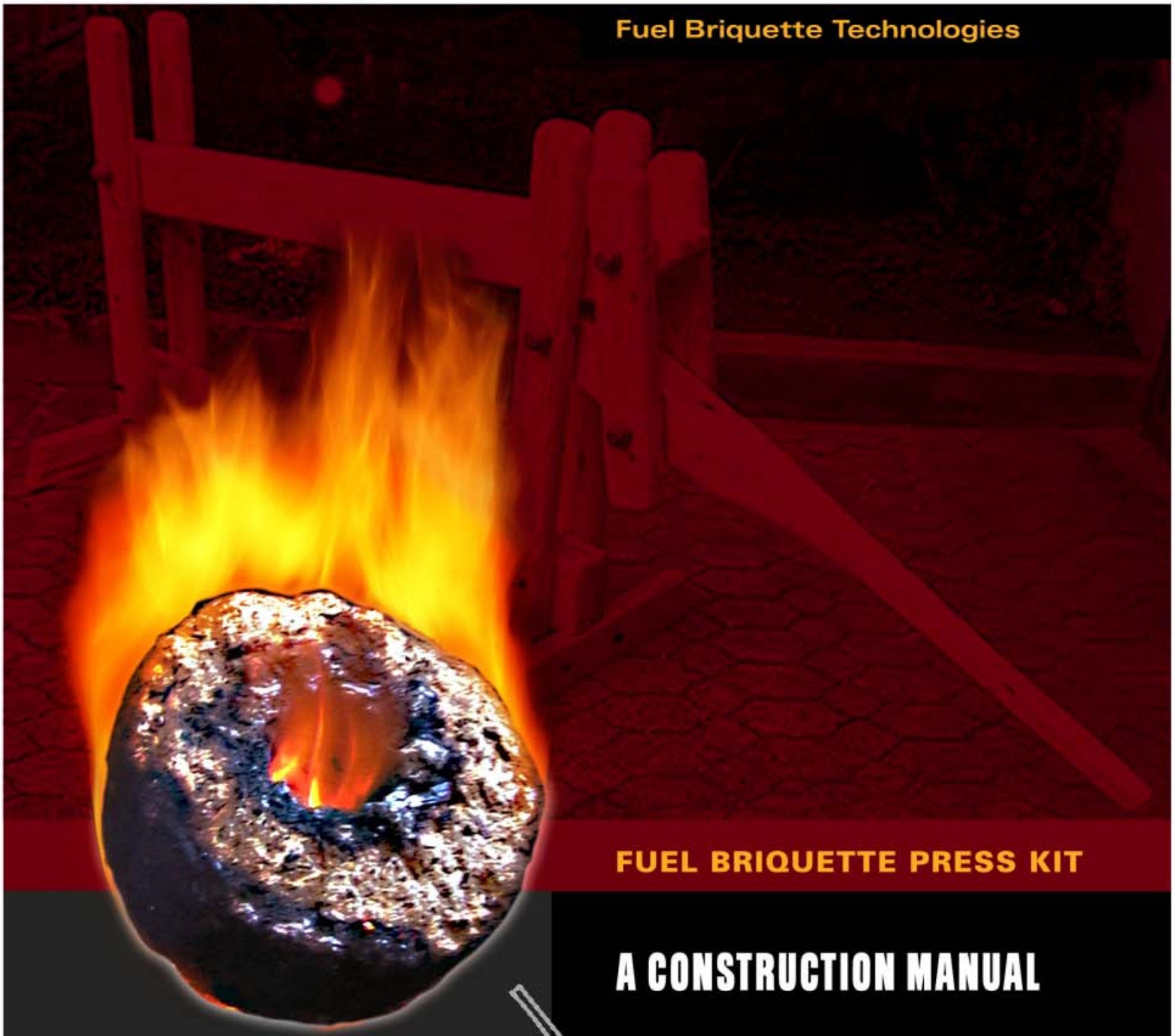
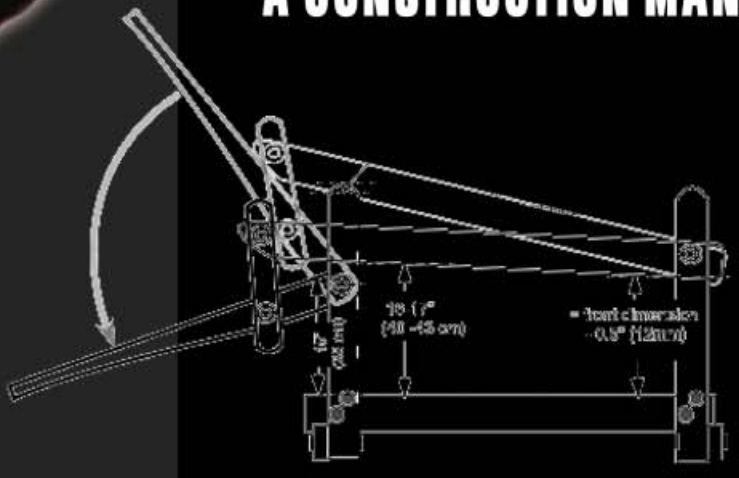
Fuel Briquette Technologies



FUEL BRIQUETTE PRESS KIT

A CONSTRUCTION MANUAL



LEGACY FOUNDATION

Technology, Management, Training and Media Services for Sustainable Development

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FUEL BRIQUETTE PRESS KIT

A CONSTRUCTION MANUAL

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INTRODUCTION

INTRODUCTION

Fuel Briquettes - made from everyday agricultural and commercial residues such as weeds, leaves, sawdust, rice husks, carton board and scrap paper – are a unique, yet well proven technology.

In many parts of the world, people are making this new and modern fuel, saving time, saving energy, saving our environment and creating income. Fuel briquettes are unique because they provide a fuelwood alternative from resources that are right under your feet or in your wastebasket! Fuel briquettes can be made relatively quickly at a low cost to the manufacturer or consumer and can be adapted and applied in a wide variety of settings, making the briquettes appropriate, sustainable and renewable.

