

Guide to Using the BigFoot BF300 Baler

TO COMPACT AGRICULTURAL PLASTICS FOR RECYCLING

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FIGURE 1. BIGFOOT BF300 BALER, WITH 1000-POUND BALE OF COMPACTED AGRICULTURAL FILM IN THE BALING CHAMBER, READY TO EJECT.

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SECTION 1.**WHY COMPACT PLASTIC FOR RECYCLING?**

The problem of waste plastic has bothered farmers for years. Recycling offers a solution. It conserves energy and resources, usually saves farmers the cost of tipping fees for landfill disposal, and offers a legal alternative to open burning.

However, it is expensive to collect and transport recyclables, so recycling programs must be efficient. No one wants to pay to move dirt, debris, air, or moisture so plastic should be kept as clean as possible and loose or bulky materials should be compacted.

These Guidelines explain how to use a BigFoot BF300 vertical stroke baler to compact waste agricultural plastic into dense, square, stackable bales that fit neatly into the enclosed van of a tractor-trailer for efficient transport to recycling markets. Markets want loads with a cargo weight of at least 40,000 lbs. This weight is reached with 40 BigFoot bales, each weighing about 1000 pounds.



FIGURE 2. STORAGE AND LOADING OF BALES READY TO BE TRANSPORTED TO MARKETS.

SECTION 2.

TRAINING REQUIREMENTS

Anyone who will be transporting, loading, assisting, or operating a plastics baler purchased by, or used under the auspices of, the New York State Recycling Agricultural Plastics Program (NYS RAPP) must first be trained in basic baler safety and operational procedures. RAPP staff and others with extensive experience in using the BigFoot BF300 are designated to provide training. RAPP's list of designated trainers and their locations is posted on the RAPP website.

TRAINEE LIABILITY RELEASE FORM. After receiving the basic training and before working with the baler, trainees must sign a required liability release form. By signing the liability release, trainees attest that they received training and take responsibility for their own safety. Baler managers are responsible for keeping these forms on file for a minimum of six years (FIGURE 3).

ADVANCED TRAINING REQUIREMENT TO OPERATE THE BALER INDEPENDENTLY. People who will be operating the baler controls or handling the baler on their own will need additional training prior to taking full responsibility for baler operations. They must first participate in at least one baling event under the supervision of a designated trainer and must be thoroughly familiar with the information in this Guide.

RAPP strongly recommends that people planning to operate the baler independently watch the **BigFoot BF300 training video** and keep it handy for later reference. Once these individuals have adequate training and experience, they will be given a wallet-sized **BigFoot BF300 Operator Certification card** signed by their trainer (FIGURE 4). The trainer will also sign the shaded *Baler Operator Certification* at the bottom of the Trainee Release form (FIGURE 3).

TRAINING REQUIRED FOR EVERYONE. These training requirements apply to farm owners and managers, farm workers and volunteer help, as well as to Soil and Water Conservation District and Extension personnel. Failure to follow the training requirements can void the contract between the agency managing the baler and the New York State Department of Environmental Conservation (NYS DEC), which holds title to the balers.

Recycling Agricultural Plastics Program BigFoot Baler Operator Certification	
I, _____, received advanced training to operate a BigFoot BF300 plastics baler. I have read, understood and signed the Trainee Liability Release on file at:	
[agency]	_____
[trainer/affiliation]	_____
[trainer signature]	_____
[trainee signature/date]	_____

FIGURE 4. BIGFOOT BALER OPERATOR CERTIFICATION CARD.

SUMMARY OF TRAINING REQUIREMENTS

- Basic training required for all
- RAPP trainers provide training
- Trainees sign liability release before using baler
- Baler operators need advanced training
- Advanced trainees get *Operator Certification* card

RECYCLING AGRICULTURAL PLASTICS PROGRAM

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PLASTICS BALER TRAINING REQUIREMENT and LIABILITY RELEASE

Instructions: Prior to working with a BigFoot plastics baler, or a comparable compactor, all persons **MUST**

- Undergo training in safe operation of the baler.
- Sign and date this legally binding liability release, clearly entering all required information.
- **Persons who will be independently operating the baler MUST:**
Undergo sufficient additional training to competently operate and maintain the baler. TRAINERS: Verify this higher level of training by completing and signing the Baler Operator Certification at the bottom of this page; and provide the Trainee with a wallet-sized certification card attesting to this training.

These training requirements apply to anyone assisting or supervising any aspect of operating balers owned by the NYS Department of Environmental Conservation as well as balers owned or managed by other RAPP Partners. (RAPP Partner: entities receiving funds or other resources from RAPP to carry out plastics recycling.)

The required training must be provided by a Trainer designated by RAPP or by a RAPP Partner.

The entity managing the baler (*i.e.*, the Soil and Water Conservation District or other entity named below) must retain this form for at least six years, or for the duration of the Cooperation Agreement with NYS DEC, if pertinent.

BALER TRAINEE LIABILITY RELEASE

I, [TRAINEE name], the undersigned, have received training to operate a plastic baler owned by the New York State Department of Environmental Conservation (NYS DEC) (or by another entity, specified below) and provided for my use by

[entity managing the baler].

Training was provided at [location] on

[date] by [TRAINER name & affiliation].

I hereby RELEASE and forever discharge Cornell University, the Cornell Cooperative Extension Associations and the Soil and Water Conservation Districts of the various counties participating in the Recycling Agricultural Plastics Program (RAPP), the NYS Department of Environmental Conservation, and the People of the State of New York, their officials, employees, heirs, successors, contractors, agents and assigns (Releasees), jointly and individually, from any and all claims arising out of or related to my use and operation of the plastic baler and Releasees' role in providing me training to use and operate the baler, including a claim of negligent training. By signing this Waiver, I also intend to make it binding on my estate, heirs, guardians, legal representatives, family members and assigns.

In the event that I train other individuals ("sub-trainees") in the use of the plastic baler, I agree to obtain a RELEASE in the exact form of the paragraph above from each sub-trainee, and to ensure that the RELEASE is kept on file as described in the instructions above. If I fail to obtain such RELEASE, I agree to defend and indemnify the Releasees from any and all claims arising out of or related to the sub-trainee's use and operation of the plastic baler, including a claim of negligent training.

Signed: _____

Dated: _____

Witnessed: _____

Filename: BalerTraineeLiabilityRelease2014Sept24

BALER OPERATOR CERTIFICATION

TRAINERS: I verify that [TRAINEE name] has experience and training to independently operate a plastics baler of the type(s) s/he was trained to use.

[printed name & signature of TRAINER]

[date]

FIGURE 3. NYS RAPP PLASTICS BALER TRAINING REQUIREMENT AND LIABILITY RELEASE.

SECTION 3.

OVERVIEW OF THE BIGFOOT BF300

The BigFoot BF300 is an integrated unit consisting of a compaction chamber (baler), two hydraulic power systems, and a trailer designed for both on-road and off-road travel (FIGURE 5).

The **compaction chamber** remains permanently attached to the trailer, removed only when undergoing rare, heavy-duty maintenance.

To make a bale, plastic is loaded into the compaction chamber until the chamber and the space above it are full. Loose plastic is compressed by lowering the plunger or compaction ram.

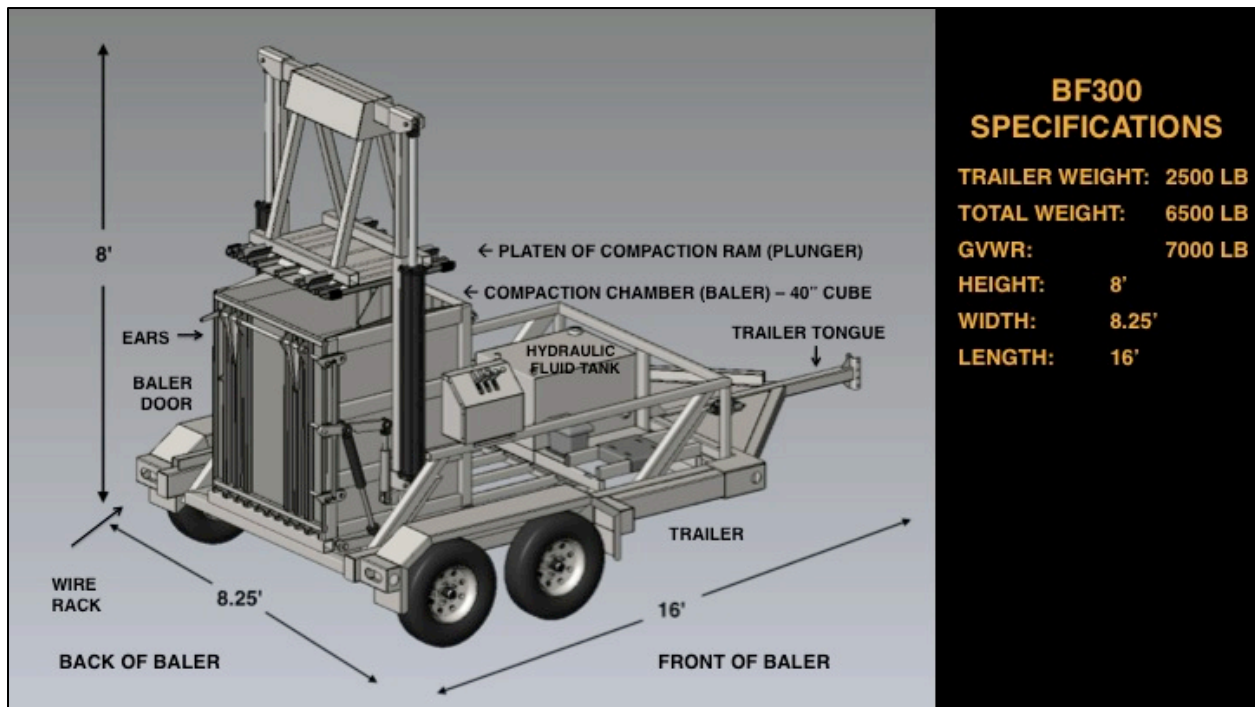


FIGURE 5. BIGFOOT BF300 BALER, MAJOR PARTS AND DIMENSIONS.

BALER HYDRAULIC SYSTEM. The plunger and other moving parts of the baler are powered hydraulically.

A **Honda gasoline engine** runs the hydraulic pump that moves hydraulic fluid from a 50-gallon tank through steel-reinforced hosing to the **control box** where three levers regulate the flow of hydraulic fluid to the moving parts. The engine, pump and fluid tank are all located near the front of the trailer bed (FIGURES 6, 7, 8).

FIGURE 6. HYDRAULIC HOISING AND CONNECTIONS AT THE CONTROL LEVERS, SHOWN WITH THE CONTROL BOX COVER REMOVED.



CONTROL BOX OPERATIONS (FIGURE 7). The lever on the left operates the plunger. The lever in the middle operates the opening and closing of the three door latches (FIGURE 29). The lever on the right lifts and lowers the four ejection feet at the base of the compaction chamber (FIGURES 25, 26). When these feet are raised, the finished bale of plastic is kicked out.

A **hydraulic pressure gauge** and an **emergency off switch** are also located on the control box. When the emergency off button is pushed in, the engine and hydraulic pump shut down immediately, and all moving parts stop.

This is great feature if there is a problem. However, it is difficult to see if the button has been depressed. So—if the baler engine cranks but will not start—check that the emergency off button is not activated (pulled out).

The **hydraulic flow divider** is the rounded aluminum block mounted on the right side of the control box. It ensures that equal amounts of hydraulic fluid are flowing to each of the two cylinders that control movement of the plunger.

FIGURE 7. BIGFOOT BF300 BALER CONTROL BOX, SHOWN WITHOUT THE PROTECTIVE SHIELD RAPP INSTALLED TO COVER THE CONTROL LEVERS ON MOST RAPP BALERS. SEE ALSO FIGURE 30.

