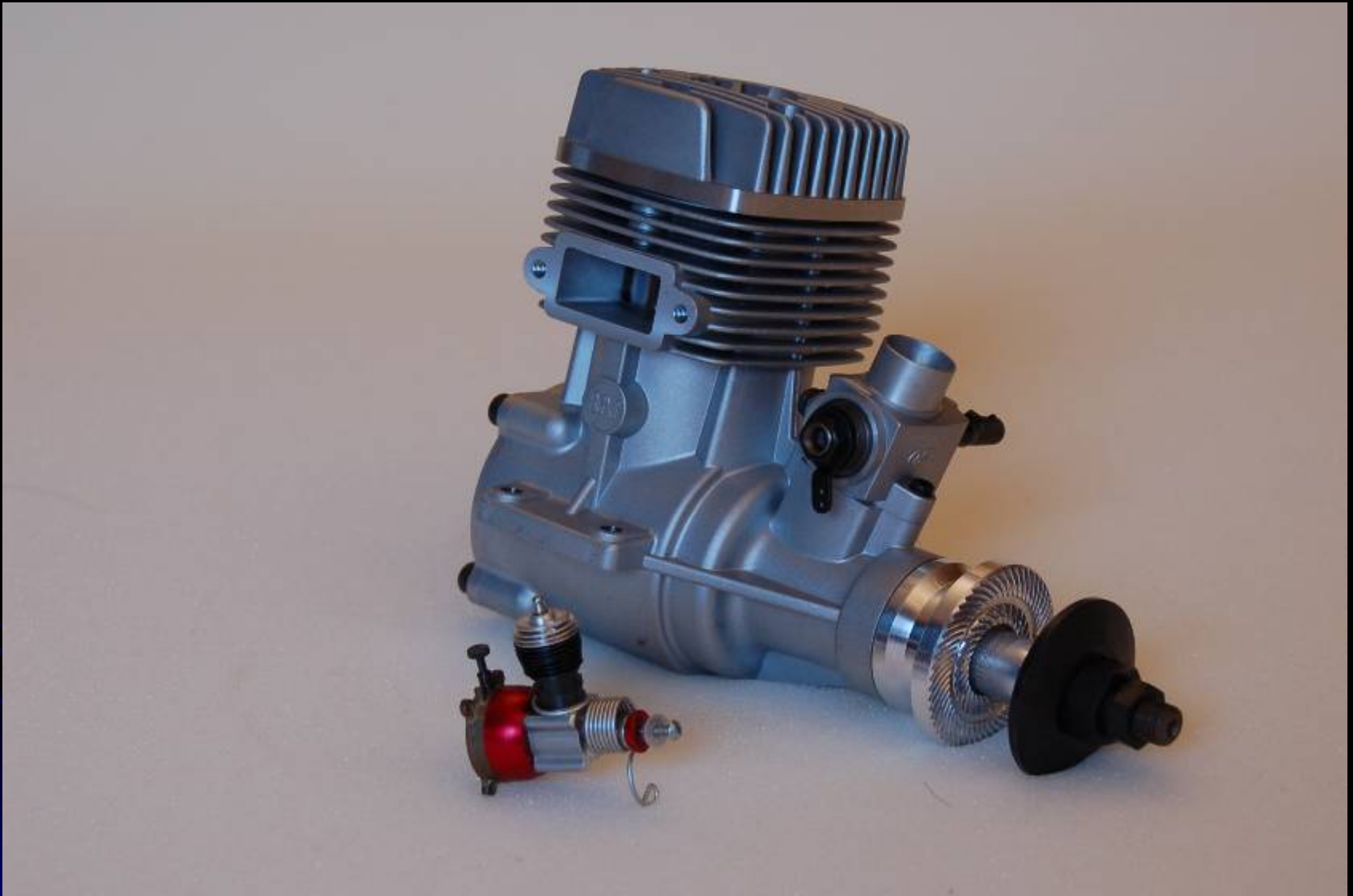
- The 4 stroke/cycle engine draws in the air and fuel on a down stroke of the piston.
- As the piston travels on the up stroke it compresses the mixture and ignition occurs.
- The resulting down stroke of the piston is the power stroke.
- The burned gasses are exhausted on the next upstroke of the piston.
- These 4 strokes result in two complete revolutions of the crankshaft and propeller.



A four-cycle model engine.