The Legacy Foundation and its partners have tested the briquette-making process over ten years in a wide variety of environments and conditions – in urban and sub urban and rural areas in Malawi, Haiti, Kenya, Zimbabwe, Nicaragua, Peru, Mali and the United States. The producers who have participated in briquette training have become expert in the process and able to adapt their own conditions, materials and environment to the briquette production process.

This manual provides all that is required to make a Briquette Press Kit. Other manuals in our series include *Briquette Making: A Users Manual* a step by step guide in making fuel briquettes, *Fuel Briquettes: A Trainers Manual* a guide to expand briquette making into a community project and *Fuel Briquettes: The Theory and Applications From Around the World* which includes a recipe book for the experienced briquette maker to expand the variety and types of fuel briquettes made and their applications.

The Briquette Press Kit

A Fuel Briquette Press Kit consists of the following:

- A wooden hand press
- Two mold sets
- A plastic tarpaulin or black PVC sheet film of 5 meters by 2 meters in size, for drying and composting. Heavy-duty plastic sheet is preferred as shown on the right, below.
- 4 large metal pails or plastic buckets, as used for washing clothes, or kids. Two are shown, below.
- Two -three large mortar and pestles, used in pounding maize; optional for higher production is a hand thresher or motor powered maize or hammer mill with a modified screen.
- Water: 200 - 250 liters is consumed gradually, throughout a full day's production effort. However to initiate production, another 200 liters should be available. Remember that this will be recycled throughout the day.

Wooden Hand Press

Mold Sets — 2 each

(from top left) center GS guide pipe, wood piston with cap plate at bottom end, divider washer and wood base plate with its centering ring and (bottom) white perforated PCV cylinder.

Plastic Tarpaulin

The fuel briquette press itself is made of normal pine or other medium density softwood and is designed to provide considerable mechanical advantage through a compound lever arrangement. It was originally developed at the University of Washington's Forest Products Laboratory in the mid 1980's. Through extensive field use throughout the world, it has been modified to the current design. However, no structural changes have been made to the original design.

Overall fuel briquette press dimensions, ex-handle, are roughly six (6) feet (183 cm) in length (main beam) with a three (3) foot (91.5 cm) wide base. It can be collapsed into roughly, a 6 ft. by 1.5 ft by 1-ft. (183 x 46 x 30 cm) rectangular solid package for transportation in about thirty minutes, with an adjustable spanner and simple pliers.

The press is easily transported in the back of a station wagon or light pickup. The weight of the assembled unit, assuming use of the low-to medium density wood, is between 80 and 125 lbs (36-57 kg).

Thus far, the cost of materials for the press and mold sets has varied only about 25% from the experience in Malawi, Zimbabwe, Kenya, Tanzania, Nicaragua, Haiti, Mali and Peru and most recently Uganda.

This press design was initially developed by Dr. Ben Bryant, ret. Prof Emeritus, College of Forest Resources University of Washington Seattle Washington US. Dr Bryant is the real technical godfather of the fuel concept. He has taught, done research and consulting work in the field of wood utilization technology for 38 years. Over 200 similar presses have been built in seven nations and are in use daily since the late 1980's

Preparation of the Fuel Briquette Press Kit

A Step-by Step Process

Any qualified carpenter can produce the press and molds entirely with hand tools in about three to four days. The length of time will depend on the experience of the carpenter and quality of the tools. With training, the construction process can be reduced. The diagrams and photos throughout this manual illustrate the general layout and the detailed construction requirements.

The fuel briquette press is made much stronger than it needs to be. Tolerances are relatively low and quality of wood can vary considerably without loss of functionality.

There are several steps in preparing a Fuel Briquette Press Kit

1. Construction of the briquette press.
2. Construction of the two mold sets.
3. Purchase of standard wash basins, large size mortars and pestles and a heavy-duty plastic tarpaulin.

Tools Required for Fuel Briquette Press and Molds Construction

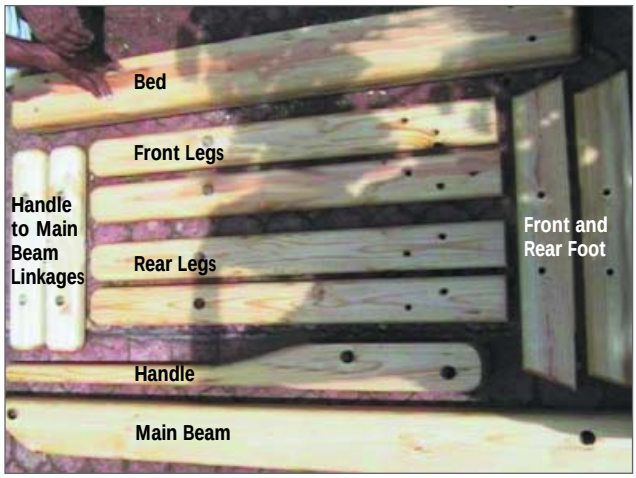
To start the process you will need some tools. In our experience, all of these tools are available to a rural carpenter or in a small home workshop.

1. Claw Hammer
2. Wood saw
3. Hacksaw
4. Chisel
5. Hand drill with 1/2inch diameter (12mm) bit
6. Additional hand bit and brace with a 11/8 inch diameter. (28 to30 mm), a 1/2 inch (12 mm) wood bit
7. Screwdriver (flat blade)
8. Hand plane and/or wood rasp
9. Flat and round metal files
10. Adjustable spanner: an 8 -10 inch (20-25 cm) length, medium size
11. Tape measure
12. Two wood clamps with a 10 inch (25cm) opening capacity

Use Sharp Tools!