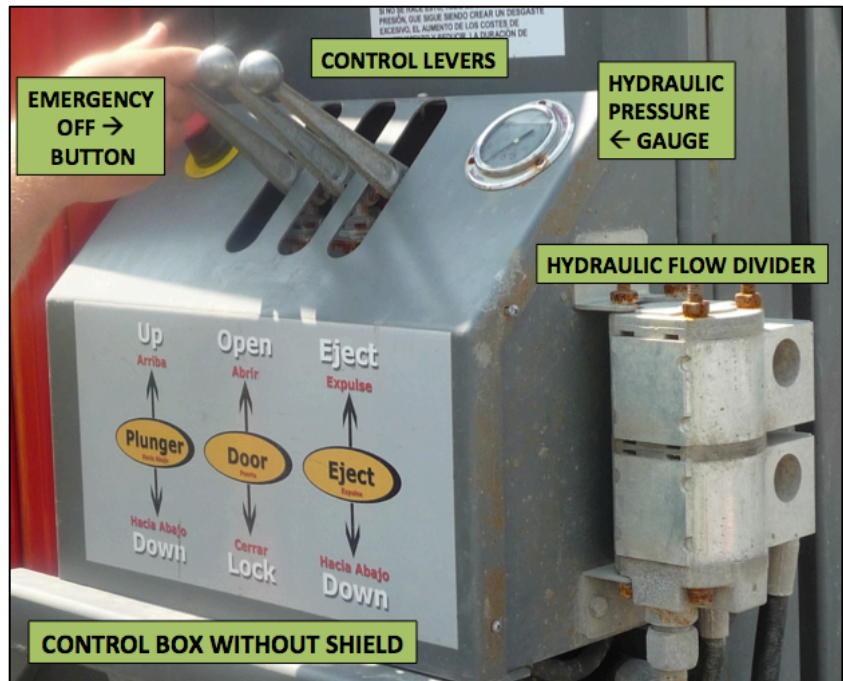


FIGURE 8. BIGFOOT BF300 BALER HYDRAULIC PUMP (BLACK CYLINDER AT RIGHT OF PHOTO).

The **pilot actuated check valve** is a safety feature that prevents the pistons and plunger from dropping in the unlikely event of a sudden drop in hydraulic pressure. The valve is contained within the small aluminum box attached at the base of the red cylinder to the left of the control box (FIGURE 9).

FIGURE 9. PILOT ACTUATED CHECK VALVE (ALUMINUM BOX, TO THE RIGHT OF THE ARROW).



TRAILER. The trailer bed is raised for travel and lowered to the ground for easier loading. Lifting and lowering the trailer bed are controlled by a small hydraulic system that is completely separate from the baler hydraulic system.

TRAILER HYDRAULIC SYSTEM. The trailer hydraulic system consists of a pump, a battery and a hand-held control device, all located on the right side of the large storage box at the front end of the trailer, near the tongue that attaches to the tow vehicle (FIGURES 10, 22).

The battery that powers the trailer hydraulic system draws its charge from the tow vehicle. RAPP has found that if the trailer has not traveled much distance since the battery was last used, it may not have sufficient charge to lift the trailer bed.

To assure that the trailer deck can be raised and lowered when needed, RAPP has installed a **trickle charger** in the hydraulic compartment of the storage box. If the baler will not be moved or used for several days, especially in cold weather, consider plugging the charger into a 110-volt outlet to maintain an adequate charge on the battery. If the battery is depleted, several days of charging time will likely be needed to restore adequate voltage.

If the need is more urgent, use jumper cables to connect the trailer hydraulic system battery with the baler battery, or connect the trailer battery to another vehicle. Keep the jumper cables hooked up to both batteries while the trailer bed is being lifted or lowered.

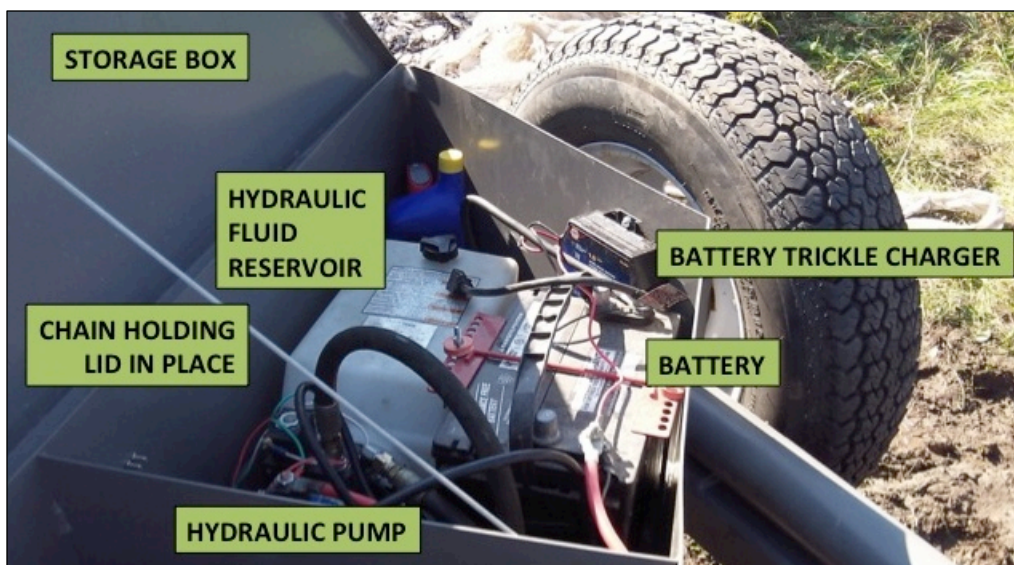


FIGURE 10. TRAILER HYDRAULIC SYSTEM COMPONENTS, LOCATED IN THE RIGHT SECTION OF THE STORAGE BOX (SHOWN AT THE TOP OF THE PHOTO). AN AREA FOR TOOLS IS ON THE LEFT SIDE OF THE STORAGE BOX, WITH A WALL SEPARATING IT FROM THE TRAILER HYDRAULIC SYSTEM COMPONENTS. THE TOOLBOX SECTION IS PARTIALLY VISIBLE AT THE BOTTOM OF THE PHOTO.

STORAGE BOX. The right side of the storage box is only for components of the hydraulic system. Do not use it for tools, which can damage the components or short out the battery. However, the left side of the box is for tools.

RAPP has attached a chain to the storage box lid to prevent it from opening so far that it could be mangled when the trailer bed is raised. This chain (or a strap) should be left in place to prevent the lid from opening too far.

Before taking the BF300 on the road, review the **checklist of recommended tools and supplies**. A laminated copy of the list should remain affixed to the inside of the storage box lid. Use a grease pencil to check off the items on this list before the baler leaves its home base. Users should also sign off on a paper copy of the supply list before the baler is released to them, and then upon its return (FIGURE 11).

The contents of the storage box are valuable, so keep the box locked with a **weather-resistant lock**. RAPP has provided combination locks with override keys. The baler manager has one copy of the key and RAPP staff has another.

BIG FOOT BALER BF300 – TOOLS & SUPPLIES CHECKLIST	
✓	BigFoot baler Basic Training Curriculum (4 pages)
	Grease pencil (for checking off tools, supplies, & procedures on laminated sheets)
	Waterproof plastic bag containing trailer registration & other paperwork
	Board, about 8" sq (to stabilize the trailer jack on soft ground)
	Ball mount hitch fitted with 2-5/16" ball (either with 1" rise or with raised ball)
	Jack (for changing tires)
	Tire iron
	Trailer jack (to stabilize the trailer when unhitched)
	Wheel chocks (blocks to prevent trailer from rolling)
	Anti-slip grit tape
	Fire extinguisher
	J-bar (wrecking bar)
	Jumper cables
	Scissors, Knife or other cutting tools
	Marker (permanent, for labeling finished bales)
	Safety reflectors (a set of triangular reflectors are provided)
	Screwdriver (heavy duty, long shaft)
	Storage box lock
	Tire pressure gauge
	Vice grips
	Wire cutters (fencing quality)
	Wire ties (sufficient number, in wire rack—need 5/bale)
	Wire-tying tool (such as <u>Pango Tie-Tyer</u> —optional)
	Fuel Stabilizer (such as STA-BIL® Ethanol Treatment or Marine Formula; add to gas regularly)
	Lubricant for metal parts (e.g., WD-40)
	Oil (spare quart of SAE 5W-30 or 10W-30 for Honda engine)
	Respirator masks (* <u>Moldex</u> 2300 N95, for use in dusty or moldy conditions)
	Ear plugs/sound-reducing ear muffs (* <u>EAR Taper Fit Foam</u> / <u>Peltor H9 Ear Muff</u> NRR 25dB)
	Safety glasses (* <u>Crews BearKat</u> mini safety glasses / <u>Uvex Astrospec</u> OTG – for over glasses)
	Gloves (non-slip palm grip recommended—e.g., Atlas cloth-backed; waterproof, if needed)
	Waterproof apron (&/or other protective clothing)
	Wear: Waterproof, closed toed shoes or boots

File: BigFootToolsChecklist2012Mar29

* Personal Protection Equipment (PPE) recommended by the New York Center for Agricultural Medicine and Health (NYCAMH)

FIGURE 11. CHECKLIST OF TOOLS, SUPPLIES, GEAR.

SECTION 4.**PREPARING TO OPERATE THE BIGFOOT BF300**

Before embarking on a day of baling, check everything on the Daily Maintenance checklist to ensure that the baler and trailer are in good working order (FIGURE 12). A copy of this list should remain affixed to the inside of the storage box lid. Use a grease pencil to check off after daily inspection. More information on many of these topics is covered in the *Maintenance & Troubleshooting* section of this Guide.

CHECK:

HONDA ENGINE AIR FILTER. Remove the top cover of the engine to access the air filter. Then remove the air filter and blow out any dust. The BigFoot BF300 is often operated in dusty environments and a dirty air filter will reduce engine performance. Replace the air filter as needed.

HONDA ENGINE AIR INTAKE & MUFFLER. Remove any dirt and debris from the muffler, and then do the same at the air intake. Debris from hay chaff or plastic could cause a fire. Since the engine is air-cooled, the air intake must be kept clear (SEE MAINTENANCE CHAPTER, FIGURE 8).

HONDA ENGINE OIL LEVEL. Use the dipstick to check the engine oil. Add sufficient 4-stroke SAE 5W-30 or 10W-30 oil to keep the oil level near the maximum mark on the dipstick. A red Oil Alert® indicator light is located below the ignition key. When the light comes on, the engine will shut down. But do not rely on this – check regularly and keep a spare quart of oil in the toolbox (SEE MAINTENANCE CHAPTER, FIGURE 9).

HONDA ENGINE GAS LEVEL. Visually check the gas level in the small, seven-gallon, gray tank at the front of the trailer bed. Refill with unleaded gas, 87-octane, or higher (SEE MAINTENANCE CHAPTER, FIGURE 12).

BALER AND TRAILER PINS & RETAINER CLIPS. The moving parts of the baler and trailer are held in place by steel pins and pin retainer clips. Walk around the baler to check that all of the pins and clips are in place and seated properly in their pin grooves. The baler should not be operated if any clips are missing or poorly seated. Keep a few spare retainer clips in the toolbox in case any become lost or broken (FIGURE 13 AND MAINTENANCE CHAPTER, FIGURES 6, 7).

HYDRAULIC FLUID LEVEL. Check the fluid level of the baler hydraulic system using the gauge mounted on the front of the hydraulic fluid reservoir. If the fluid level is below the sight gauge, add sufficient hydraulic fluid to bring it up to the mid-point on the gauge (SEE MAINTENANCE CHAPTER, FIGURE 18).

HYDRAULIC HOISING. Check all hydraulic hoses for fraying or leaks. Also check for leaks elsewhere in the hydraulic system, such as at the connectors and in the control box (FIGURE 14).

TRAILER TIRES. Check pressure on the trailer tires and look for signs of wear.

TRAILER HITCH & CONNECTIONS. If the trailer is hitched to a tow vehicle, check that the hitch and all connections are secure, including the brake breakaway cable, the safety chains and the 7-pin electrical harness (HITCHING/UNHITCHING THE TRAILER TO THE TOW VEHICLE IS DESCRIBED AND ILLUSTRATED IN SECTION 9, BEGINNING PAGE 28).

