The First Test May 14, 2013
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The Holey Roket as a Char Making Stove

The First Test : The Holey Roket as a Char Making Stove

JED PLASTERING THE CLAY-SAW DUST MIX, FOLLOWING THE PRESCRIBED USE OF PVC PIPES BY ROK OBLAK.

- The clay-saw dust mix was meant to create bubbles inside the stove body thus increase its insulating property.

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The stove in the final stages of plastering. Note the char pocket as it is being formed.

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THE STOVE AS IT DRIES

AND COMING OUT FROM THE KILN

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THE CHAR BOX

AS IT IS BEING FORMED

BEAUTY IN STOVES COMES EASY WITH CLAY

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The stove coming out of the kiln.

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HOLES FOR THE SECONDARY AIR POINT TO AN UPPER CENTER THUS CREATE MORE CONTACT OF THE INCOMING AIR IN THE STOVE BODY AND THEREFORE IS BETTER PREHEATED.

THIS CREATES A SPIRAL WEB OF FIRE THUS IMPROVES THE FUEL TO AIR MIX. THANKS TO THE RECHO ROCKET WEBSITE.

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THE STOVE NOW SITS SNUGLY ON TOP OF THE CHAR BOX.

A HOLE WAS FIXED ON THE BOX WHERE THE CHAR MAY BE PULLED OUT. ANOTHER HOLE WAS MEANT TO BECOME A PEEPING HOLE FOR OBSERVATIONS.

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I was able to cook rice very quickly and boiled four (4) liters of water in twenty three (23) minutes.

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FOR THIS TEST, ELEVEN (11) CUPS OR ABOUT FIVE LITERS OF PILI SHELLS WERE POURED UNTO THE TOP OF THE STOVE

AND MORE WERE PUSHED INTO THE FUEL SHELF WITH THE HELP OF THE PUSHER ROD. THIS LEAVES A NEW SPACE WHICH ALLOWS MORE FUEL TO COME IN.

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WITH A GENTLE BLOW OF AIR AT THE FUEL SHELF, CLEAN YELLOWISH FLAMES WENT UP

IN A TWISTING MOTION.

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The flame went on for two (2) hours with a hot bed of char remaining. With a gentle blow of air into the fuel shelf, it would grow bigger. But that is no longer necessary as the clean flame would go up with the natural draft.

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- At about 90th minute, the flames got too strong. Too much primary air is coming in the gaps at the elbow. A plug at the fuel shelf was necessary.

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- With the primary air closed at the front, some primary air would still come from the backside, and that is through the port hole of the char pocket. It would show a response as shown in this photo.

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- (Sorry, my camera went pfft at this point and I have to catch the bus to Manila. Will send you the photo later.)

- After four hours, the stove have already cooled down. The char box yielded chars as shown in this photo. At total of about one liter of char remained inside the fuel shelf and at the second barrel.

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Results of the Second Test

August 15, 2013

by Joshua B. Guinto
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The Holey Roket as a Char Making Stove

- First round of test: Making the hot char fall to the box.
  - The char that is pushed on the side pocket falls on the char box. However, the channel easily gets clogged up by the char not sliding towards the center of the box thus leaving it exposed to air.
  - The side pocket did not work for this purpose. But it may still work if char box will be made higher so as to allow the char to fall to the center of the taller box or cylinder.

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First Mechanism: Making the hot char fall to the box.

- Another hole had to be drilled but this time midway along the base of the second barrel. This will make the char fall at the center of the box.
- The char only stops from falling at the point when the spot is already fully filled. The pile of char in the box will then have to be pushed aside to create a vacant space for the new char to fall.

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Second Mechanism: Control of Air

The fuel feeder was plugged with clay plate to control the inflow of primary air.

Pulling the entire plug would cause the clay plug to break due to over handling. Some of the shells would also fall out. It also caused the shells at the posterior end not to gasify well. It also caused problem with reloading.

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Third Mechanism: Pushing the Shells forward .

A spiral metal grate was placed instead. It allows the inflow of primary air through the pile of shells.

Reloading more shells was again difficult as the shells would fall out as soon as the grate was taken off.

With the spiral metal grate, the shells can only be pushed with a metal rod that fits in between the grates. This is not very user friendly.

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Fourth Mechanism: Reloading

- A hole had to be drilled though the roof wall of the fuel feeder by the elbow.
- This allowed pouring the shells from the roof of the chamber thus filling the entire fuel chamber with shells thus attaining a balance of fuel to air mix.

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A new metal grate was fabricated to serve the purposes of the three mechanisms: allow the inflow of primary air, keep the fuel shelf filled with shells to the brim and lastly, become the pusher as a prelude to reloading. .