Materials Required for the Construction of the Fuel Briquette Press

The following is a detailed list of all of the materials required for fuel briquette press construction

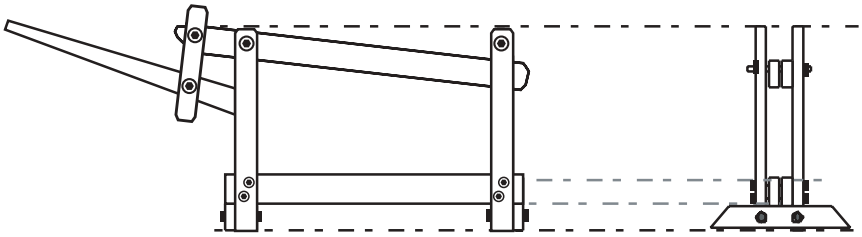


An Illustration of the Fuel Briquette Wood Parts

WOOD — ***Should be planed and beveled, and relatively free of knots***	DIMENSIONS	TOTAL QUANTITY
Top and Bottom Beams are made up of two (2) 2 inch x 6 inch boards (5cm x15cm) sandwiched together. *This makes the 4 inch x 6 inch (10cm x15 cm) cross section.*	**2 inch x 6 inch (5 cm x 15cm)**	**30 feet (10.02 mtrs)**
Legs, Feet, Handle and Handle Linkages The handle is shaped of two (2), 2 inch x 4 inch (5cm x 10cm) stock giving a 4 inch x 4 inch (10cm x 10cm) cross section. *The wood is to be cut to dimensions shown in construction diagram above.*	**2 inch X 4 inch (5cm x 10cm)**	**28 feet (9.52 mtrs)**
Center Guide Rings for Base Blocks of Mold Sets One piece of 4 inch X 12 inch (10cm x 30.4cm) plywood of ¼ inch thickness (6mm). *A flattened plastic sheet can be used as well.*	**4 inch X 12 inch (10cm x 30.4cm)**	**Once Piece**
PIPE **— 1 inch outside diameter** ***Total pipe length = 63 inches (160 cm cut into 6 pieces)***		
Pivot Pipes in Press Four (4) pieces galvanized steel or "black" pipe: ¾ inch X 10 inches (25.4 cm) length.	**¾ inch pipe 1 inch (25.4mm) OD x10" (24.5cm) length**	**40 inches (101.6cm)**
Center Guide Pipes for the Molds Two (2) pieces of the same diameter pipe each cut to 11.5" (29.3cm) length.	**¾ inch pipe 1 inch (25.4mm) OD x11.5" (29.3cm) length**	**23 inches (58.6cm)**

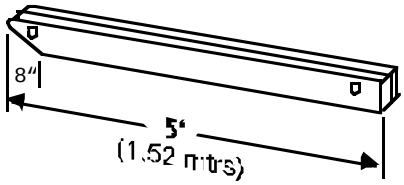
ANGLE IRON	DIMENSIONS	TOTAL QUANTITY
Eject Lip in the press One (1) piece. One side of this is to be cut back to ~1/8 inch to 3/16 inch (3mm to 4.5 mm).	**1 inch x 1/2 inch x 8 inches (25mm x 12mm x 20cm)**	**1**
NAILS AND SCREWS		
Twenty-four (24) nails - flathead. (12-14 penny)	**Nails length 3.5 inches (9cm)**	**24**
Six (6) flathead woodscrews	**Screws 1.5 inches (39mm) length**	**6**
BOLTS **— mild steel with washers (NOTE: Adjust lengths to actual lumber dimensions)**		
Four (4) mild steel bolts with nuts and two washers per bolt. *These are used for attaching bolt frame bed to legs.*	**3/8 inch x 8 inches (10mm) x (20cm)**	**4 bolts** **8 washers**
Four (4) mild steel bolts with nuts and two washers per bolt. *These are used for attaching legs to feet.*	**3/8 inch x 6 inches (10mm) x (15mm)**	**4 bolts** **8 washers**
WASHERS **— mild steel washers**		
Eight (8) flat washers: These will be needed only for the first two of the three options shown below for attaching the pivot pipe. *Check p. 11 of this manual first to determine which attachment method you prefer before sourcing these large flat washers.*	**1 inch (2.54 cm)** *inside diameter*	**8**
PVC PIPE — **4 inch (10 cm) inside diameter**		
Cylinders for Molds Two (2) pieces heavy-duty gray or white PVC pipe. *Note the wall thickness and the kind of plastic used is important! The wall needs to be 3/16 inch to 1/4 inch (5 to 6 mm) thick: Do not use thinner wall PVC drain pipe or black ABS plastic of any thickness.*	**4 inches x 11 inches (10cm) x (28cm)** *inside diameter*	**2 ea.**
METAL SHEET		
Dividers and End Caps Thick mild steel or aluminum plate cut into four (4) pieces 1/ 4 inch (10 cm) diameter disks. *A one foot square piece is not essential. You can assemble these from any scraps of sheet metal you may have. Oil drum material can work if it is of a relatively heavy gauge. Two of the disks are to be used for dividers in the molds; the other two disks are used as end caps for the pistons in same mold sets.*	**1/16 inch to 1/8 inch thickness (1.5 – 3 mm) x 1 square foot (925 sq cm)**	**4 disks**
WOOD PRESERVATIVE		
Linseed oil, commercial wood preservative, or if nothing else available, used motor oil.		**1 quart (1 liter)**

Building the Press



Step 1: Cut all the wood as shown below: (only pivot holes are shown)

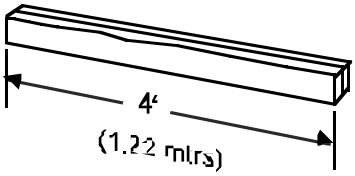
Main (top) beam:
Double thickness of,
6" (15cm) X 2"(5cm)
X 5 ft (1.52 mtrs.)