TRAILER LIGHTS. After the trailer is hitched to the tow vehicle, check that all the trailer lights are in working order: brake lights, emergency flashers, turn signals, and taillights.

TRAILER BRAKES. Test the trailer brakes to be sure they are working, and in unison with the truck brakes. If the setting is too low, the trailer brakes will not assist in stopping the vehicle. If set too high, the trailer brakes will engage before the truck brakes, reducing the vehicle's stopping power, creating risk that the brakes will lock, and likely making steering more difficult (FIGURE 15). The brake control is housed in the larger black box on the trailer tongue, which serves as control center for all trailer electronics. The 7-pin electrical harness cable runs from this box to the tow vehicle (FIGURE 16).

✓	ITEM
— HONDA ENGINE —	
	Gasoline: visually check level in small gray fuel tank (use 87-octane or higher, unleaded)
	Engine oil: use dipstick to check level (add 4-stroke, SAE 5W-30 or 10W-30)
	Air filter: blow out dust, replace as needed
	Air intake: remove accumulated debris
	Muffler: remove accumulated debris
— BALER —	
	Pins & retainer clips: check that all are in place and properly seated, with spares in toolbox
	Clean or wash debris and corrosive materials from the baling chamber and trailer
— HYDRAULICS —	
	Hydraulic fluid level: check gauge mounted on front of the hydraulic reservoir
	Hydraulic hoses: check for fraying or leaking
— TRAILER AND TOWING —	
	Tires: check pressure and wear
	Hitch to tow vehicle: check for secure connections <ul style="list-style-type: none"> • Breakaway brake cable • Safety chains • 7-pin electrical connector
	Trailer lights: working properly <ul style="list-style-type: none"> • Brake lights • Emergency flashers • Turn signals • Taillights (running lights)
	Trailer brakes: working properly; set controls in tow vehicle to lowest effective setting

FIGURE 12. BIG FOOT BALER BF300 - DAILY MAINTENANCE & PRE- OPERATION CHECKLIST.

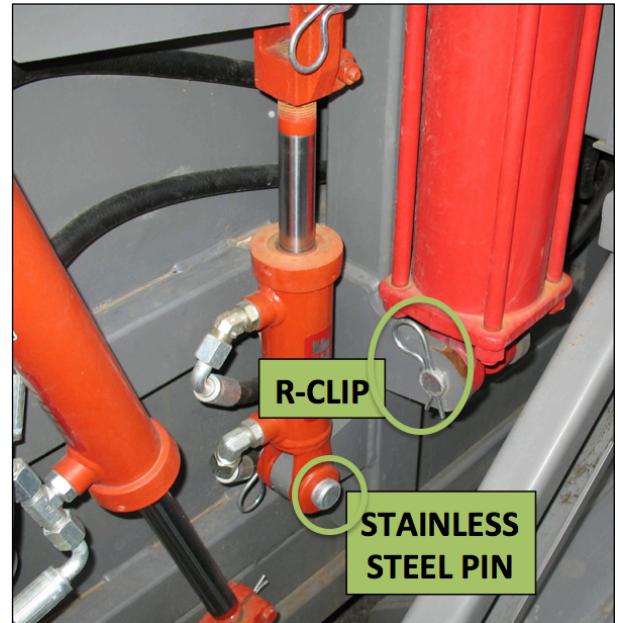


FIGURE 13. BALER PINS & RETAINER CLIPS.



FIGURE 14. INDICATION OF HYDRAULIC LEAK.



FIGURE 15. TRAILER BRAKE CONTROLS. NOTE THAT BRAKE CONTROLS APPEAR DIFFERENTLY IN DIFFERENT TOW VEHICLES.

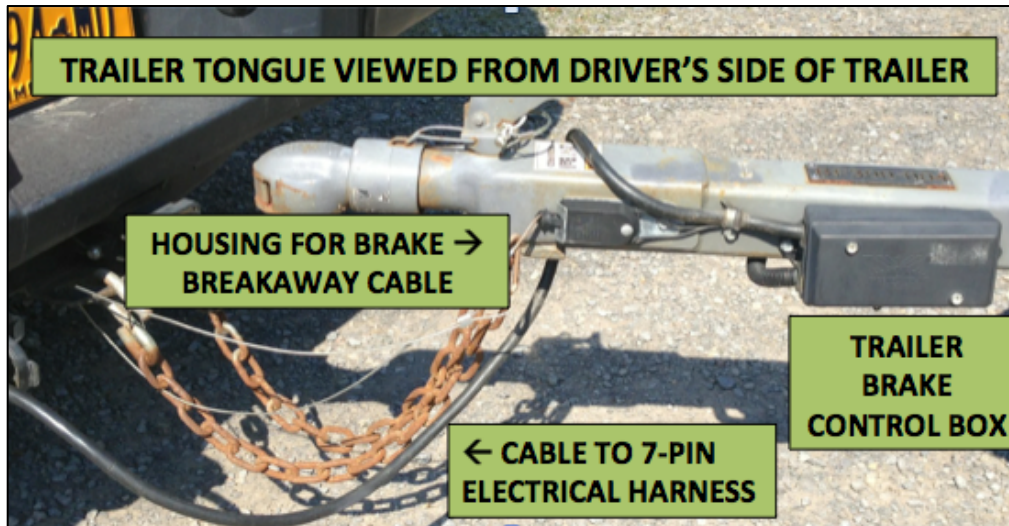


FIGURE 16. TRAILER TONGUE VIEWED FROM DRIVER'S SIDE OF TRAILER.

POSITION THE BALER. After the BigFoot has travelled to the baling location, position the baler on flat, dry ground close to the bundles of plastic. The area behind the baler must be clear, with adequate space to open the baler door and eject the finished bale.

LEAVE THE TRAILER HITCHED TO THE TOW VEHICLE. In most situations, the trailer should remain hitched to the tow vehicle. But if the trailer is unhitched, place **wheel chocks** between the wheels on both sides of the trailer to prevent the trailer from rolling (SECTION 9 AND FIGURE 44).

USING BALER INDOORS. If the baler is used indoors, the space must be well ventilated.

PROTECT YOUR EARS, EYES & LUNGS!

The engine noise is **LOUD**, so RAPP and the New York Center for Agricultural Medicine and Health (NYCAMH) strongly recommend that all helpers use **earplugs** or **sound-reducing ear muffs** to protect their hearing while the engine is on. Keep a supply in the Toolbox.

Safety glasses are also strongly recommended, particularly when working with wires to tie the finished bale.

Eyeglasses and sunglasses do not provide sufficient protection unless they are safety rated, with lenses that fully wrap around.

Keep a supply of safety glasses sufficient to outfit all helpers. Some should be for people who do not typically wear glasses and others should be designed to fit over glasses.

Dust masks are the third type of recommended personal protection equipment, to be used as needed in moldy or dusty conditions.

Check that these items are on hand before the baler leaves its "home base" and encourage all helpers to use the provided equipment to protect their ears, eyes and lungs.

FIGURE 17. SUMMARY OF OPERATING STEPS (next page).

BIG FOOT BALER BF300 – SUMMARY OF OPERATING STEPS*

1.	TRAINING & TRAINEE RELEASE: All helpers must have received training in baler operations & signed the <i>Trainee Liability Release</i> form. Baler operator must have <i>BigFoot Baler Operator Certification</i> card.
2.	CHECKLISTS: Complete all pre-operation steps. Be sure all needed tools & supplies are on hand.
3.	POSITION BALER on flat, dry ground, with $\geq 10'$ clearance behind baler. Keep hitched to tow vehicle.
4.	START HONDA ENGINE to warm hydraulic fluid to 50° F. Set throttle mid-way between <i>turtle</i> and <i>rabbit</i> . Pull choke if engine is cold. Leave engine idling with throttle in <i>turtle</i> position.
5.	LOWER TRAILER BED: Clear area behind trailer. Remove trailer bed locking pin. Push <i>down</i> button on the hand-held control device located in right side of toolbox. Lower bed firmly to ground.
6.	RAISE PLUNGER: Push <i>up</i> on plunger control lever (lever on left).
7.	OPEN BALER DOOR (middle lever): With door open, check that ejection feet are flush with floor and that wire channels are clear. Lay flat sheet of plastic as bottom layer (about 4'x4'), white side out.
8.	SHUT BALER DOOR: Use hydraulic control to latch the door. Also engage backup latch if provided.
9.	LOAD COMPACTION CHAMBER: Pile plastic as high as possible.
10.	COMPRESS PLASTIC: Clear area. Operator holds plunger control lever in <i>down</i> position to lower plunger. Release lever as soon as <i>ears</i> pop in (the ears prevent plastic rebound).
11.	RAISE PLUNGER to full height after compressing to re-set alignment of hydraulic piston rods.
12.	REPEAT CYCLE (LOAD-COMPRESS-RAISE PLUNGER) five or more times to make full 1000 lb. bale.
13.	INDICATORS of FULL BALE: 2500psi needed to compact load. 2-3" shiny metal seen on piston rods.
14.	SQUARE the BALE: Add plastic to corners & edges, as needed, to pack them as tight as center of bale.
15.	FINAL COMPRESSION: Lay 4'x4' sheet of plastic (white on the outside) as top layer of the bale. Lower plunger. Keep plunger in <i>down</i> position. Keep engine running.
16.	OPEN DOOR: Clear area behind door. Use middle lever to unlatch door (this also retracts ears).
17.	TURN ENGINE OFF after the door is opened.
18.	TIE BALE WIRES: Use gloves, safety glasses and vice grips. Remove 5 wires from rack (12-gauge, 14' wires with loop on one end). Thread wires from door-side of bale through channels at base of baling chamber. Bring wires up on opposite side, and back through channels in plunger platen. Thread loose end through loop. Pull up slack. Make sharp bend in wire at loop. Wrap loose end around tie 2-3 times.
19.	EJECT BALE: Restart engine. Raise plunger fully. Check that ears are retracted. Pull up on eject lever.
20.	FINISH: Retract feet. Close & latch door. Lower plunger. Engine off. Jiggle levers to release pressure.
21.	RAISE TRAILER BED (if baler will be moved): Push <i>up</i> button on control. Replace trailer bed locking pin.
22.	LABEL BALE: Name of farm or producer. City. State. What's in the bale. Date baled. Weight, if known.
23.	STORE BALE out of mud and gravel, on pallet or under cover.
24.	CLEAN BALER: Brush and wash out debris, corrosive materials (road salt, silage juice, etc.).

* Full operating instructions are in RAPP's *Training Video & Guidelines for Operating & Maintaining the Bigfoot Baler*

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SECTION 5.

START THE ENGINE & LOWER THE TRAILER BED

**BEFORE STARTING THE ENGINE:
CHECK FOR TRAINEE
LIABILITY RELEASE FORMS!**

- Before starting the engine, check that everyone in the work area has gone through at least a basic training in safety procedures and signed the RAPP Trainee Liability Release form.
- Trainees who have not yet signed the Liability Release should stand well back from the operating unit.
- Take special care that no children or pets are nearby!

START THE HONDA ENGINE. The Honda engine must be running to operate the baler. Especially in cold weather, start the engine first thing so that it warms up during set up (FIGURE 18).

To **start a cold engine**:

- Set the throttle half way between the **turtle** and **rabbit**
- Pull out the **choke**
- Gradually push the **choke** closed after the engine starts.

To **idle the engine** put the throttle in the turtle position.

The **choke** is an aid in starting the engine. Pulled out it reduces the flow of air to the engine, thus enriching the fuel mixture.

