Overview

Fandrich aerial branch collectors are designed to rapidly collect a large volume of seed bearing cones or scion material with the aid of a helicopter. The pilot lowers the branch collector over a tree, then raises it to remove cones and branches which then fall into a wire cage surrounding the rake head. When full, the wire cage is dumped at a central unloading site. In operation a Fandrich machine is connected to the cargo hook of the helicopter so that in case of a problem, the pilot can release the rake.

Fandrich branch collectors weight about 310 pounds. They should not be used with helicopters having a net lift in excess of 1800 pounds. Fandrich branch collectors use technology patented in Canada and the United States.

Caution: Stay clear of the cutting blades at all times.

Instructions for Ground Crew

Caution: Never reach over the blades to clear debris while the helicopter is attached and overhead or if there is any possibility of the ground crew or machine slipping or otherwise moving.

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.

Unloading Instructions

The ground crew must stand clear and watch the Fandrich branch collector while it is set down and must not approach the machine until it is grounded or until advised by the ground supervisor that it is safe to do so.

1. The pilot should lower the Fandrich branch collector at the unloading location until the main cables are sufficiently slack.
2. One member of the ground crew should push the cage lever and step back.
3. The pilot should raise the helicopter so that the cables tighten, thereby raising the wire cage so that the cones and branches begin to fall out. The helicopter should continue to rise until the cables between the wire cage and fibreglass cone tighten and the fibreglass cone is lifted free of the ground. At this stage, most of the branches and cones should fall free of the rake.
4. The ground crew can remove any remaining branches. When the rake is free of branches and cones, the ground crew should stand clear and watch the branch collector.
5. The pilot should lower the rake until the cage is resting on the ground. This will reset the unloading cables
6. When the ground supervisor signals that all is clear, the pilot should raise the rake and fly away for another load.

Servicing Instructions

Continually (at least daily): Inspect cables for damage or wear. Replace frayed or damaged cables immediately. Remove any debris from the cage lever mechanism.

Instructions to Change to Manual Cable Hooking

Although the branch collector is designed for one-touch raising of the cage, a manual cable

attachment is included as a back-up system. If the cage is set up this way, for unloading the branch collector the ground crew will need to hook the chain links attached to the main support cables onto the hooks on the wire cage. (Unloading Instructions Step 2). Once the machine has been unloaded and the cage has been lowered onto the fibreglass cone on the ground, the ground crew will need to unhook the rings on the main cables from the hooks on the wire cage (Unloading Instructions Step 5).

The following procedure sets up the manual cable links:

1. Mark the locations on each of the three main support cables where the small cage cables are connected to the main support cables. Remove the small cage cables from the main support cables and fasten the loose ends to the wire cage to prevent the cage cables from interfering with the raking operation.
2. Attach the three chain links to the main support cables with the large ring hanging free at the same location that the small cage cable had been attached.
3. Rotate the wire cage on the bottom lip of fibreglass cone until the three hooks on the top of the cage are next to the main support cables.
4. Ensure that each of the three main support cables are **securely** fastened to the three metal support lugs at the bottom of the fibreglass cone. It is not necessary to disconnect the main support cable from the fibreglass cone.
5. Pass the main support cables through each of the U-clamps on the side of the wire cage so that the cables slip up and down easily in the U-clamps.

Preflight Checks

Ensure that the three wire rope support cables are securely fastened to the fibreglass 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 fibreglass body and fly into the helicopter rotors.

1. Lay the cables out to their full length, approximately 35 feet. If necessary, untangle the cables and place the cables parallel to each other.
2. Ensure that the cargo hook unlocking mechanism on the helicopter is working satisfactorily.
3. 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.
4. Ensure that all twelve bolts fastening the Fandrich rake head to the fibreglass cone are secure.
5. Ensure that the main support cables are securely fastened to the fibreglass cone and that they are not frayed. **It is of utmost importance that a cable cannot separate from the fibreglass cone so that it does not fly up to become entangled in the helicopter blades**.
6. Ensure that the equipment used to communicate to the ground crew is fully operational.
7. Attach the swivel hook on the end of the cables to the cargo hook of the helicopter or have the ground crew attach the swivel hook once the helicopter is airborne.

Instructions for the Pilot

Local safety regulations must be respected at all times and take precedence over the following practices. Cone collecting 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 3 1/2 hours per day harvesting cones.

1. Ensure that the cables do not tangle as the helicopter lifts off.
2. Lower the Fandrich branch collector over the tree until it is below most of the cones or until it is stopped by branches. Do not lower the branch collector below branches that are too large to be severed. Ensure that no other tree or snag interferes with the helicopter operation.
3. Move the rake so that the tree trunk enters one of the slots.
4. Raise the rake to cut or strip the branches.
5. If more cones can be harvested efficiently from the same tree, repeat the procedure without allowing the tree top to move out of the fibreglass cone.
6. If the rake is below a branch that is too big to be cut, lower the rake slightly further, centre the rake so that the tree moves out of the slot and into the large opening in the rake head, and then raise the rake without cutting branches.
7. When the cage is full, fly to the unloading site and lower the branch collector to be unloaded as described above. As there is an inherent risk of dropped payload, the equipment should not be flown directly over the ground crew. Wait for the signal from the ground supervisor that all is clear for liftoff.

When detaching the branch collector from the cargo hook, ensure that the rake is firmly on the ground and that all ground crew are clear before dropping the cables.

Suggestions for Faster Collections

1. Fly paths that minimize distances between cuts. Generally fly out empty and collect tops on the way back so that the longest flight is with an empty cage.
2. Select unloading sites that are below the stand being harvested. It is easier to fly upward with the cage empty than upward with the cage full.
3. When possible, transport branch collectors to the collecting site by truck or trailer. Aerial ferrying of branch collectors reduces helicopter air speed.

The main factors affecting collecting rates are the number and size of the cones on the tree-tops, the density of collectable trees in the stand and the flying distances. The speed of collections also depends on the species being collected, the shape of the treetops, the size of the helicopter, the efficiency of the ground crew and the skill of the pilot. Pilots with vertical reference skills require only two to three hours to become proficient with the Fandrich branch collector.

Transporting Branch Collectors

In securing a branch collector to a truck or trailer, ensure that the main body of the branch collector is held tightly and cannot move vertically or transversely. The cage should also be held to the branch collector body.

A branch collector should not be transported on its side without a special brace between the rake head and the cage and without the cone body being held to the bottom of the cage. Contact Fandrich Cone Harvesters for more details.

Dimensions and Weight

	Approximate dimensions	Approximate weight
Branch Collector	8.2’x8.2’ x4’ high	310 lb

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