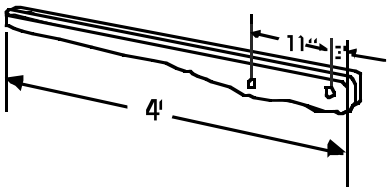
Left Side Top - 1" (25mm) radius on beam end.

Drill 1⅛" (28 - 30mm) dia. holes, 4" (10cm) in from ends and 1½" (38mm) down from top.

Base: **Double thickness of,**
6 X 2 x 4 ft
(1.22 mtrs.).

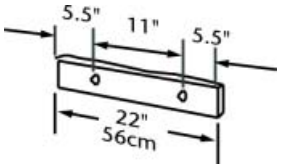


Handle: **Double thickness of,**
6 X 2 x 4 ft
(1.22 mtrs.).



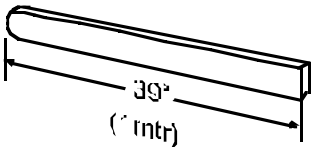
Drill two 1⅛" (28 - 30mm) dia. holes, One on right is 2" (5cm) in from right end and 1½" (38mm) down from top. Other is 13" (33cm) in from right end and 1½" up from the bottom. Holes are 11" (28cm) apart.

Links: **Two each of, 4” X 2” X 22” (56cm)**



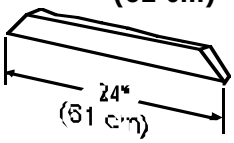
Drill two 1⅛” (28 - 30mm) dia. holes, 11” (28cm) apart and 5½” (14cm) in from each end and 1½” (38mm) down from top.

Legs: **Four each of 4” X 2” X 39” (~1 mtr): Two for front; two for back.**



Pivot holes for legs not shown because they may vary according to wood sizes and results of actual assembly.

Feet: **Two each of, 4” X 2” X 2 ft (61 cm)**

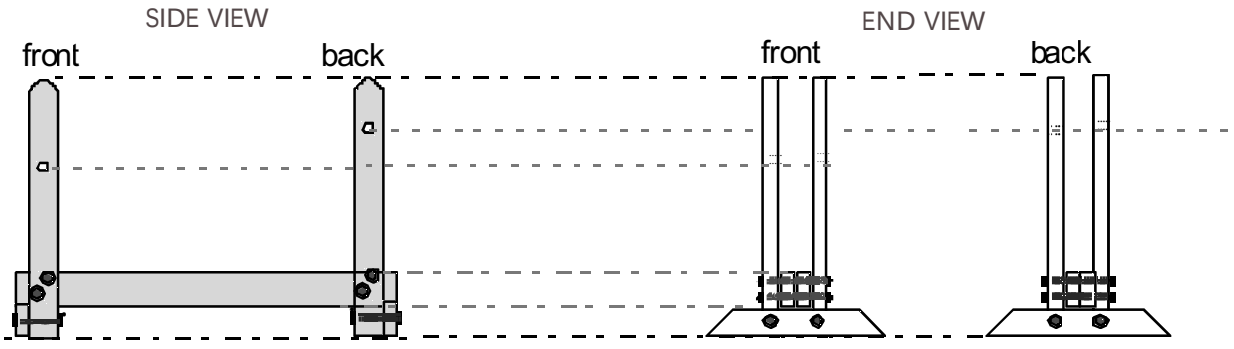


Taper ends 45 deg.

Step 2: Assemble the frame

Put feet, legs and base in position - then clamp, drill and bolt all together. Use a ‘square’ to ensure legs are vertical before drilling. Not shown are the top (moving) beam, the handle and the handle linkages).

Hole placement is not critical for the legs where they attach to the feet, but it is necessary to pay very close attention to hole placement for the main beam handle and handle linkages. The varying dimensions of the lumber will necessitate pre-testing the rear hole position to assure the correct clearance between the base at the rear of the press and the main beam – as is noted and shown in the accompanying blueprint drawing.



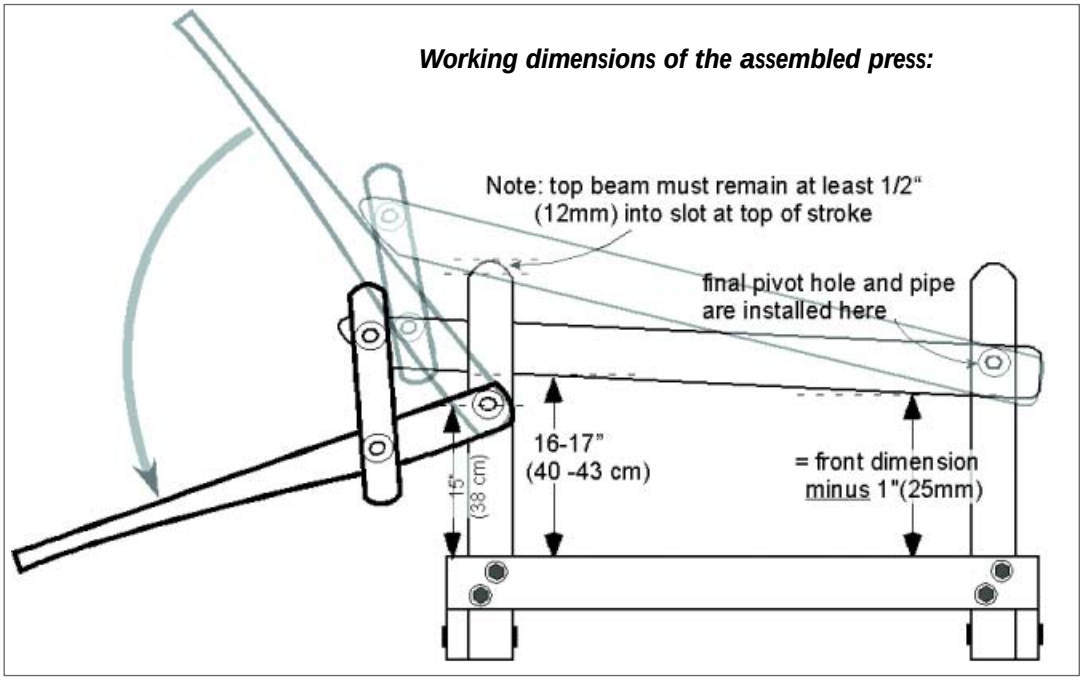
Step 3: Assemble And Place The Handle, Top Beam and Handle Linkages

The positioning of the handle linkages and top beam in the press is critical and perhaps the most challenging part of making the press. It requires two persons and bits of wood scraps and clamps to block up the various wood parts in position as you precisely locate their pivot holes.