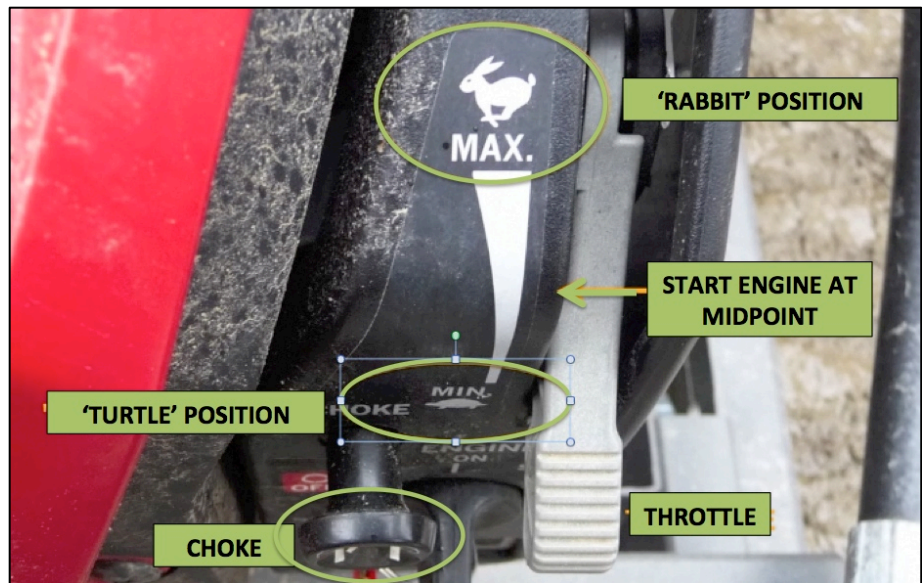


FIGURE 18. HONDA ENGINE, CHOKE & THROTTLE.

The **throttle** controls the amount of fuel going to the engine: More fuel goes to the engine when the throttle is pointed to the **rabbit**, and less when pointed to the **turtle**.

The balers will usually achieve adequate compression with the engine idling, but if the hydraulics operate too slowly or if more power is needed, put the throttle mid-way between the turtle and rabbit.

Do not operate the baler with the throttle fully open—in the rabbit position—because it will shorten the engine life, use **excessive** fuel, and be unnecessarily loud.

HONDA ENGINE IGNITION KEYS

Two ignition keys were provided with each new baler. One of these should be kept on file with the baler manager.

Replacement keys can be ordered from a Honda Dealer, who will need to know the model number and other specification numbers that are stamped on the engine block behind the starter.

WARM THE ENGINE & HYDRAULIC FLUID. Check the temperature of the hydraulic fluid using the **thermometer** located on the front surface of the **hydraulic fluid reservoir**. The thermometer is the red vertical line inside the **hydraulic fluid level gauge** (FIGURE 19).

Wait until the hydraulic fluid has warmed to at least 50°F before operating the hydraulic controls.

In cold weather, leave the engine idling while loading the baler, with the throttle at the turtle position.

In warm weather, turn the engine off if it will not be used for 10 minutes or more.

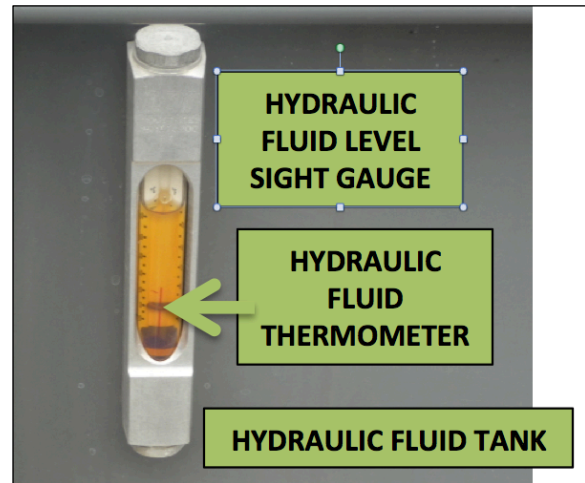


FIGURE 19. HYDRAULIC FLUID RESERVOIR, HYDRAULIC FLUID THERMOMETER & FLUID LEVEL GAUGE.

AIR-COOLED HONDA ENGINE. Because the engine is air cooled, nothing should block airflow. The engine should not be covered while in use.

To provide some protection to the engine components from exposure to road grit and salt, RAPP has installed a shield on the front edge of the trailer frame on most of the balers operated under its auspices (FIGURE 20). The **Honda Engine manual** and the **Maintenance & Troubleshooting** section of this Guide contain additional information about the Honda engine.



FIGURE 20. ENGINE SHIELD INSTALLED BY RAPP.

LOWER THE TRAILER BED. Once the baler is in position and the engine is idling, lower the trailer bed to the ground for easier loading. The up/down position of the trailer bed is controlled by the small hydraulic system located in the right side of the storage box at the front end of the trailer.

The first step in lowering the trailer bed is to remove the **trailer-bed locking pin** that secures the trailer bed in its raised position. First remove the pin clip from its shaft in the pin. So as not to lose the clip, replace it in the pin shaft after the pin is removed (FIGURE 21 AND MAINTENANCE CHAPTER, FIGURE 24).

If the pin is difficult to remove, push the *up* button on the orange hand-held control device to raise the trailer bed slightly. This will decrease pressure on the pin so it is easier to remove.



FIGURE 21. TRAILER BED LOCKING PIN. NOTE THE PIN CLIP HELD IN THE LEFT HAND AND THE PIN SHAFT CLOSE TO THE END OF THE PIN.

Then press the *down* button on the control device to lower the trailer bed until it is sitting firmly on the ground. If the trailer bed is not fully lowered, it may be difficult to open the baler door (FIGURE 22).

CLEAR THE AREA BEHIND BALER. Before pushing the *down* button on the control device, check that the area behind the trailer is clear because the **trailer bed moves back as it moves down**. (FIGURES 23, 24)



FIGURE 22. LOWER THE TRAILER BED: PRESS *U* FOR UP TO RAISE THE TRAILER BED AND *D* FOR DOWN TO LOWER IT.

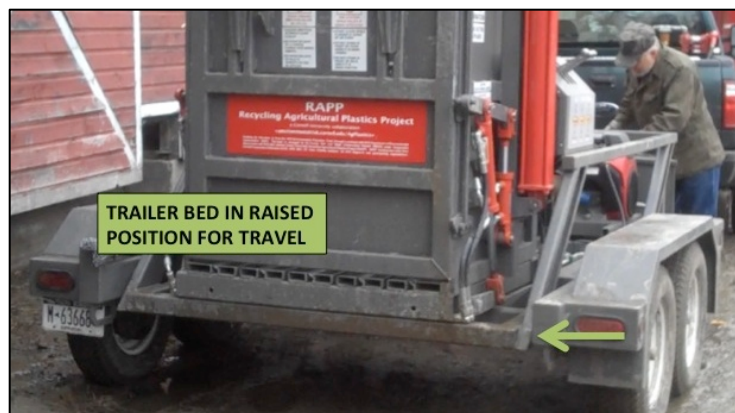


FIGURE 23. TRAILER BED RAISED.

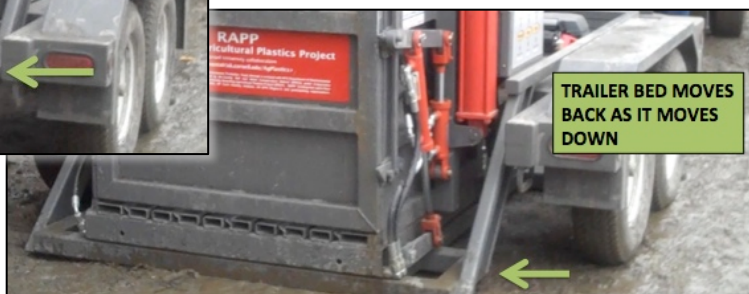


FIGURE 24. TRAILER BED LOWERED.

SECTION 6. LOADING THE BALER

DESIGNATE ONE PERSON TO OPERATE THE BALER CONTROLS, monitor hydraulic pressure and oversee all that is going on. This person is in charge and thus must be thoroughly familiar with baler operations and idiosyncrasies.

HELPERS STAND BACK WHEN OPERATOR IS AT THE CONTROLS. For safety reasons it is good practice for helpers to step back away from the baler whenever the operator is standing at the controls. Seeing the operator at the controls should be a signal that something is about to move.

RAISE PLUNGER. The first step the operator takes is to raise the plunger to its maximum height by moving the control lever on the far left of the control box to its *up* position (FIGURE 7). After putting the lever in this position, the plunger is supposed to continue moving up automatically until it reaches its maximum height. However, RAPP has found that the valve controlling the automatic lifting of the plunger often does not function as intended. If this feature (the detent valve) is not working, the operator can manually hold the lever in position to raise the plunger. (Note that if the detent valve is operating as intended, the automatic upward movement of the plunger can be halted at any time by moving the control lever back into neutral.)

OPEN THE DOOR. Next, the operator uses the middle control lever to lift the latches on the baler door (FIGURE 7). Check that the safety chain is removed (FIGURE 29).

EJECTION FEET DOWN, WIRE CHANNELS CLEAR. While the baler door is open and before any plastic is loaded into the compaction chamber, check that:

- the **ejection feet** on the floor of the chamber are fully retracted and flush with the baler floor.
- the **wire guide channels** are completely clear of debris (FIGURES 25, 26) .

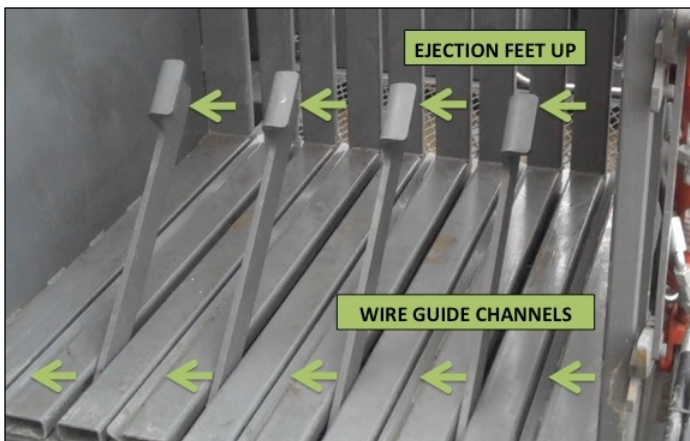


FIGURE 25. BALER EJECTION FEET IN UP POSITION.

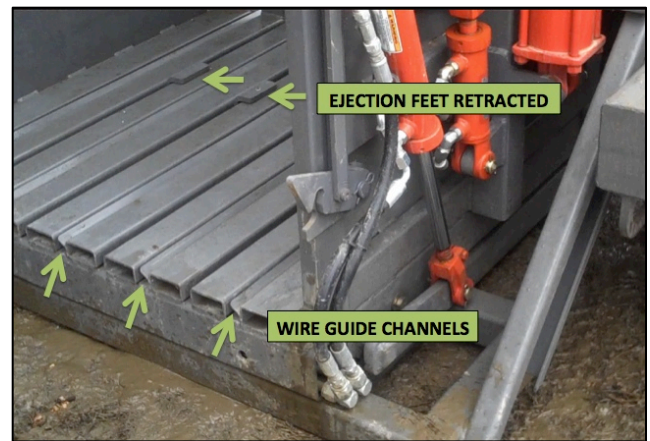


FIGURE 26. EJECTION FEET RETRACTED, FLUSH WITH FLOOR.

LAY A FLAT SHEET OF PLASTIC ON THE BOTTOM OF THE BALING CHAMBER, and save a comparable piece to finish the topside of the bale. Use plastic that is white on at least one side. Lay the sheet so the white side is facing down (to the outside of the bale) (FIGURE 27).

The purpose of this sheet is to provide a clear white surface for writing a label. It will also prevent small pieces of plastic from jamming into the wire tracks or squeezing out the edges of the bale, help keep the bale intact, and keep the plastic inside the bale cleaner and drier during storage.

The top and bottom pieces can be cut from a silage bag, bunker silo, greenhouse cover or other plastic sheeting. However, do not use bale wrap for the top and bottom layers because this lighter weight film tends to billow out of the compaction chamber and get caught in the wire channels. And because it is tacky, grit tends to stick and become embedded in the surface layers of the bale (FIGURE 28).



