Interlocking Stabilized Soil Block (ISSB) Maker

Teammates from Guatemala, Honduras, Tibet, and Zambia are collaborating on an income generating project that has applications all over the world. The team is working to improve upon existing designs of presses, so that communities can use locally available resources and skills to produce soil blocks in order to make building projects more accessible.

Production of soil compressed blocks is environmentally friendly, because only very little water, very little cement and no firewood are used in production. Unfortunately, even the most affordable block makers are prohibitively expensive, have low throughput and require frequent maintenance. Additionally, many building projects face high materials costs. By designing interlocking blocks, the need for mortar (the white compound between bricks to hold them in place) is eliminated.

We are working on a low-cost, environmentally friendly, ergonomical press that can improve the economic well-being of people with very low incomes. By making this widely available, even in the most remote locations, communities can use their local resources to make blocks, and enrich the area with buildings to suit their needs.

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Understanding the Market

An excellent technology can be viewed here: [1]

The design makes a durable block very quickly. After it is compressed, as they show, it must be set in the sun for 24 hours to dry out. This is in contrast to the way many bricks are currently made, since they are fired in unhealthy, polluting kilns.

Project Requirements

The current soil blockmaking machine costs from $200 up to $3000, and most of them require electricity or human power to generate and operate. ISSB machine is designed to reduce the cost of electricity, and the need of human power when operates. Electricity free system used in our design process and contributes to reduce the cost for the ISSB machine. The screw operating
system is used to replace the current lever mechanism which requires enormous physical human force. Iron angel is main material considered for the designing due to its cheapness in price and sturdiness in quality. We are designing a machine that is at least half-price less than the currently available alternatives in the market.

NO human force needed when pressing

### Design

Finally our group designed and produced a blockmaking machine, two moulds, and a taper.

Our team used soil and cement mixture producing blocks with our machine that has two different presser mechanisms, screw and lever. The soil that we transported from Charles River contains two types, one contains more clay and the other has less. Through our block making process, we learned the soil that contains more clay in keep the block together and it makes easy during blockmaking. The cement portion binds with the soil and gives the block its sturdiness.

<table>
<thead>
<tr>
<th>Mixture Design and Selection</th>
<th>ISSB Block Strength Soil (parts) Sand (parts) Cement (parts) Soil (organical material) Remarks Mix 1 x20 x1 x2 Mix 2 x6 x1 x4 Mix 3 x5 x1 Looks 20% sturdy</th>
</tr>
</thead>
</table>

### Costs

These figures are based on cost and availability in Zambia.

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Cost (ZMK)</th>
<th>Cost (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle Lines</td>
<td>2</td>
<td>330,000</td>
<td>$115</td>
</tr>
<tr>
<td>Pipes</td>
<td>2</td>
<td>195,000</td>
<td>$68</td>
</tr>
<tr>
<td>Sheet Metal</td>
<td>1</td>
<td>645,000</td>
<td>$225</td>
</tr>
<tr>
<td>Car Jack</td>
<td>2</td>
<td>645,000</td>
<td>$225</td>
</tr>
<tr>
<td>Bolt &amp; Nuts</td>
<td>6</td>
<td>160,000</td>
<td>$56</td>
</tr>
<tr>
<td>Planks</td>
<td>3</td>
<td>180,000</td>
<td>$63</td>
</tr>
</tbody>
</table>

The total cost of the system is currently $752. The team is exploring ways to bring down the cost.

**Next steps**

- Employ highly skilled engineers with more than 30 years experience.

**Contact details**

- Dennis Chibwe (Zambia, DISACARE Wheelchairs)
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