



Overview

Fandrich toppers are designed to rapidly remove a significant portion of tree crowns with helicopters that stay above the forest canopy. The topper hangs on the cargo hook of the helicopter and can be released in an emergency.

Fandrich toppers are based on Fandrich aerial shear technology patented in Canada and the United States. They should not be used with helicopters having a net lift in excess of 1800 pounds. The pilot controls the cutting action through switches on his control stick.

Caution: Stay clear of the cutting arm and knife at all times.

Instructions for Ground Crew

Caution: If the arm is not completely open, shut off the machine engine before clearing debris as the arm may unexpectedly open by itself.

Local safety regulations must be respected at all times and take precedence over the following practices. The ground crew should wear suitable shatterproof eye protection, ear protection, safety headgear with chin straps, gloves and reflective vests. The ground supervisor should be easily identifiable and should stay on the pilot's side of the helicopter so the pilot can see him at all times. All ground crew should understand any signals arranged between the supervisor and the pilot.

Top up 4-stroke Honda engine fuel tank with gas whenever helicopter is being refuelled.

In very cold weather, the following procedures may be used:

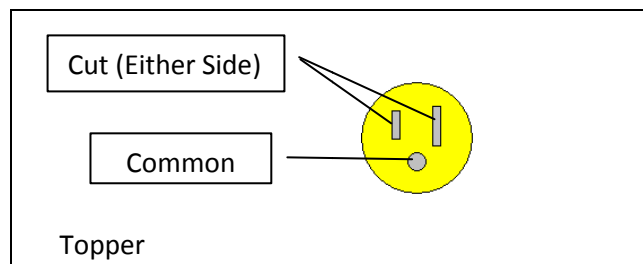
- Switch to AW22 hydraulic oil
- Prior to starting the engine cold, place the engine and pump under a blanket and heat the engine with a portable heater. (Ensure the heater does not cause any

localised danger of fire or melting. No blowtorch should be used on the engine or other equipment.)

- Prior to starting the engine cold, remove the pump from the mounting bracket and start the engine unloaded. When the engine is warm, stop the engine and re-attach the pump. (The mounting bracket should not be removed from the engine.)
- Shut fuel off and let the engine stop by itself at the end of the working day.

Wiring Details

Fandrich toppers are controlled by a three-wire electrical cable ending in a household electrical plug that is to be connected to the helicopter. Only one switch to 24 volt power and a return wire are required.



The cutting arm closes to cut when the cutting switch is on and automatically returns to the fully open position when the switch is released.

Power between the cut switch and return closes the cutting arm until it contacts a built-in limit switch. When the cut switch is open the cutting arm opens until it contacts another built-in limit switch. The wires connect to a solenoid valve that switches the flow of hydraulic oil pumped by a Honda engine. A light on the solenoid indicates when the circuit is complete and the solenoid is activated.

Troubleshooting

If the arm stops moving or has sluggish movement, check that there is no build-up of debris or snow on the limit switch that triggers as



the arm closes and check that there is no debris on the arm trigger that contacts the limit switch. This debris may cause the switch to stick open.

Servicing Instructions

Servicing instructions for the Honda engines are provided separately in Service Bulletin #1/4.

Continually (at least daily): Inspect cables for damage or wear. Replace frayed or damaged cables immediately. Remove any debris from the closed arm limit switch and the arm trigger for this limit switch.

Daily: Grease cutting arm guide and bushings.

Every 10 hours (or when a leak is observed): The hydraulic oil level should be checked. The level should be 2" below the top of the oil tank cap when the machine is level. On observing an oil leak from a loose fitting, the fitting should be tightened. On observing oil leaks from other sources, contact Fandrich Cone Harvesters. AW32 hydraulic oil should be used in the machine or AW22 hydraulic oil in very cold weather.

Proper operation of the Fandrich topper depends on careful alignment of the blade with the anvil. For this reason the blade should not be sharpened in the field.

