

# Sugar Brick: Charcoal Briquette Compactor

Team Blue B  
October 7, 2004





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# Current briquette process

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- # Harvest raw bagasse
- # Carbonization for 24 hours in drum kiln
- # Mix binder with carbonized bagasse
- # Hand press into briquettes
- # Sun dry for 1 week

# Customer needs

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- # Operated by 1-2 people
  - # 5 briquettes/minute
  - # Cost under \$100
    - Serves 5 families
    - \$525/year family income in Haiti
  - # Repaired by local blacksmith
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# Market needs

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- # Sugarcane crop in Haiti
    - 1.05 million tons
  - # Cassava crop in Haiti
    - 340,000 tons
  - # Energy consumption in Haiti (1997)
    - 11.14 petajoules
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# Competing technologies

- # Hand-crank briquette press
- # \$600



# Lever press model – Theory

## # Current

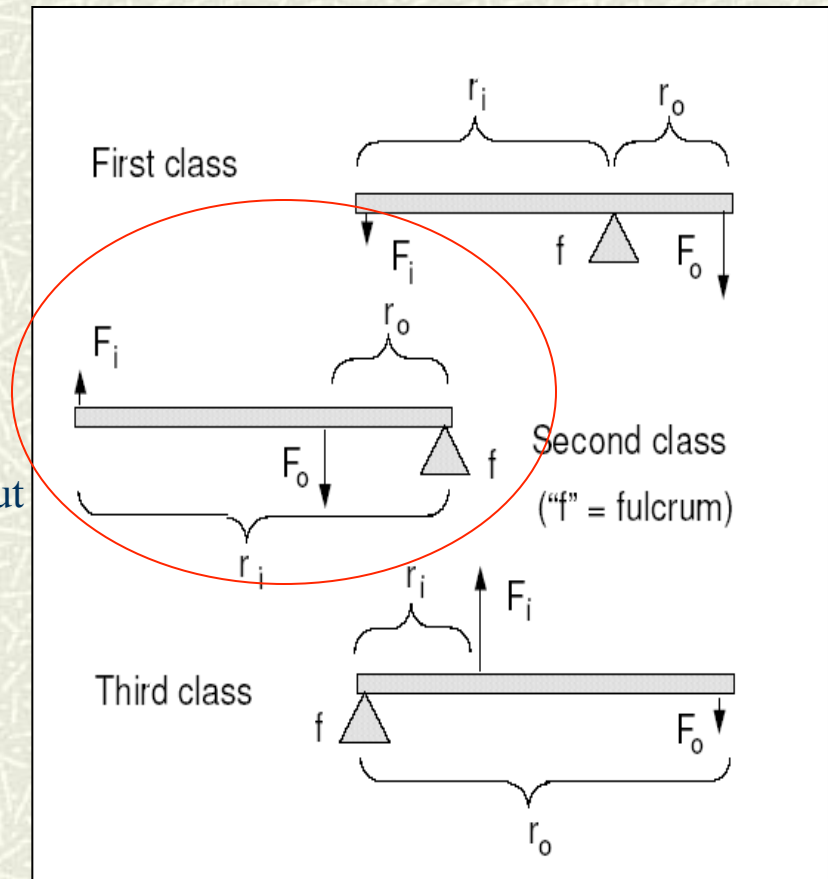
- 2-5 psi hand pressure

## # Goal

- 6-50 psi machine pressure  
Mechanical advantage:  $F_{out}/F_{in} = r_{in}/r_{out}$

