Reinforcements on the Holey Roket Stove

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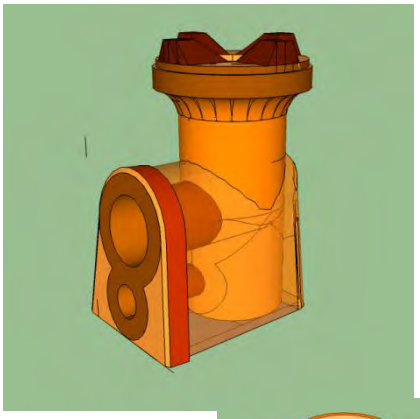
1. The Basic Mechanisms of the Rocket Stove. With the lessons from people like Rok Oblak, Richard Stanley and the Aprovecho Institute the author began learning to build the holey roket stove in his workshop at Daet, Camarines Norte. With sheer perseverance and amidst scarcity, he was able to create several models and delivered skills training to poor people in Camarines Norte, Sorsogon and recently in Bulacan.

2. Among the many feedbacks from the users are the limitation of the holey roket stove in terms of (1) fragility in handling and (2) capacity to receive bigger loads when cooking for bigger occasions and events and for food business. In response, one of the models was picked up for reinforcements.

3. The Innovations as of July 2013

    3.1. The Holey Roket Stove has evolved to come with sculpted designs. The stove truck is only one of many models that the author was able to create.

    3.2. The stove has a second barrel beneath the fuel feeder. This barrel serves two purposes. It is where the ash may be pulled out. It is also where an added boost of primary air comes in preheated. The hot char from the fire chamber should be allowed to stay inside the length of the second barrel until it turns into ash. With the hot char in the barrel, the incoming primary air will be preheated thus adds to the efficiency of the burn.



    3.3. It comes with a metal frame of 10 mm square bars. Having the stove in a metal frame box achieves two things. First, it protects the stove from damage during transport. The stove is made from refractory clay, meaning it is not built for durability but instead for insulation and therefore much more fragile than a clay pot or a brick for construction. Second, it allows the use of bigger and heavier pots and woks for safety and for carrying the heavy load.

    3.4. A metal pan (planggana) now serves as a skirt. The shape of the skirt allows the use of different sizes of pots and pans. The metal pan for this stove model costs Php 95. (The wok in the photo is extremely big for the skirt). It achieved the purpose of improving the contact of the flames to the walls of the wok. Furthermore, it also reduced the heat fatigue being experience by the cook in stoves that otherwise would not have a skirt.

3.5. A blower may be fixed to the front of the fuel feeder. The metal rod (please see photo) is upon which the blower may be connected. During the test, Maricris Tugade, the stall owner said she does not have access to electricity in her stall and so the test went on without the blower and she was very satisfied with the results just the same.

Photo at left presents a much advanced model of the holey roket stove. It is fitted with a metal frame to support heavy loads and ensure safety. It also features a metal pan which directs the flames in much closer contact with the walls of the pot or wok thus multiplying the efficiency to as much as three times. The same model may be fixed with blowers to further increase the power but this will just be an added option.

4. Results of Test. During the test in a banana cue stall in Daet in 27 July 2013, five hours of cooking for fifty (50) kilograms of banana consumed about eight kilogram of fuel consisting of coconut ribs, coco shells and wood sticks with a market value of Php 12. This was a big drop from the regular daily consumption of Php 150 daily for buying wood charcoal. One bag worth Pp 300 is consumed every two days. It will translate to a savings of Php 138 daily or Php 39,744 every year.

Going further, with the assumption that one big tree would yield thirty six (36) bags of charcoal, this stove will therefore save four (4) big trees every year for this stall alone.

Heavier kind of charcoal called *barit* is much preferred by the consumers like Maricris because of much higher heat output and the hot char stays longer before turning into ash. However barit is a kind of charcoal made from hardwoods which the charcoal producers chopped. Those hardwoods include *narra*, *mahogany, yakal* and dirigkalin. To confirm this claim, the author, during his field research for his master's thesis, went up to the forests of Barangay Bulala in Sta. Elena to observe the traditional practices of wood charcoal production. There he found several piles of huge *dirigkalin* logs ready for the carbonization.

Dirigkalin also known as iron wood is a prime wood species of the Philppine forests. Its durability can last for centuries and have been used by the Americans to build the first railroads in the Philippines. It was also described by De Anda in her Tag Archives. Please see http://withonespast.wordpress.com/tag/paracale/. Unknown to many, this prime wood of Philippine forests ends up in the kitchen of most wood charcoal consumers (top and right photos).

Maricris Tugade of the banana cue stall at Daet, Camarines Norte (top photo) was amazed about the power and efficiency of the holey roket stove. It meant Php 138 daily savings from fuel costs plus the reduction of heat fatigue because of the metal skirt around the flame. The skirt directs the heat closer to the wok instead of reaching her. During the same test, Maricris also asked that the skirt be enlarged for the size of her wok. Finally the platform of her cooking area will have to be dug deeper down to attain the correct height of her stove for the ease of her reach.

Photo at left presents how the clean and strong flame without any visible smoke can produce enough heat to bring the oil to this kind of boil.

The author is a development worker since 1987 and is at present a freelance consultant on village technologies. He followed his master's program in 2006-2008 at the Wageningen University at the Netherlands under the sponsorship of the International Fellowships Programme of the Ford Foundation. He wrote his master's thesis entitled *Realistic Evaluation of Stove Design Process*. His thesis led him to do field research in the stoves fabricators in many parts of the province including the wood charcoal producers of Bulala, Sta. Elena. PDF copy of his thesis is available upon request.

The author is an affiliate member of the Global Alliance for Clean Cookstoves (GACC) and participated on the Clean Cooking Forum in Cambodia in March 2013. Please see www.cleancookstoves.org/. Photo on top is the author with the representative of the Envirofit, one of the leading stove companies and to the left is with Dr. Paul Anderson, one of the brains in the stove designer community with his TLUD stove.

Some of the author's works on stoves may be accessed at www.holeyroket.wordpress.com. He may be reached at his email address jed.building.bridges@gmail.com and on his mobile phone 0922 886 9831.