The sequence of the following assembly is as follows.

1. Connect the two short handle linkages to the handle with a 10 inch (25cm) long GS pivot pipe, passed through the pre drilled holes.
2. Repeat with the connection of the links to the top beam.
3. Push the top beam into the slot between rear legs and front legs. Block an /or clamp the rear (square end of the top beam into an approximate position.16 inches (40cm) above the main bed of the press.
4. Push the thick end of the handle into the slot between the front legs, beneath the top beam and block/ clamp it at an elevation of between 14 and 15 inches (35.6 – 38cm) above the main bed. As you do this, make sure that the thick end of the handle remains flush with, and does not protrude beyond, the front legs into the center of the press.
5. Raise the handle (and the now connected top beam) to its top most position. As the top beam is raised, ensure that it does not leave the slot between the front legs. It can remain with as little as 1/2"(12mm) in the slot at this point but not less. When you have found this position then locate and drill the front pivot hole in the front legs. It should be between 14 and 16" (36 and 41 cm) above the main bed.
6. Insert one of the 10" (25cm) long metal pivot pipes through the front legs and through the handle end. Take care to make sure it is easy to insert the pipe and that the handle is well aligned.
7. The final step is the positioning of the hole at the rear end of the main beam. This is determined by lowering the handle to the bottom most point. Measure the distance between the top beam and the bed along the front legs. This should be between 16-17 inches (40-43cm). Then block/ clamp the rear of the main top beam such that it will be 1/2 inch (12mm) lower than it is at the front legs. Mark and drill this last pivot hole and insert the remaining pivot pipe.

All that remains for the completion of the fuel briquette press construction is the comparatively easy tasks of attaching the pivot pipes and making and installing the Eject Lip.



= Pivot holes: First, attach handle linkages (left) to handle and top beam. Next, set handle end into front legs and make pivot hole and attach pivot pipe. Finally, position rear of top beam

Step 4: Attach the Pivot Pipes

There are three known alternative methods for attaching the pivot pipes. Each varies according to what resources one has available. There are three options which follow:

Method #1

This is the most basic method which presumes no means of drilling holes in steel, but at least access to a hack saw.

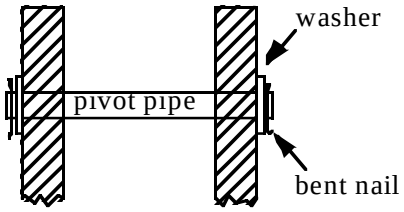
Cut two (2) 1 inch long slots (about 1/2 inch apart) in the ends of the pivot pipes with a hacksaw. Bending this slotted section out will form a lip which will easily retain the tube and washer. While this may be the easiest method, it is more or less a one-time fix. The lip will not last if you were to be bending it back and forth frequently to remove the pivot tube.

Method #2

Drill 3/16 inch (4mm) diameter holes and insert cotter pins. If no cotter pins are available, you can use some of the 12 penny nails:

The nails should be bent around and tightly to the pipe, to avoid possible injury to the operators.

typical front / rear leg section



Method #3

Another more recent pivot tube fastening method has emerged in Uganda. This is proving cleaner, stronger and safer than either of the above pivot tube fastening methods. However, it requires a longer drill bit and greater skill in aligning the holes than the above method.

In this method, the pivot pipes are cut flush with the legs. The hole is drilled halfway through the 4 inches (10cm) width of the leg and through the midsection of the pivot pipe where it passes through the leg. (Alignment of the hole with the center of pivot pipe is easier said than done). A long nail is then first inserted through the leg and on through pipe, then driven through the remaining leg section. The ends of the pipes are not exposed nor are any nails or cut off pipes and the use of a steel nail across the leg section at this location greatly strengthens the wood leg at one of its greatest stress points.

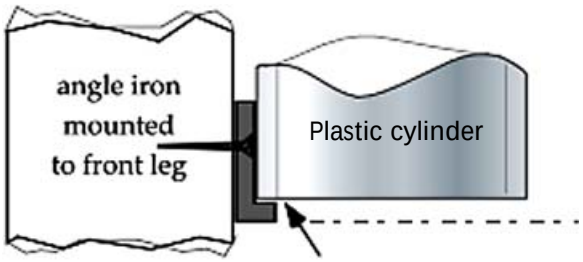
White line shows approximate nail position for attaching the pivot pin, through the wood.

Step 5: Make and Install the Eject Lip

The Eject Lip is a 7 to 8 inch (18- 20cm) long piece of modified angle iron used to hold the bottom of the plastic cylinder up from the base so that the prepared fuel briquette can be ejected. We indicate 7 or 8 inches length because the lumber dimensions vary resulting in varying spans between the legs. The length of the angle iron should be such that it does not extend beyond the legs in either case.

