Improving Cook-Stove Bricks with Organic Material

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Improving Cook-Stove Bricks with Organic Materials
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Background
• Three billion people around the world use wood burning stoves made from brick for cooking.
• Carbon monoxide released as emissions can be harmful.
• People are dying at an earlier age due to lung problems and other factors such as cancer.
• Mixing organic materials into brick recipes increases their insulative properties, however it also decreases their overall strength.

Objective:
Determine which organic additive generates the strongest and most insulative brick.

<table>
<thead>
<tr>
<th>Test Methods</th>
<th>3 Point Bend Test (ASTM: C133-97)</th>
<th>Compression Test (ASTM:C126-16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>Extruded</td>
<td>Thermally Cycled</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Baseline</td>
</tr>
<tr>
<td></td>
<td>Egg Carton</td>
<td>Thermally Cycled</td>
</tr>
<tr>
<td></td>
<td>Corn Stalk</td>
<td>2 cycles, 15 mins, @1100F</td>
</tr>
</tbody>
</table>

Porosity testing was used as a measure of insulative properties.

Conclusion
• The corn stalk brick was found to have the best overall performance.
• The bricks were found to have a better compressive strength but a lower flexural strength after thermal cycling.
• The porosity tests were incunclusive.

Recommendations
• Revise molding process.
• Consider increasing thermal cycling temperature.
• Test thermal capabilities of materials.
• Consider evaluating microstructures.
• Increase sample size.

References

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