Preflight Checks

Ensure that the three wire rope support cables are securely fastened to the kevlar body. Check cables continually for damage and wear. Replace frayed or damaged cables immediately. It is extremely important that the cables cannot separate from the kevlar body and fly into the helicopter rotors.

1. Lay the cables out to their full length, approximately 30 feet. If necessary, untangle the cables and place the cables parallel to each other.

2. Hang the cable teardrop on the helicopter cargo hook or have the ground crew attach it once the helicopter is airborne. Ensure that the front of the spreader bar faces forward to give a more steady flight. Attach the electrical connector to the helicopter.
3. Ensure that the cargo hook unlocking mechanism on the helicopter is working satisfactorily.
4. Remove the pilot's door and unnecessary articles to reduce the helicopter weight. Take only enough fuel for an hour's flight plus an adequate reserve.
5. Top up 4-stroke Honda engine fuel tank with gasoline. Check crankcase oil level of the engine.
6. Start Honda engine. Once engine is warm, open throttle fully.
7. Check operation of shear by having the pilot open and close the cutting arm.
8. Ensure that the equipment used to communicate to the ground crew is fully operational.

Instructions for the Pilot

Local safety regulations must be respected at all times and take precedence over the following practices. Tree topping is strenuous flying and can lead to pilot fatigue. Take 15 minute rest breaks after each hour of flying. A good plan is to double pilot and alternate during refuelling stops. Fly no more than 4 hours per day topping trees.

1. Ensure that the cables do not tangle as the helicopter lifts off.
2. Ensure no people are in the vicinity of the tree to avoid any danger from the falling tree top.
3. Lower the Fandrich topper over the tree to 2 to 3 feet below the desired cutting height. Ensure that no other tree or snag interferes with the helicopter operation.



4. Raise the topper to the cutting height and close the shear arm. Keep a slight upward pull on the topper to keep the cables taut; the cables should not slacken while cutting.
5. Move to the next tree and repeat.

As there is an inherent risk of branches being caught in the equipment, the equipment should not be flown directly over the ground crew.

Should the engine stall during a cut, the cut switch should be turned off to open all hydraulic lines so that the shear arm can be wiggled free more easily.

Suggestions for Faster Topping

1. Fly paths that minimize distances between cuts.
2. When possible, transport toppers to the worksite by truck or trailer. Aerial ferrying of toppers reduces helicopter air speed to about 80-90 mph.

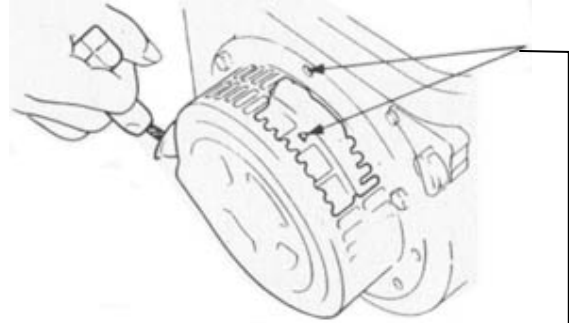
The main factors affecting topping rates are the size of the tree-tops and the density of trees to be topped. The speed of collections also depends on the shape of the treetops, the size of the helicopter, and the skill of the pilot. Pilots with vertical reference skills require only two to three hours to become proficient with the Fandrich topper.

Transporting Toppers

In securing a topper to a truck or trailer, ensure that the main body of the topper is held tightly and cannot move vertically or transversely. Keep in mind that a topper has an uneven distribution of mass.

Prior to transport, shut off the fuel valve on the Honda engine and pull the starter rope slowly until a resistance is felt. Continue pulling the rope until the notch on the starter pulley is on top. At this point, all valves are closed so that water and

dirt will not enter the engine through the exhaust or carburettor during transport. The engine should be covered with a plastic garbage bag.



Align the mark on the starter pulley with the hole at the top of the recoil starter.

Dimensions and Weight

	Approximate dimensions	Approximate weight
Topper	7.1'x8.1' x4' high	480 lb