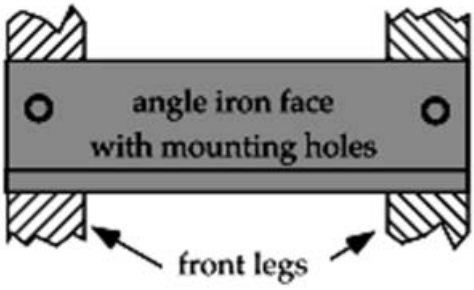
Cut and file one side of the angle iron to form a 3/16 inch (5 mm) wide lip. Screw the longer (unaltered) side onto the back of the front legs, so that the lip will be 8" (20cm) above the base: The exact measurement is not critical but it is important to ensure that the lip is somewhat level in its span from one leg to the other and that the lip is filed back far enough to let the fuel briquettes pass through the cylinder unobstructed.

SIDE VIEW



(cut back lip so that the plastic cylinder pipe covers the lip entirely when rested upon it)

FACE VIEW



Step 6: Do a Final Check of the Construction

Check over all the wood parts to ensure that they are smooth and do not have sharp edges or splinters. Cut of protruding bolt, pivot pipe and eject lip ends.

Step 7: Coat the Press with Wood Preservative

In some locations where there is no wood preservative used motor oil can be used. The most important areas to protect will be the bottom of the legs, the feet and the bed (lower main beam). Apply whatever preservative you have liberally as the press will be operated daily in a water-saturated environment.

With the smoothing and application of preservative, the fuel briquette press is structurally complete. It now awaits the construction of the mold sets and the assembly of the additional off the shelf supplies such as the tarpaulin, mixing pails and mortars and pestles.

Making the Molds, Pistons and Other Pieces for the Fuel Briquette Press

The mold sets can be made at the same time as the construction of the press. While we suggest two mold sets, some prefer to make three in areas where higher production is anticipated. It would not add much to use more than three mold sets for one press, as work flow, material resource processing and fuel briquette storage demand would likely exceed the work space available.

Mold set components in detail:

1. **A hollow piston:** water resistant medium density wood, 3⅞ inches (98mm) diameter by 11 inches (28cm) length. The piston has to have a 1⅛ inch (28 - 30 mm) diameter hole through its center. This can be a daunting task if one has no lathe, but there are alternative and well-tested construction methods using many laminated pieces of wood. Note the construction options below.

2. **A Plastic Cylinder Pipe**: 4 inches (10cm) diameter X 11 inches (28 cm) length. Required is the so-called "Schedule 40" or, 3⁄16 -¼ inch (5–6mm) wall thickness pipe. It is commonly white or gray in color. Do NOT use thin walled PVC rain gutter or black ABS pipe, (even that of ¼ inch thickness), as these will NOT withstand the pressure.

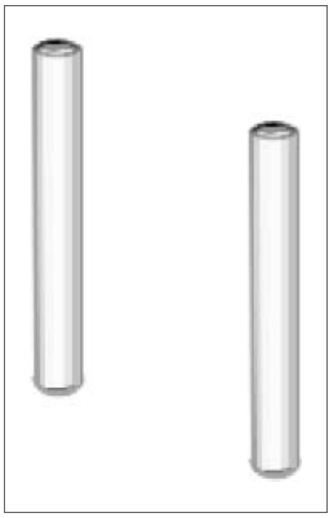
3. **A Center Pipe:** 1 inch (25.4mm) outside diameter (GS) galvanized steel pipe x 11.5 inches (29.2cm). The center pipe slides through the piston and rests in the base plate ring. Bevel and file the ends of these pipes so that they are smooth to the touch.

4. **Two metal (steel or aluminum) washers**: between 1⁄16 inch and ⅛ inch (1.5 – 3mm) thickness x 4 inches (10cm) diameter, with an inside hole diameter of 1⅛ inches (29-30mm). One of these is to be used as an end cap plate for the piston, the other as a divider in the cylinder, for making two fuel briquettes at one time.

5. **A base plate:** This is a 6 inches x 6 inches x 2 inches (15 x15 x5cm) block of wood (usually cut from leftover press beam wood stock).

6. **Center guide ring:** ¼ inch (6mm) thick. This ring is similar in dimensions to the above metal washers – 4 inches (10cm) diameter –with an inside hole diameter of 1⅛ inches (29 -30mm), however it is made of wood or plastic, not metal. This guide ring centers the cylinder and the guide pipe on the base plate.

Step 1: Prepare the Two Center Guide Pipes



The Center Pipe is a 11.5 inch long piece of 1inch (2.54 cm) outside diameter galvanized metal water pipe commonly known as 3/4 inch GS pipe.

It slides through the piston.

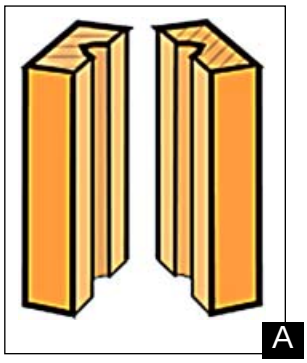
File it until it is smooth to the touch all along the exterior surface, especially at both ends.

Do not use plastic, aluminum or wood dowels, as these tend to float up and out of the base, with frustrating consequences in the actual fuel briquette production operation.

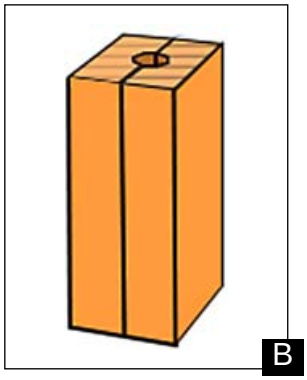
This space for your notes

Step 2: Make the two pistons

The piston is the most difficult part of the mold kit to make. It requires the fabrication of a long, hollow, wood cylinder, which must be fairly accurate in terms of outside size and alignment of the center hole.



The easiest way to make a piston without a machine lathe, is to build up the piston by layering pieces of flat wood together, leaving a square hole in the center, then planing them round. This is much easier than trying to bore a hole through a solid piece of wood with the very unlikely chance of coming out the other end exactly on center. You can use two notched pieces as shown below or a four-piece assembly (top, bottom and two sides) to the same end. The latter does not require notching but is more hassle to assemble. Either way, the resulting square hole must be at least 1 and 1/8 (30mm) inches on each side to allow the center guide pipe to easily pass through. It should not be a tight fit.