FIGURE 27. LAY FLAT SHEET OF PLASTIC OR CARDBOARD ON THE BOTTOM OF THE BALE CHAMBER.



FIGURE 28. DO NOT USE BALE WRAP FOR THE TOP AND BOTTOM LAYERS.

LATCH THE DOOR. After laying the bottom sheet, push the door shut. Then latch the door by moving the hydraulic *door* lever into the down position (FIGURES 7, 29).

Check that the baler door is securely latched, with the latch hooks flush on the metal latch pins.

Use the safety backup system for the door latch if the baler has been equipped with one (FIGURE 29).

Once the door is securely latched, two or three people can load the plastic.



FIGURE 29. DOOR LATCHES. PUSH DOOR SHUT. PUSH DOWN ON MIDDLE CONTROL LEVER UNTIL LATCH HOOKS ARE FLUSH ON LATCH PINS. MANUALLY PLACE SAFETY CHAIN IN THE CHAIN CATCH THAT RAPP ADDED TO THE DOOR.

PRESSURE ON THE DOOR. A great deal of pressure is put on the door during compaction, so if the door is not latched securely it could fly open, causing significant injury. As a precaution, all helpers should stay well clear of the door while plastic is being compressed or when the operator is at the controls.

PREPARE PLASTIC FOR BALING. A key to successful and efficient baling is having plastic that has been prepared for recycling. Briefly, preparation means that plastic should be as clean and dry as possible, and kept away from mud and gravel. Large sheets of film should be cut into sections and rolled into bundles about the size of a large pillow.

With properly prepared bundles of film, a full 1000-lb bale can be made in about half an hour.

LOAD THE BALER. Fill the compaction chamber by piling bundles of plastic as high as possible (FIGURE 30).

RAPP has installed a shield over the control levers on most of the balers operated under its auspices. If operating a baler without this shield, take care that loose film does not dangle near the control box where it could get caught in the levers, and that bundles of plastic do not fall on the control levers. Plastic caught in the levers could activate the door-unlocking mechanism or set the plunger in motion. The shield also reduces exposure to rain, snow, road grit and debris (FIGURE 31).



FIGURE 30. PILE BUNDLES AS HIGH AS POSSIBLE.

NO CONTAMINANTS. Load only the one type of material being baled—anything else is considered a contaminant. For example, cut off string that may have been used to tie the bundles.

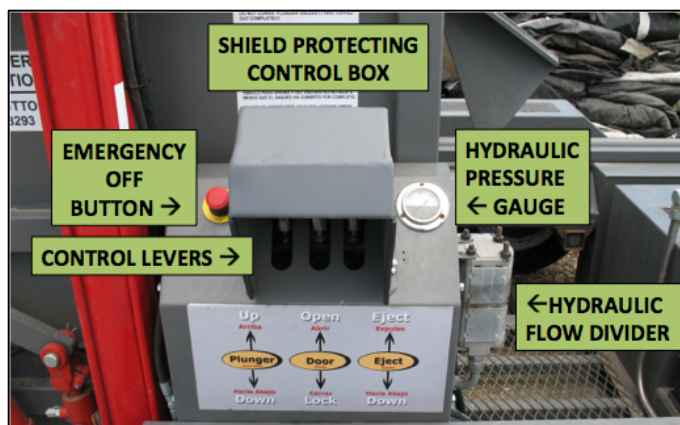


FIGURE 31. PROTECTIVE COVER INSTALLED OVER CONTROL LEVERS AT CONTROL BOX.



SECTION 7. MAKING A BALE

LOWER THE PLUNGER. When there is no more room to add plastic to the pile, the operator lowers the plunger by holding the control lever on the left in its down position (FIGURE 7).

As a safety precaution, the plunger will stop moving if the lever is released. Thus the operator must continue to hold the lever down in order for the plunger to continue moving downward.

Expect to fill the compaction chamber and lower the ram five or more times to make a full bale. The first several times the plunger is lowered, the hydraulic piston rods will be able to bottom out, leaving no shiny metal visible on the rod. This indicates that more plastic is needed to make a full bale (FIGURE 32).



FIGURE 32. NO SHINY METAL VISIBLE ON THE HYDRAULIC PISTON ROD WHEN THE PLUNGER IS LOWERED AS FAR AS IT CAN GO INDICATES THAT THE BALE IS NOT FULL AND SHOULD BE LOADED AGAIN.

RELEASE PLUNGER CONTROL LEVER AFTER COMPRESSING. Immediately after the plastic in the compaction chamber is compressed and the ears have sprung into place, release the plunger control lever. If the lever is held in the *down* position, hydraulic pressure will continue to build (FIGURE 33).

FIGURE 33. BALER EARS SPRUNG INTO PLACE, HELPING TO HOLD PLASTIC DOWN AND PREVENT PLASTIC REBOUND.



CAUTIONS:

- **OPERATOR SHOUTS: “STAND CLEAR” BEFORE LOWERING THE PLUNGER.** Every time the plunger is about to be lowered, and before the operator touches the controls, s/he should call out a “stand clear” warning and check that no one is within 10’ of the baler.
- **DO NOT LOAD PLASTIC WHILE PLUNGER IS MOVING.** Helpers may find it tempting to continue to load the baler or run forward to punch down some plastic that is spilling over the sides while the plunger is moving downward towards the compaction chamber. *But don’t do it!*
- **WATCH CAREFULLY AS THE PLATEN ENTERS THE BALE CHAMBER.** If a large amount of plastic does spill over the sides of the bale chamber, which can happen as the plastic is compressed, raise the plunger and push the plastic back into the bale chamber. **Do not allow billowing plastic to accumulate around the top edges of the bale chamber.** This accumulation of plastic could cause the plunger to go out of kilter and catch on a sidewall of the bale chamber, which could cause catastrophic damage to the baler.
- Resume loading only after the operator has stepped away from the control box and given the signal to begin.

BIG FOOT EARS. When the plunger has descended completely, four **ears**—two on the baler door and two on the back wall of the baler compartment—spring into place to prevent the plastic from rebounding. The operator should be able to hear and to see the ears snap into place (FIGURE 33).

If the ears do *not* snap into place after plunging, there are several possible reasons and fixes:

- Plastic may be obstructing their path. If this is the case, raise the plunger about 12” and re-plunge. If the ears still do not snap into place, raise the plunger again and remove or cut away the plastic causing the problem.
- The bale may have become too big, with plastic above the level of the ears. If so, remove the excess plastic.
- Especially when the baler is new, the ears may simply be sticking and need to be manually pushed in after the plunger is down. (SEE ALSO MAINTENANCE CHAPTER OF THIS GUIDE, PAGES 2-3)

ALIGN THE HYDRAULIC PISTON RODS. After each compression, raise the plunger to its full height. In addition to providing maximum clearance for loading, it also ensures that the two hydraulic piston rods stay in alignment.

To be absolutely sure that the piston rods are in alignment, raise the plunger if it has been left in the *up* position for any length of time—for example, if loading the baler has gone slowly. Even if the plunger appears to be all the way up, push the lever into its *up* position before lowering the plunger again to compress the next load of plastic.

The reason for doing this is that a small amount of hydraulic fluid may have drained from one of the cylinders while the plunger is up, causing the two cylinders to become misaligned. If the two piston rods are out of alignment, one may start the downstroke before the other, causing the plunger to be off-kilter. Lowering an off-kilter plunger into the baling chamber can create serious problems.

NOTE: If the plunger has only been raised a few inches, it can be brought back down again without first going to the top. This small lift and lowering might happen if the operator needs to push in stray plastic or clear the area around the ears.

MISSING RAM GUIDES. Damaged or missing **ram guides** are a first sign that the plunger was—at some point—lowered while the hydraulic piston rods were out of alignment. These **rubber bumpers** are located near the four corners of the plunger. If the plunger is tilted or off kilter, the ram guides can catch on the wall of the baling chamber, become damaged, and possibly break off

(SEE MAINTENANCE CHAPTER, FIGURES 1 and 2).

While the ram guides can be replaced—and in fact a replacement set should be kept in the baler toolbox—a far more serious consequence of misalignment is that an off-kilter plunger can catch on the side of the bale chamber, or the piston rods can bend, leading to a complete failure of the hydraulic system.

If any misalignment is noticed, immediately stop the compression and run the plunger all the way to the top to equalize the hydraulic fluid pressure in the two cylinders.

REPEAT THE CYCLE OF LOADING, COMPRESSING, RE-ALIGNING five or more times to make a full bale.



FIGURE 34. BALE OF RIGID PLASTIC.



FIGURE 35. STACKED PLASTIC PLANTING TRAYS.

LAYERING DIFFERENT MATERIALS IN THE SAME BALE. If the plastic is going to a market that is able to process more than one type of material, and is willing to receive the different plastics within the same bale, keep the different plastics in layers that can easily be separated from one another. *I.e.*, do not intermingle different materials within the bale.

COMPACTING RIGID PLASTICS. Rigid plastics such as nursery pots, planting trays, irrigation tubing, and maple tubing have more structure and rebound energy than plastic film. Although a BigFoot baler can contain these plastics, a bale of rigid plastics will be considerably lighter than 1000 lbs. Taking into consideration the time it takes to load the baler, and the limited space it will save, it may be more efficient to stack loads of rigid plastics on pallets, or in Gaylord boxes, rather than baling them for shipment to recycling markets. Confer with RAPP staff to determine the best approach (FIGURES 34, 35).

SECTION 8. FINISHING A BALE

SIGNALS THAT THE BALE IS ALMOST FULL:

- **ENGINE NOISE CHANGES.** As the bale fills and the plunger encounters more resistance, the engine begins to work harder and whines at a lower pitch. It may sound as though the machine is bogging down, but it is just starting to work harder.
- **HYDRAULIC PRESSURE = 2500 psi.** An **increase in hydraulic pressure** is another signal that the bale is close to full. When 2500 pounds per square inch pressure (psi) is needed to compress the load, then the bale is nearly full.

At about 800 psi, the hydraulic pump goes into low gear and the plunger begins to move more slowly, but with more power. The pump sounds different when it is in low gear. Several compression cycles with pressures between 800 and 2500 psi will likely be needed before the bale is complete.

If the plunger control lever is kept in the *down* position after the ears have sprung into place, pressure will continue to rise, so **release the control lever as soon as the plastic is compressed.**

- **2-3" SHINY METAL SHOWS ON PISTON RODS.** During the initial compressions, the hydraulic piston rods will bottom out when the plunger is lowered as far as it can go. No *shiny metal* will be visible (FIGURE 31). But when plastic fills the bale chamber, 2-3" of the shiny metal of the rods will still be visible when the plunger is lowered as far as possible. This is a key signal that the bale is almost finished (FIGURE 36).

Keep loading and compressing until the 2-3" of shiny metal are visible and the hydraulic pressure needed to make the compression approaches 2500 psi. Allow the pressure to go to 2500 psi but no higher.

DO NOT OPEN THE BALER DOOR TO FIND OUT IF THE BALE IS FULL! Once the door is opened, the plastic expands and the door cannot be shut again. But if a mistake is made and the door *is* opened before the bale is full, empty the compaction chamber and start again.



FIGURE 36. 2-3" OF SHINY METAL VISIBLE ON THE PISTON RODS WITH THE PLUNGER LOWERED AS FAR AS POSSIBLE.

BALE WEIGHT: 1000-1200 LB. The weight of full bales will differ somewhat depending on the type of plastic being baled, but aim for a 1000-lb bale. Bales that are too big, or heavier than 1200 pounds, can be difficult to eject and could break the ejection feet or shaft.

Small bales also cause problems. They are difficult to handle—they become ‘squishy’ and rounded, expensive to transport and difficult to market. However, a lightweight bale will not appear smaller than a bale of proper weight because once the plunger is raised and the baler door is opened, the plastic in the

compaction chamber will expand to fill the available space, no matter what its weight. Thus to avoid making lightweight bales, keep filling the bale chamber until all the cues signal that the bale is full.