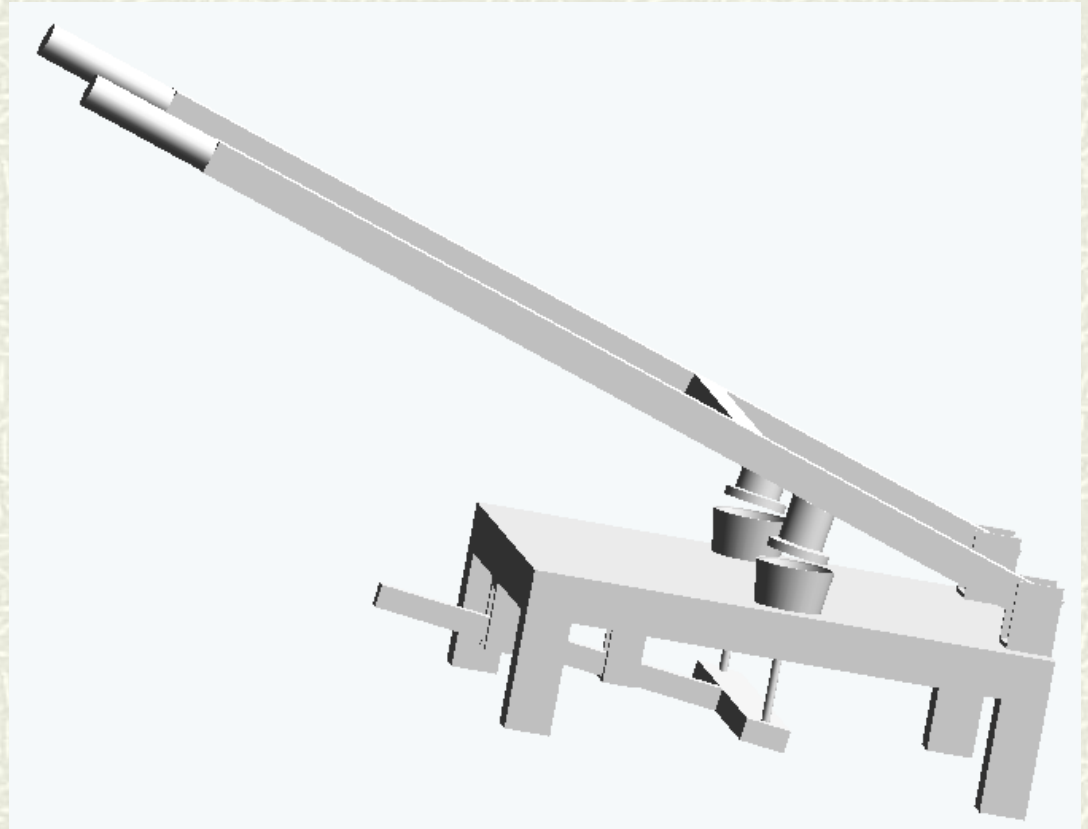
## # One briquette at 30psi

- $F_{out} = 356.4$  lb.
- $F_{in} = 89.1$  lb. required



# Lever press model

- # Sits on a low table
- # Uses arms and body weight
- # Ejection lever
- # 2 briquettes per cycle





# Lever press model - Capabilities

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## # 90 lb. girl:

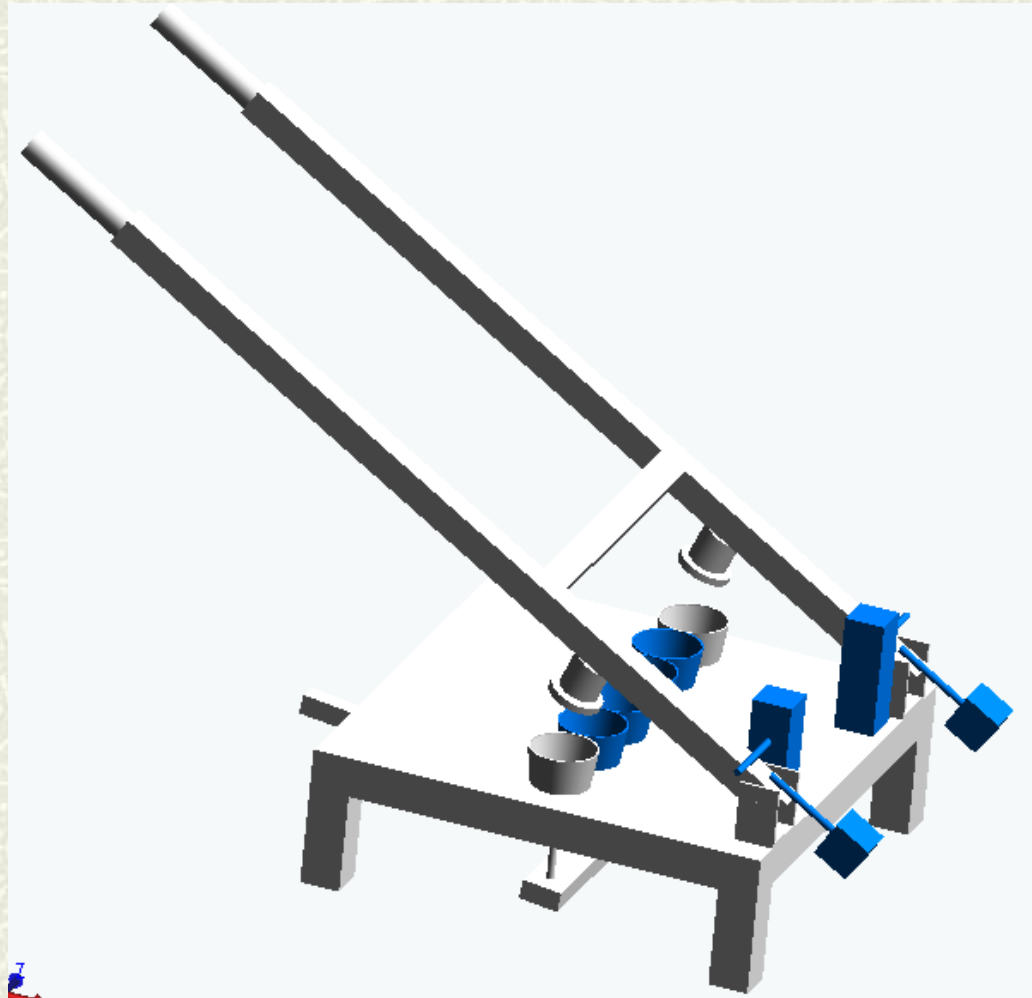
- 30 psi, 1 briquette/cycle
- 7.5 psi, 4 briquettes/cycle

## # 130 lb. man

- 43.8 psi, 1 briquette/cycle
  - 11 psi, 4 briquettes/cycle
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# Lever press model – Iteration 1

- # Counterweight and stoppers on levers
- # Stoppers on ejection pins
- # More briquette compactors
- # Stability pieces on levers



# Lever press model - Improvements

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- # Foot power
  - # Lower molds flush into table
    - Easier cleaning and loading method
  - # Removable tray with briquette molds
  - # One motion for pressing and ejecting
  - # Bending on the long levers
  - # Push in same line of action as press
    - No tipping
  - # Indexing table (lazy susan)
    - Faster throughput and ease of use
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