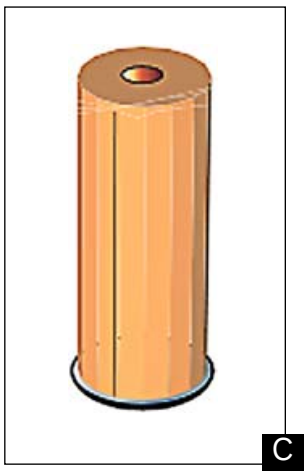
Cut two 11 inch ((28cm) long pieces of 4 inch x 2 inch (10 x 5cm) (medium to hard) wood which is resistant to shrinking, swelling or deteriorating in water.

A. Make a “V” notch along the length of each block to create a square hole when you align the pieces as shown. The two blocks are then nailed and glued together,

Take care to sink the nails well below the surface while avoiding passing the nails through the center hole.

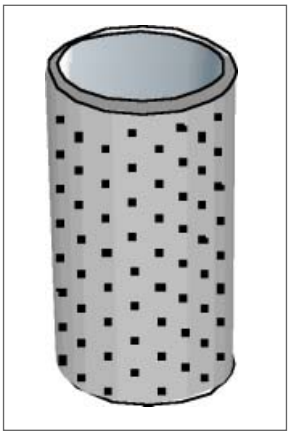
B. Cut off the corners of this square block with a saw, then shave or plane it it round, so that it can slide up and down without sticking, in the PVC pipe cylinder (see below).

C. Screw a divider washer (described below) onto the end of the piston with six flat head wood screws, each about 1 inch (25mm) in length.



Step 3: Make Two PVC Cylinders

Cut two 11 inch (28cm) lengths of a 4 inch (10cm) –inside diameter- heavy duty PVC pipe.

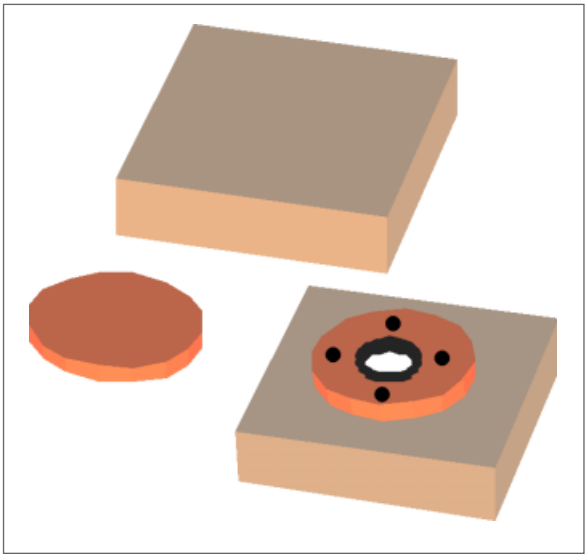


Drill or burn 1/8 inch (3mm) diameter holes on 3/4 inch (20mm) centers, all along and around the pipe. In other words, the holes should be placed about 3/4 inch (20cm) apart.

Clean off all rough edges inside the pipe that will be there from drilling and bevel the outside and inside ends so that the inside and outside surfaces and the ends are smooth to the touch.

Step 4: Make the Base Block and Centering Ring (2 each)

The base plate is made from a 6" (15cm) square cutoff of any 2" x 6" scrap wood from the press itself. Either nail or screw on to the base plate another washer of the same size as you made for the piston above. This washer should be 1/4" (6mm) thick plywood.



This washer is added to align the center rod and the cylinder in production.

Cut two 6 inch (15cm) squares out of the excess from the boards used for the main beam or bed.

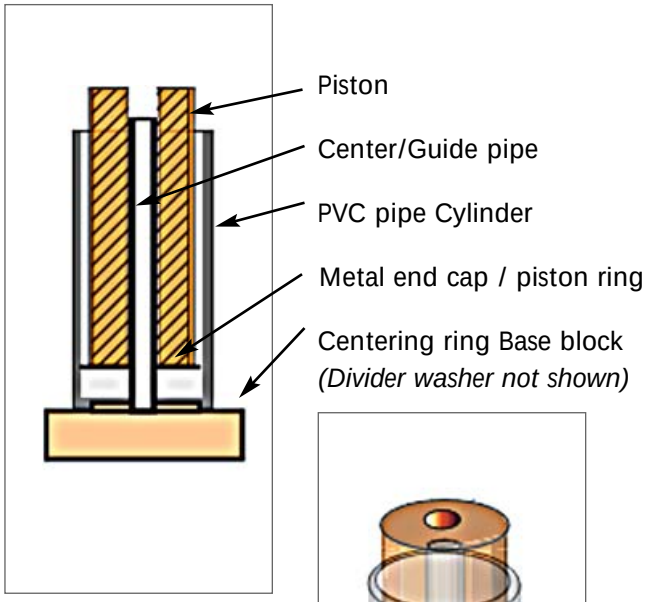
Cut two 4 inch (10cm) diameter circles out of 1/4 inch (5mm) plywood. Screw circles onto the centers of the base blocks and drill 11/8 inch (29 - 30mm) hole in their centers.

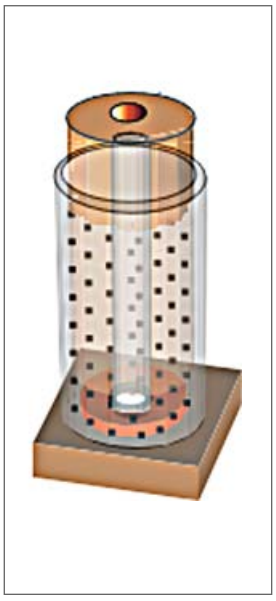
Step 5: Test the Mold Set for Proper Fit

Test to make sure that:

- The 1 inch guide pipe slides through piston and divider and into the base block centre.
- The piston slides through PVC cylinder easily. In actual operation, the piston may swell as it becomes saturated with water, so make sure that the piston is small enough to slide easily through the PCV pipe and that the center pipe slides easily through the piston under water- saturated conditions. The piston may wind up 1/4 inch (3mm) smaller in diameter than the plastic pipe.