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Fifth round of test: Improving air seal

- There are leakages in many spots in the whole assembly.
- The juncture between the stove and char box had to be packed with clay.
- A new plug was made for the opening of the char box. It is a clay plug which was also fired inside the same stove. It was then lined with a heat resistant gasket to seal it off from air.
- Two more plugs of the same structure was made; one for the second barrel and one for the fuel port.

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- Results of Test
  - There are spikes of smoke every time fuel is reloaded and pushed. It is when the balance is disrupted but is easily recovered after a few seconds.
  - The performance remained the same.
  - The char falls at the center of the box and may be harvested with a stick from the port on the side.
  - Reloading was possible through the fuel port by the roof of the fuel shelf. The plug will always have to be in place to maintain the correct fuel-air mix.

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- Results of Tests
  - Pushing the fuel forward was successful with the new innovation. The fuel pusher-grate served three purposes very well. Continuous cooking is then very possible.

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The bio char harvested was thick and tough. One full load of shells (1.9 kg) gave 75 minutes of clean cooking and a harvest of 750 grams of biochar. The topmost layer of the biochar had some ashes on its skin but the ashes represent about 5 % and less of the total biochar harvest.

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The Char Making Holey Roket Stove

- Conclusion
  - The Char Making Holey Roket Stove is born!!
  - It allows harvesting bio char safely and conveniently and without having to tip the stove over. It eliminates the risk of heat fatigue, burns and open fires.
  - It allows clean cooking with the similar performance as a gasifier stove.
  - It allows continuous cooking.

The Char Making Holey Roket Stove

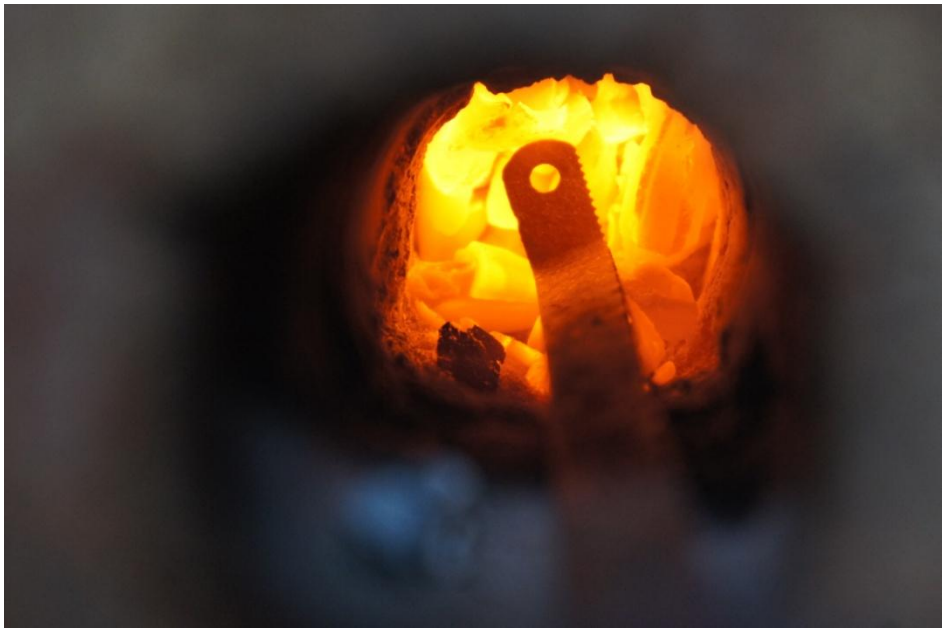
- The stove will last for four years or more.
- It can be used with many other kinds of fuels.
- The stove is much cheaper and can be fabricated in village workshops thus promotes social inclusion much better.
- With clay, the stove has very small ecological footprint.

The Char Making Holey Roket Stove

The Char Making Holey Roket Stove

- For further studies
  - The conclusions are based only on the author's knowledge and understanding of the mechanisms of a good stove including the correct fuel to air mix, the color and scent of the fuel being gasified and the indicative color, texture and weight of a good bio char.
  - This experiment would need verification of the experts and a series of laboratory tests. The char may be investigated with and electron microscope and the gas emissions be tested in a laboratory.
  - Other kinds of fuels – wood sticks, corn cobs and holey briquettes, among many others will have to be tested using the same procedure.


Philippine Rural Reconstruction Movement
PRRM
50
YEARS
1952-2002
Building rural capacities
for sustainability



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You get your biochar, we get the remaining heat !!!