If there is not enough plastic to make a full bale, leave it for the next collection or combine it with the same type of plastic from another farm.

HOW TO MAKE A SQUARE BALE. There is something of an art to making dense, firm and square bales that will stack well for transport. The art is in packing bundles of plastic film into the corners of the baler chamber and along the front and back edges. This is particularly important during the last several compression cycles. If plastic is loaded only into the middle of the pile, bales will tend to become round and difficult to stack. They will likely be lightweight and spongy, and may fall apart when moved around or loaded for transport (FIGURE 37).



FIGURE 37. MAKING A SQUARE BALE.

FINAL COMPRESSION. When the bale is just about full, raise the plunger and look inside the compaction chamber. If the center is higher than the rest, add plastic to the corners and along the front and back edges to square the bale (FIGURE 36).

While the plunger is still in its *up* position, lay a flat sheet of white plastic on top as the final piece covering the bale. The flat top and bottom sheets create a surface that can shed water, prevent small pieces of plastic from clogging the wire channels, and provide an area for writing the information needed to label and track the bale.

Then lower the plunger for the final compression, keeping the engine running and the plunger fully down.

OPEN THE BALER DOOR. With the engine running and the plunger down, use the middle control lever to unlock the three door latches and open the baler door. The control lever that opens the door also retracts the set of ears in the baler wall. Remove the safety chain so the door can swing open.

AFTER THE DOOR IS OPENED, TURN OFF THE ENGINE.

CAUTIONS:

- The door can open with a forceful swing. Be sure the area behind the baler is clear.
- If the door sticks and does not open when the latches are unlocked, use a **J-bar** to pry the door open. Stand cautiously to the side, clear of the door, to avoid possible injury when the door swings free. No one other than the person working with the J-bar should be in the vicinity of the door.

TIE OFF THE BALE WITH FIVE STRANDS OF 12-GAUGE, 14' GALVANIZED STEEL WIRE WITH A LOOP ON ONE END. The wire typically comes in bundles of 125 strands. Typically it is least expensive when purchased in lots of 100 bundles. A full bundle of bale wire fits into the wire rack to the left of the baler door (FIGURE 38).

Tying off the bale is most efficiently and safely done with **two people**, and only two people, working together, one in front of the open door to the compaction chamber at the back of the baler, and the other standing on the trailer bed, near the engine at the front of the baler. The engine should be off so the two can hear one another. Communication between the two is critical to minimize risk of injury from the sharp wires. Having more than two people involved in tying the wires can be more chaotic than useful.

To protect eyes from the sharp end of the wires, RAPP staff recommends wearing **eye protection**. **Gloved hands** and **vice grips** are also recommended.

STEPS IN TYING THE BALE WIRES:

1. The person standing by the open door of the compaction chamber at the back end of the baler removes five strands of wire from the wire rack and lays them on the ground within easy reach.
2. This individual (*PERSON A*) threads the pointed end of each wire from the back end of the baler through one of the five wire channels at the base of the baler chamber to the front (FIGURE 39A). To reduce risk of poking, thread all five wires through the wire channels before the second person (*PERSON B*) moves into position on the front end of the trailer bed.



FIGURE 38. BUNDLE OF WIRE IN THE WIRE RACK LOCATED TO THE LEFT OF THE BALER DOOR (BACK SIDE OF THE BALER).



FIGURE 39A. *PERSON A* THREADS ALL FIVE WIRES THROUGH THE WIRE GUIDE CHANNELS AT THE BASE OF THE BALING CHAMBER.

3. Once the wires are threaded through the bottom channels, *PERSON B* pulls them to the front of the baler, leaving about 18" of the looped end of the wire on the door side of the baler (FIGURE 39B).
4. *PERSON A* makes a 90-degree bend about 8" from the looped end of each wire to prevent this end from being pulled into the wire guide channels when the wires are pulled to the front of the baler (FIGURE 39B).
5. *PERSON A* steps away while *PERSON B* feeds the wires through the wire guide channels in the plunger platform, back to the rear of the baler (FIGURE 39C). If plastic blocks the wire channels, a screwdriver, scissors or knife can be used to clear the channel or cut away the plastic.

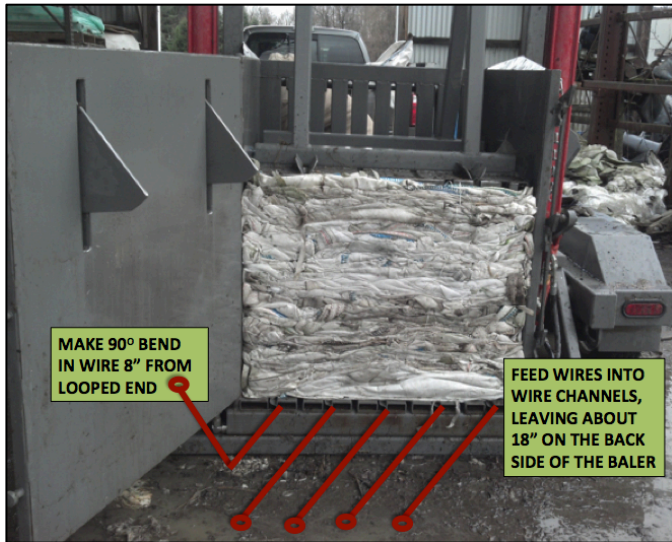


FIGURE 39B. *PERSON A* PUTS A RIGHT ANGLE BEND (90°) IN EACH WIRE ABOUT 8" FROM THE LOOP TO PREVENT THE WIRES FROM BEING PULLED INTO THE WIRE CHANNELS UNDER THE BALE. (THE RED-COLORED LINES IN THE FOLLOWING SERIES OF FIGURES REPRESENT THE WIRES).



FIGURE 39C. VIEW FROM THE TRAILER BED: *PERSON B* FEEDS WIRES FROM THE BOTTOM OF THE BALE TO THE TOP AND THEN THROUGH THE WIRE CHANNELS IN THE PLATEN (THE PLUNGER PLATFORM) TO THE BACK END OF THE BALER.

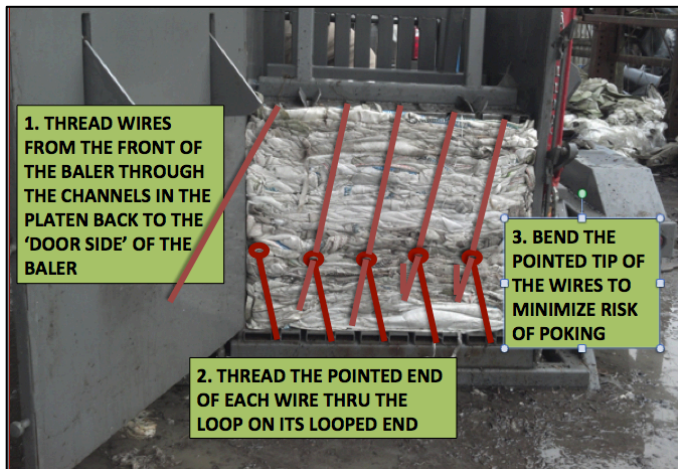


FIGURE 39D. AFTER THE FIVE WIRES ARE THREADED BACK THROUGH THE TOP WIRE CHANNELS TO THE DOOR-SIDE OF THE BALER (BACK END), *PERSON A* RETURNS TO POSITION BY THE DOOR AND THREADS THE POINTED END OF EACH WIRE THROUGH ITS LOOP, THEN BENDS THE TIP BACK TO REDUCE RISK OF INJURY FROM POKING.

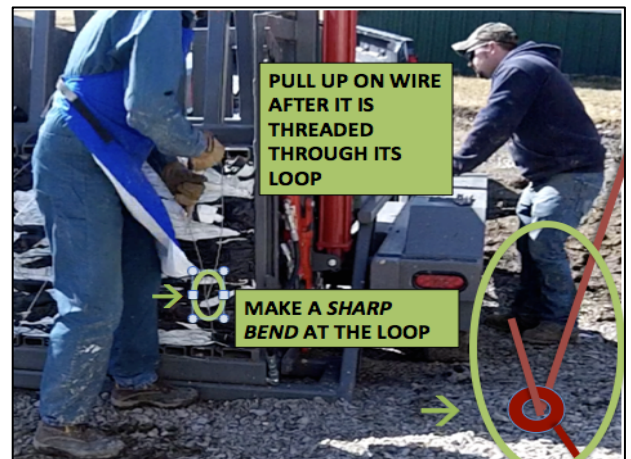


FIGURE 39E. PULL UP ON THE LOOSE END OF THE WIRE, MAKING A SHARP BEND AT THE LOOP.

6. Once all five wires are threaded through the upper wire channels back to the exposed side of the bale, *PERSON A* steps back into position and threads the pointed end of each wire through the loop at the looped end. To reduce chance of poking during the tying operation, the pointed tips of the wires should be bent back (FIGURE 39D).
7. *PERSON A* uses vice grips and gloved hands to pull up on the loose (pointed) end of the wire. Pull enough to take up the slack. However, the wire does not need to be exceptionally tight (FIGURE 39E).
8. A *sharp bend* must be made in the wire at the place where it is threaded through the loop. If the bend is not sharp, the wire tie will not remain tight (FIGURE 39E).
9. *PERSON A* secures the wires by twisting the non-looped end around the tie for two revolutions, being careful that loose ends are not poking out of the bale. Do not make a knot in the wire. The wire will tighten when the plunger is raised and the plastic expands. The sharp, crisp bend and the two twists will hold the tie and keep the bale in shape (FIGURE 39F).

Once the five wires are secured, the bale is ready to be ejected and moved into storage.



FIGURE 39F. WRAP THE LOOSE END OF THE WIRE AROUND THE TIE TWICE TO SECURE THE TIE. DO NOT KNOT THE WIRE. THE TIES WILL TIGHTEN WHEN THE PLUNGER IS RAISED AND THE PLASTIC EXPANDS.



FIGURE 40. TROUBLE EJECTING THE BALE.

EJECT THE BALE. First, **restart the engine**, positioning the throttle in the mid-range between the turtle and rabbit symbols (FIGURE 18).

Check the back wall of the baling chamber to be sure the **ears are retracted** and check that the **plunger is fully raised**. If either the plunger or the ears are in the way, the ejection feet will not be able to kick out the bale and – more of a problem – the force can break the ejection feet or shear the shaft holding the feet.

The bale may roll when it is ejected, so **clear the area** around the baler door—no people, no pets, no objects.

Pull up on the eject control lever to raise the four ejection feet at the base of the compaction chamber, which should kick out the finished bale of plastic (FIGURE 25). The eject lever is on the right in the control box (FIGURE 7).

Retract feet immediately after ejecting bale. Immediately after ejecting the bale, push down on the lever to **retract the feet** so they are again flush with the floor of the compaction chamber (FIGURE 26).

Eject the bale onto a pallet or a sheet of plastic on the ground behind the baler. The objective is to keep finished bales out of mud and gravel.

Then **move the bale** out of the way with a forklift, a bale grabber, or the bucket of a skid steer (FIGURE 2).

Once the bale is ejected and the feet are retracted, **turn off the engine** and **jiggle the control levers to release pent up hydraulic pressure**. Releasing the pressure reduces wear-and-tear on the hydraulic system.

TROUBLE EJECTING THE BALE. Sometimes finished bales jam in the compaction chamber and the ejection feet do not have enough oomph to push them out. If this happens, try to work the bale out by using the ejection feet to push the bale up, then lower the feet and use the compression ram to push the bale back to floor of the chamber. Raise the compression ram and repeat this cycle several times until the bale ejects properly (FIGURE 40).

LABEL THE BALE. Labeling is the final step before moving the bale to its storage location. The purpose of the label is to know what is in the bale, and where the material came from. Use a permanent, waterproof marker and write label information in two places, either on tags enclosed in waterproof envelopes or plastic bags, or on two faces of the bale. Write or place the labels off-center so that if the bale becomes rounded, the information is less likely to be rubbed off.