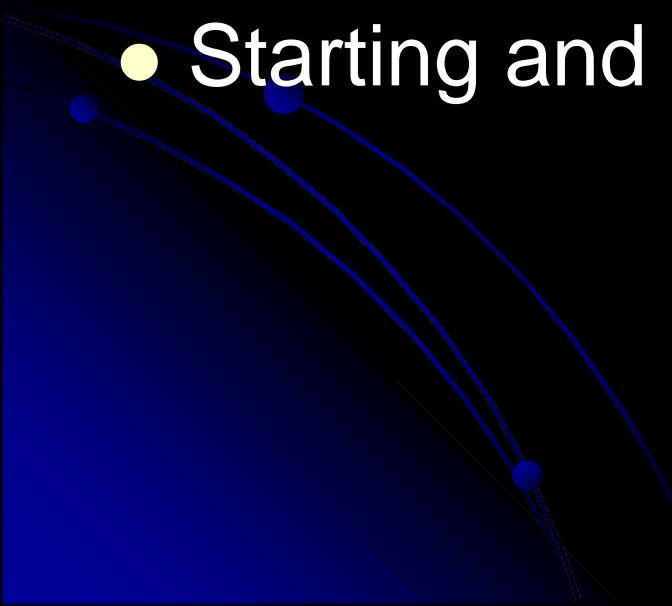
2-Stroke Engine

- The 2 stroke/cycle engine draws in the air and fuel and compresses it on a single up stroke.
- When the mixture is ignited, power is produced and the exhaust gases pushed out on a single down stroke.
- These two strokes result in one complete revolution of the crankshaft and the propeller.



Examples of two-cycle model engines.

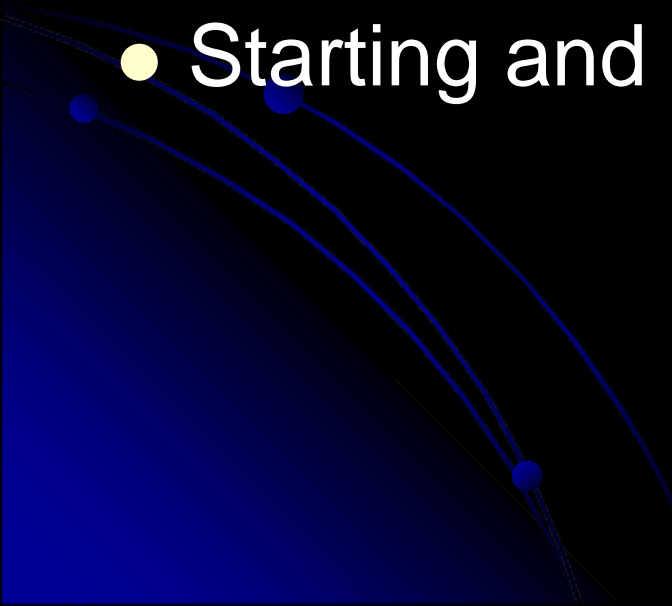
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Considerations in Choosing an Engine

- Most manufacturers will recommend an appropriate engine size.
- Generally, 2 stroke engines produce more power at higher RPMs than 4 stroke engines of the same size.
- Most people find the sound of a 4 stroke engine more pleasing and realistic.
- Four-stroke engines are generally more expensive than 2 strokes.

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Glow Fuel

- Glow fuel is a blend of
 - Alcohol (methanol)
 - Nitro-methane
 - A lubricant
- Glow fuel is hygroscopic: It absorbs moisture.
- The nitro-methane is corrosive to engine parts like ball bearings.

Gasoline

- Some folks use regular gasoline in engines designed for it.
- Gas is also mixed with a lubricant similar to that used in the glow fuel.
- Fuel tanks and fuel tubing and fittings need to be compatible with the gasoline.
- Gas is more volatile than glow fuel so caution is paramount.

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Safety When Starting an Engine

- Restrain the model. Use either a restraining device (stooge) or get a helper.
- Set the throttle control stick to idle with a little bit of trim.
- Flip the prop with a “chicken stick” or use an electric starter.
- Be sure all wires are clear of the prop.
- Never get distracted when you have a running engine.
- NEVER throw something (like a rag) into a prop to stop it



Use a glove, a “Chicken Stick”, or ...



Better yet, an electric starter.

Remember

- A spinning prop will not give you a second chance!