  This is acceptable because it is the metal piston ring at the base of the piston which determines the actual clearance of the fuel briquette, not the piston wood itself.
- Finally, make sure the PVC tube (cylinder) fits easily over the centering ring on the base block, when the circle is saturated with water.





Purchase of Standard Wash Basins, Large Size Mortars and Pestles and Heavy Duty Plastic Tarpualin

The Wash Basins:
These are more or less standard items, which can usually be purchased directly at the village or district or town shop. The basins should be of 4 to 5 gallon (16 to 20 liter) capacity, heavy duty and if at all possible, with rounded smooth inside surfaces. Various sizes and shapes are shown throughout the manual.

The Tarpaulin:
The tarp has several functions: as a water catchment liner for the press, as a material processing closure to accelerate decomposition. The tarpaulin 5 to +6 ft (1.5 to 2 mtrs.) x 17 ft (~5 mtrs.) can be simple black plastic sheeting but it should be of the heaviest gauge possible. Select the darkest color available (preferably black) as the tarp will be used to accelerate material decomposition and needs to function as a solar heat absorber. The exact size is less important that obtaining a durable heavy gauge. Indeed, the tarp need not even be one piece.

The Mortar and Pestle:
The mortar and pestle pictured *(right)* is of a type found in most villages that use pounding as a means of food preparation. More mechanized, alternative means of mixing and breaking up of materials follow.

Alternatives to hand pounding include a variety of hand operated threshing or field-chopping technologies that break up the materials into the optimum size/shape far faster than hand pounding. These are commonly available in agriculture research institutes and development projects. With the manually operated thresher chopper equipment, the processing can be greatly accelerated because material size and shape is altered to greatly

Hand operated thresher chopper: Uganda

accelerate decomposition and or softening. Legacy Foundation has developed a specialized hand thresher for this purpose. It can provide chopped residues sufficient for two press groups per day under most conditions. Information on how to order this hand thresher can be found on the Legacy Foundation web site: www.legacyfound.org

In the district centers and more urban areas of developing nations, mechanized technologies may be a wiser choice for chopping. The mechanized process involves a chipper, lawn shredder or a lawn-mower with a mulcher attachment, or a common hammer mill commonly known as a Maize/ Posho/Chigayo/Molino. The chipper or shredder or hammer mill needs to be fitted with a screen/sieve of a ⅝" to ¾" (15 to 20mm) diameter hole size. These machines can greatly assist the process of chopping the materials and free up much labor for production. A six to eight Hp (~4 to 6 Kw) hammer mill can process the residues needed for up to six press groups.

5 Kilowatt Hammer-mill: Mosocllacta, Cusco, Peru

5 Kilowatt Hammer-mill: Bamaco, Mali

3 Kw homemade Hammer-mill Unit: Comitan, Chiapas, Mexico

Important Notes for Fuel Briquette Press Kit Construction

- In order to prevent injury to the users, be certain to bevel all edges, in particular, the handle, main beam, bed and legs as these points are where people are most likely to be in contact the press. To further prevent any injury to the users, bevel and smooth all protruding pipes and bolt ends.
- If you plan to ship the press disassembled, you should mark the location of the legs and feet, as it will make it much easier to reassemble.
- To haul the Fuel Briquette Press in a typical 4x4 or pickup truck or atop a bus, remove the pivot pipe, which attaches the handle end to the front legs. This allows you to fold the handle up over and back onto the top of the main beam, making the press much more compact and easier to handle.

Maintenance of the press:

There are a few basic maintenance techniques to help ensure that the press is well taken care of and will last a long time. Over the past ten years, in use around the world, in several climates, with all different types of wood, the press stands up well with care and regular maintenance.

The best way to make the fuel briquette press last a lifetime is to watch for any problems with the press as it is used. The following maintenance tips will help to ensure a long and useful life of the press.

- A combination of drying in the sun and water soaking of the frame during production can crack the frame. Saturate the press with either used motor oil, linseed oil or other wood preservative, regularly, as the press will be constantly splashed with water during operation, then is subject to drying when not in use. This saturation can be required once weekly to once monthly depending upon use rate and local conditions.
- Cracking will likely first occur in the rear main beam where it joins the legs. Where operating conditions are harsh or the wood type is questionable, you may need to protect the press further by wrapping banding steel around the end of the rear beam. Alternatively you may prefer to drill two vertical holes through the top beam in the vicinity of the rear pivot hole so that you can bolt the beam together vertically.
- Protect bolts and nuts with used motor oil or grease.
- Store the press in the shade or cover it when not in use to further prevent the drying and cracking noted above.

Conclusion

This Fuel Briquette Press Kit that you have prepared has much potential to be used for making a fuel that will save our environment and provide many with employment.

While no social taboos against fuel briquette making exist to our experience, it is nonetheless a new product and one that will challenge traditional fuelwood usage in any part of the world. Fuel Briquettes therefore require strong initial promotion to gain wide public acceptance. They cannot be introduced casually. Fuel briquettes must be treated like a new product and become as popular as Coca-Cola. The broad public acceptance is what attracts the entrepreneurs to produce a positive economic and social impact in your area.

Legacy Foundation provides:

- Other training manuals in the fuel briquette making process,
- Comprehensive training of trainers programs and services,
- Marketing support and
- Technical consulting and backstopping for those committed to fuel briquette making.

For further information on training programs, or to order other manuals, please visit our web site www.legacyfound.org

We are building a global fuel briquette making network and welcome your input and insights.

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