Include:

- Name of the farm or producer, city and state where the plastic was used;
- What is in the bale—*i.e.*, bale wrap, bunker silage cover, horticultural mulch film, a combination, or ...
- The date the bale was made
- Bale weight, if known.

COMPLETING THE JOB AND PREPARING TO MAKE THE NEXT BALE. Brush or hose out the compaction chamber to remove organic debris, soil and loose bits of plastic. Pay particular attention to clearing the wire guide channels. Especially if the baler will not be used again for a while, wash it down to remove debris and corrosive materials such as road salt and silage juice.

If another bale will be made in the same location, repeat the steps covered already:

Begin by checking that the ejection feet are fully retracted; then lay a flat sheet of plastic on the bottom of the chamber before turning on the engine to latch the door and load the baler again.

If the baler will be moved to a different location, follow the steps in the next section for transporting the baler.

SECTION 9.**TRANSPORTING THE BIGFOOT BF300**

PREPARING THE BF300 FOR TRANSPORT. If the baler is going to be moved to another location,

- Turn on the engine (SEE SECTION 5, PAGE 13)
- Use the hydraulic controls to latch the door (SEE SECTION 6, PAGE 17, FIGURE 29)
- Lower the plunger as far as it will go (SEE SECTION 3, PAGE 6, FIGURE 7, AND SECTION 7, PAGES 19-21)
- Raise the trailer bed, taking the steps described below (ALSO SEE SECTION 3, PAGE 7)

RAISE THE TRAILER BED. The controls and hydraulic system for raising and lowering the trailer bed are located in the right side of the storage box (FIGURES 10, 22). Follow these steps:

- Remove the handheld control device from the box and push the *up* button (FIGURE 22).
- Raise the trailer bed until the two parts of the safety lock are aligned (FIGURE 21).
- Insert the trailer-bed locking pin to lock the trailer in its raised position for travel. Insert the R-clip into the pin to keep the pin in place (FIGURE 21 and MAINTENANCE CHAPTER, FIGURE 24).

TOW VEHICLE & TOW PACKAGE REQUIREMENTS. A **three-quarter ton truck or larger** is recommended for towing the baler-trailer unit. The tow vehicle must be equipped with a **tow package** sufficient to pull loads of at least 7,000 lb.

The tow package should include a standard **seven-pin electrical plug** to power the trailer lights, turn signals, brakes and any other electrical components on the trailer (FIGURES 41, 42). RAPP has supplied each of its balers with a **2-5/16" ball** attached to a removable ball mount with a 1" rise. The **raised ball mount** should be used in place of the standard pickup truck drop hitch because drop hitches are typically too low for the BigFoot, causing an uneven distribution of weight on the two sets of axles, leading to excessive wear on the tires (MAINTENANCE CHAPTER, FIGURE 25).



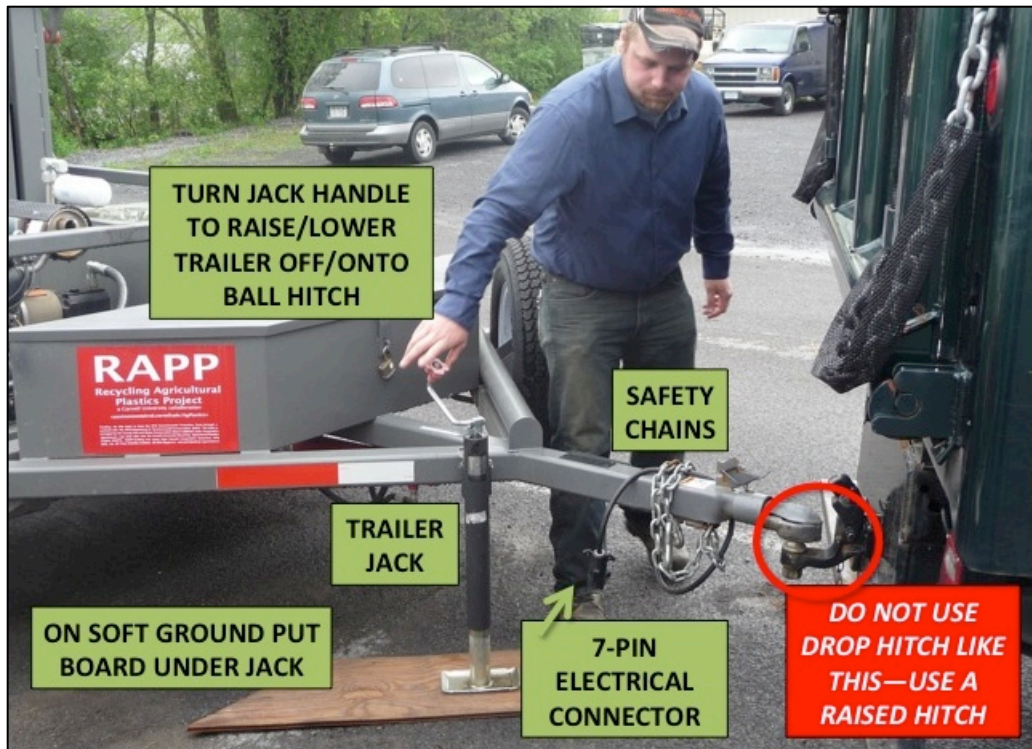
FIGURE 41. PLUG ON TOW VEHICLE FOR THE SEVEN-PIN ELECTRICAL HARNESS.



FIGURE 42. TRAILER SEVEN-PIN ELECTRICAL HARNESS PLUGGED INTO TRAILER.

HITCH THE TRAILER TO THE TOW VEHICLE. When the trailer is not hitched to the tow vehicle, the trailer jack should be in place to stabilize the trailer, with wheel chocks (blocks) between the trailer wheels to prevent the trailer from rolling. The wheel chocks play an important role in protecting the jack from lateral stress jack if the trailer gets jostled (e.g., in the process of hitching or unhitching from the tow vehicle or when moving a finished bale or loading the baler) (FIGURE 44).

1. If the wheel chocks and jack are not already in place when preparing to hitch the trailer, put wheel chocks between the wheels before proceeding and mount the jack vertically in its mount on the trailer frame, as shown in Figure 43. If the ground under the jack is soft or unstable, put a board under the foot of the jack (FIGURES 43, 44).



-FIGURE 43. TRAILER JACK IN VERTICAL POSITION STABILIZING THE TRAILER, WITH BOARD UNDER FOOT OF JACK.



FIGURE 44. WHEEL CHOCKS. PLACE SOLID, STURDY BLOCKS BETWEEN THE WHEELS OF THE TRAILER, ONE ON EACH SIDE.

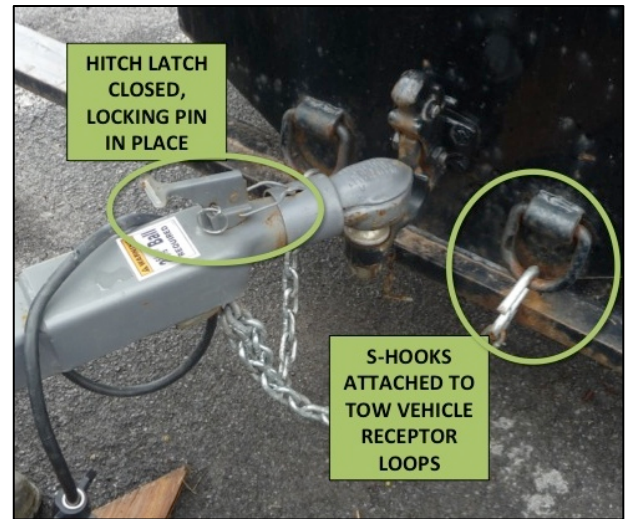
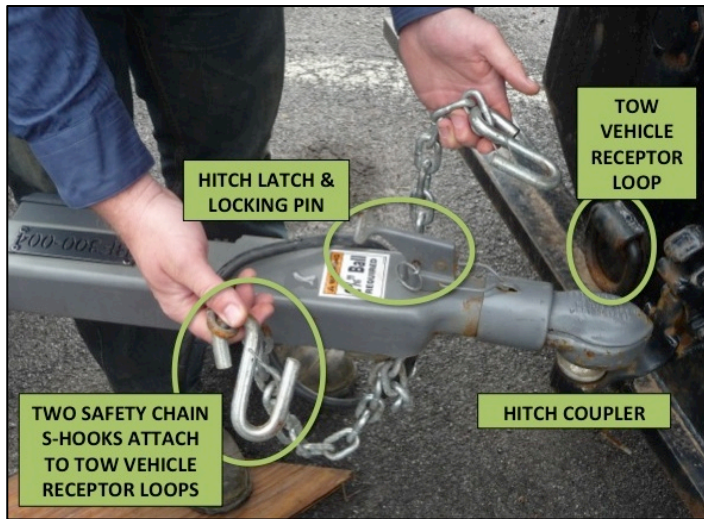
2. Raise the trailer bed (PAGES 7, 15; FIGURE 23).
3. Turn the jack handle to lift the trailer tongue enough to clear the ball hitch on the tow vehicle (FIGURE 43).
4. Back the tow vehicle so that the tow ball on the truck is directly under the coupler on the trailer. It is helpful to have two people—the driver and a guide—working together to line up the tow vehicle with the trailer hitch (FIGURE 45).
5. Turn the jack handle to lower the trailer hitch onto the tow ball.
6. Close the **hitch latch** and secure the hitch in its locked position by inserting the **hitch locking clip** into the holes in the hitch latch (FIGURES 46-48).
7. Attach the **safety chains** on the trailer to the receptor loops on the tow vehicle (FIGURES 47, 48).
8. Attach the **brake breakaway cable** on the trailer to a connector on the tow vehicle, or—if the cable is long enough—pass the cable through a receptor loop on the tow vehicle, and attach it to a clip on the trailer. This cable is the thin wire seen on the left side of Figure 16 on page 11. It runs from the small black box on the trailer tongue, through a receptor loop on the tow vehicle and clips back to the trailer. Figures 49, 50 are close-ups of the brake breakaway cable connections.
9. Connect the **7-pin electrical harness** to the receptor plug on the tow vehicle (FIGURES 41, 42).
10. Remove the jack retaining pin and raise the trailer jack sufficiently to enable it to pivot to horizontal (FIGURE 51).
11. Re-insert the jack retaining pin and clip to secure the jack in a horizontal position on the trailer frame. For road travel, remove the jack and store it in the toolbox (FIGURE 52).
12. Remove the wheel chocks (FIGURE 44).
13. Review and check everything on the daily maintenance and pre-operation checklist (FIGURE 12).
14. The tow vehicle and trailer can now be driven away, re-adjusting the trailer brakes as needed (FIGURE 15).



FIGURE 45. GUIDE DRIVER TO BACK UP TOW VEHICLE, LINING UP THE BALL HITCH ON THE TOW VEHICLE WITH THE TRAILER HITCH COUPLER.



FIGURE 46. CLOSE HITCH LATCH ON THE TRAILER TONGUE AND SECURE IT WITH HITCH LOCKING CLIP.



FIGURES 47, 48. TRAILER TONGUE FROM PASSENGER SIDE: HITCH LATCH, SAFETY CHAINS AND RECEPTOR LOOPS, HITCH COUPLER OVER BALL HITCH.



FIGURE 49. BRAKE BREAKAWAY CABLE RUNS FROM THE SMALL BLACK BOX IN THE UPPER RIGHT OF THIS PHOTO TO A RECEPTOR LOOP ON THE TOW VEHICLE (SHOWN IN FIGURE 43) AND BACK TO THE CARABINER IN THE CENTER OF THIS PHOTO.



FIGURE 50. THE CABLE RUNS THROUGH THE RECEPTOR LOOP ON THE TOW VEHICLE. ALSO SHOWN ARE THE SAFETY CHAINS HOOKED INTO THE RECEPTOR LOOPS AND THE RECOMMENDED RAISED BALL HITCH.



FIGURE 51. REMOVE THE JACK RETAINING PIN SO THE JACK CAN BE PIVOTED TO A HORIZONTAL POSITION.



FIGURE 52. AFTER THE JACK IS PIVOTED TO HORIZONTAL, INSERT THE JACK RETAINING PIN IN THE JACK MOUNT. INSERT THE PIN CLIP TO SECURE THE PIN IN PLACE.

UNHITCH THE TRAILER FROM THE TOW VEHICLE. Once the trailer is hitched to the tow vehicle, it does not need to be unhitched to use the baler. Both RAPP and the BigFoot manufacturer recommend that the baler remain hitched while baling. There are several reasons:

- The tow vehicle provides stability and support and prevents the trailer from rolling.
- If the unit is unhitched, the trailer jack is the sole source of support, but cannot provide the stability of a truck.
- If the unit is unhitched, excess lateral stress is put on the jack (a) if the trailer should begin to roll, (b) when the trailer bed is lowered, and (c) if a forklift or other machinery jostles the baler, as might happen when the finished bale is being moved out of the way.
- If the unit is unhitched and the trailer bed is in its *up* position with any load in the compaction chamber, the trailer tongue can spring up without warning.

However, sometimes the trailer must be unhitched, such as when one tow vehicle is exchanged for another or when the baler is put in storage for the winter. The procedure for unhitching the trailer is essentially the reverse of hitching it:

STEPS TO UNHITCH THE TRAILER FROM THE TOW VEHICLE:

1. Block the wheels of the trailer with wheel chocks to prevent the trailer from rolling.
2. If the trailer jack has been stored in the toolbox (or elsewhere), attach it to the jack mount on the trailer frame. Pivot the jack to vertical and secure it with the jack retaining pin and clip (FIGURES 43, 51, 52).
3. If the ground is soft, put a board under the foot of the trailer jack (FIGURE 43). Turn the jack handle to lower the foot of the jack to the ground and then continue turning the handle to raise the trailer tongue enough to take some of the tongue weight off the tow vehicle hitch.

4. Disconnect the **safety chains**, the **brake breakaway cable**, and the **electrical hookup** from the tow vehicle (FIGURES 41-43, 47-50).
5. Pull the **hitch locking clip** from the trailer hitch, release the hitch locking mechanism, and replace the clip in the same holes so it does not get lost (FIGURES 46-48).
6. Turn the jack handle to raise the trailer tongue and the hitch coupler on the trailer sufficiently to clear the ball hitch on the truck.
7. Lower the jack as needed to level the trailer and leave the jack in place to stabilize the trailer while it is unhitched (FIGURE 43).
8. Check all connections to be certain that the trailer is secure and that all connections are clear of the tow vehicle before driving the vehicle away, leaving the BigFoot behind.

As noted on the top of page 29, the trailer jack and wheel chocks should be kept in place to stabilize the trailer when it is unhitched].

TAKING THE BIGFOOT BF300 ON-THE-ROAD. The trailer has the recessed lights, turn signals and brakes required for on-road travel. Before taking the baler on the road, go through the Daily Maintenance and Pre-Operation checklist, checking the oil and gas levels, the lights and hydraulic system, the security of the hitch, etc. (FIGURE 12).

And finally check that the trailer bed is in its raised position, as needed for road travel. This sounds silly but it is an easy thing to miss.

The BigFoot is not designed to carry any additional weight in the compaction chamber or elsewhere on the trailer. No more than a few hundred pounds of plastic should be left in the baler for road travel (*e.g.*, moving from one farm to another) because extra weight on the trailer will make it difficult to handle. Partial and finished bales should be transported in the bed of the tow vehicle or in a tow trailer, not in the compaction chamber.

Tight turns wear on the tandem trailer wheels of the trailer, so the driver of the tow vehicle should make big loops when turning. In addition, the short trailer turns quickly when backing up and can jackknife on a tight turn.

SECTION 10. MAINTENANCE & TROUBLESHOOTING

The Maintenance & Troubleshooting section is published in a separate file that can be accessed from Cornell's eCommons archive <http://ecommons.cornell.edu/handle/1813/36235>.

Maintenance & Troubleshooting. Section 10 of *Guide to Using the BigFoot BF300 Baler for Agricultural Plastics*. 2014. Levitan, Lois and Nathan Leonard. 17 pages, 27 figures. Cornell University, Recycling Agricultural Plastics Project. Filename *BigFootMaintenanceLevitanAndLeonard2014*. Accessed at <http://ecommons.cornell.edu/handle/1813/36235>.

FIGURES IN MAINTENANCE & TROUBLESHOOTING SECTION:

- 1: RAM BUMPER
- 2: MISSING RAM BUMPER
- 3: HYDRAULIC CONTROL BOX WITH FLOW EQUALIZER ON THE RIGHT SIDE AND HYDRAULIC PRESSURE
- 4: BOLTS SECURING BALER TO TRAILER
- 5: PIVOT POINTS & SOCKET HEAD SCREWS OF BALER EARS
- 6: IMPROPERLY SEATED CLIP
- 7: MCMASTER-CARR STYLE 2, # 94751A782, SPECIFICATION SHEET
- 8: HONDA ENGINE AIR INTAKE
- 9: HONDA ENGINE HOUR COUNTER & OIL ALERT® WARNING LIGHT
- 10: OIL FILTER (BLUE CANNISTER) AND DRAIN PLUG
- 11: FUEL FILTER (CLEAR TUBE ON THE FUEL LINE)
- 12: LOCATION OF GAS TANK & HYDRAULIC FLUID TANK
- 13: HONDA ENGINE SERIAL NUMBER PLATE
- 14: HONDA ENGINE SPARK PLUG
- 15: HYDRAULIC PUMP & MAJOR CONNECTORS
- 16: HYDRAULIC FLUID HOSES, RATED 3000 PSI
- 17: DONALDSON DYNAMIC P565059 HYDRAULIC FLUID FILTER
- 18: FILL LEVEL ON THE HYDRAULIC FLUID GAUGE
- 19: YELLOW-HANDLED HYDRAULIC FLUID SHUT-OFF VALVE
- 20: PILOT-ACTUATED CHECK VALVE
- 21: ANTI-SLIP GRIT TAPE ON FENDER
- 22: COMPONENTS OF THE TRAILER HYDRAULIC FLUID SYSTEM
- 23: CONTROLLER FOR TRAILER HYDRAULIC SYSTEM
- 24: TRAILER-BED LOCKING PIN AND HYDRAULIC CYLINDER
- 25: RAISED BALL HITCH
- 26: TRAILER DECK WHEEL CHANNEL

FIGURES, SECTIONS 1-9, *GUIDE TO USING THE BigFoot BF300 BALER FOR AGRICULTURAL PLASTICS*

1. BIGFOOT BF300 BALER, WITH 1000-POUND BALE OF COMPACTED AGRICULTURAL FILM IN THE BALING CHAMBER, READY TO EJECT.
2. STORAGE AND LOADING OF BALES READY TO BE TRANSPORTED TO MARKETS.
3. NYS RAPP PLASTICS BALER TRAINING REQUIREMENT AND LIABILITY RELEASE.
4. BIGFOOT BALER OPERATOR CERTIFICATION CARD.
5. BIGFOOT BF300 BALER, MAJOR PARTS AND DIMENSIONS.
6. HYDRAULIC HOSE AND CONNECTIONS AT THE CONTROL LEVERS, SHOWN WITH THE CONTROL BOX COVER REMOVED.
7. BIGFOOT BF300 BALER CONTROL BOX, SHOWN WITHOUT THE PROTECTIVE.
8. BIGFOOT BF300 BALER HYDRAULIC PUMP.
9. PILOT ACTUATED CHECK VALVE.
10. TRAILER HYDRAULIC SYSTEM COMPONENTS.
11. CHECKLIST OF TOOLS, SUPPLIES, GEAR.
12. BIG FOOT BALER BF300 - DAILY MAINTENANCE & PRE- OPERATION CHECKLIST.
13. BALER PINS & RETAINER CLIPS.
14. INDICATION OF HYDRAULIC LEAK.
15. TRAILER BRAKE CONTROLS.
16. TRAILER TONGUE VIEWED FROM DRIVER'S SIDE OF TRAILER.
17. SUMMARY OF OPERATING STEPS.
18. HONDA ENGINE, CHOKE & THROTTLE.
19. HYDRAULIC FLUID RESERVOIR, HYDRAULIC FLUID THERMOMETER & FLUID LEVEL GAUGE.
20. ENGINE SHIELD INSTALLED BY RAPP.
21. TRAILER BED LOCKING PIN.
22. LOWER THE TRAILER BED: PRESS U FOR UP TO RAISE THE TRAILER BED AND D FOR DOWN TO LOWER IT.
23. TRAILER BED RAISED
24. TRAILER BED LOWERED.
25. BALER EJECTION FEET IN UP POSITION.
26. EJECTION FEET RETRACTED, FLUSH WITH FLOOR.
27. LAY FLAT SHEET OF PLASTIC OR CARDBOARD ON THE BOTTOM OF THE BALE CHAMBER.
28. DO NOT USE BALE WRAP FOR THE TOP AND BOTTOM LAYERS.
29. DOOR LATCHES.
30. PILE BUNDLES AS HIGH AS POSSIBLE.
31. PROTECTIVE COVER INSTALLED OVER CONTROL LEVERS AT CONTROL BOX.
32. NO SHINY METAL VISIBLE ON THE HYDRAULIC PISTON ROD WHEN THE PLUNGER IS LOWERED—BALE IS NOT FULL.
33. BALER EARS SPRUNG INTO PLACE, HELPING TO HOLD PLASTIC DOWN AND PREVENT PLASTIC REBOUND.
34. BALE OF RIGID PLASTIC.
35. STACKED PLASTIC PLANTING TRAYS.
36. 2-3" OF SHINY METAL VISIBLE ON THE PISTON RODS WITH THE PLUNGER LOWERED AS FAR AS POSSIBLE—BALE CLOSE TO FULL.
37. MAKING A SQUARE BALE.
38. BUNDLE OF WIRE IN THE WIRE RACK LOCATED TO THE LEFT OF THE BALER DOOR (BACK SIDE OF THE BALER).
- 39A. STEPS IN TYING BALE WIRES.
40. TROUBLE EJECTING THE BALE.
41. PLUG ON TOW VEHICLE FOR THE SEVEN-PIN ELECTRICAL HARNESS.
42. TRAILER SEVEN-PIN ELECTRICAL HARNESS PLUGGED INTO TRAILER.
43. TRAILER JACK IN VERTICAL POSITION STABILIZING THE TRAILER, WITH BOARD UNDER FOOT OF JACK.
44. WHEEL CHOCKS. PLACE SOLID, STURDY BLOCKS BETWEEN THE WHEELS OF THE TRAILER, ONE ON EACH SIDE. GUIDE DRIVER TO BACK
45. UP TOW VEHICLE, LINING UP THE BALL HITCH ON THE TOW VEHICLE WITH THE TRAILER HITCH COUPLER.
46. CLOSE HITCH LATCH ON THE TRAILER TONGUE AND SECURE IT WITH HITCH LOCKING CLIP.
- 47, 48. TRAILER TONGUE FROM PASSENGER SIDE: HITCH LATCH, SAFETY CHAINS AND RECEPTOR LOOPS, HITCH COUPLER OVER BALL HITCH.
49. BRAKE BREAKAWAY CABLE.
50. BRAKE BREAKAWAY CABLE RUNS THROUGH THE RECEPTOR LOOP ON THE TOW VEHICLE.
51. REMOVE THE JACK RETAINING PIN SO THE JACK CAN BE PIVOTED TO A HORIZONTAL POSITION.
52. AFTER THE JACK IS PIVOTED TO HORIZONTAL, INSERT THE JACK RETAINING PIN IN THE JACK MOUNT.

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GUIDE TO USING THE BIGFOOT BF300. Copies of this guide, in Spanish and English can be downloaded from the Recycling Agricultural Plastics Program website or accessed from Cornell's eCommons (<http://ecommons.cornell.edu/>, search the Agricultural Plastics Recycling library). Video versions of the Guide can be requested from RAPP or streamed from YouTube and the Cornell eCommons, both linked from the RAPP website.

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