LIST OF FIGURES

2.1 Strength with gassing time for 3.3:1 ratio silicates. 2.14
2.2 Strength with gassing time for 2:1 ratio silicate, silicate addition – 4 percent. 2.15
2.3 Strength of CO₂ process material at and after cooling from high temperatures. Four percent silicate. 2.17
2.4 Gas pressure to produce maximum compressive strength as a function of grain size of the sand for 2, 3 and 4 percent with 30 sec gassing time. 2.20
2.5 Gas pressure to produce maximum compressive strength as a function of grain size of the sand with 4 percent binder for 30, 60 and 120 sec gassing time. 2.21
2.6 Range of compressive strengths as a function of amount of gas passed through the specimen for 2, 3 and 4 percent binder, the sand being of 109 mesh size. 2.23
2.7 Maximum compressive strength obtained from 2, 3 and 4 per cent binder as a function of the grain size of the sand. Gassing pressure and time are not specified on this graph. 2.24
2.8 Average compressive strength as a function of the amount of gas passed through the specimen for all mesh size sands tested, the sand having 4 per cent. 2.25
2.9 Wet reclamation system. 2.41
2.10 Wet reclamation system. 2.42
2.11 Pneumatic reclamation system. 2.45
2.12 Pneumatic cell unit. 2.46
2.13 Thermal sand reclamation system. 2.50
2.14 Flow of thermal sand reclamation plant. 2.51
2.15 Dry reclamation plant for silicate bonded sand. 2.53
2.16. Solubility of sodium silicate in water by wet scrubbing a sodium silicate bonded sand heated to higher temperatures.

2.17. Triaxial diagram.

2.18. Sand lumps, agglomerates and other particles bound together by binders and heat.

2.19. Hot sand with binder coating and dust particles.

2.20. Individual grains with reduced or fractured binder coatings. Binder dust removed by “Moment of Impact” Air Curtain.

2.21. Cooled sand with rounded surface characteristics. Minor binder levels.

2.22. Various kinds of contacting of a batch of solids by fluid.

2.23. Liquid like behaviour of gas fluidized beds.

2.24. Relationship between the cumulative distribution (P) and the size distribution (p).

2.25. Relationship between p and P for a discrete distribution of particles sizes.

2.26. Measured voidage in fixed beds of two sized of spheres (by Furnas, from Zenz and Othmer).

2.27. Minimum voidage in mixture of 2,3 and 4 sizes of solids given the voidage in beds of one size of solid by Firmas, from Zenz and Othmer.

2.28. Quality of fluidization as influenced by type of gas distributor.

2.29. Examples of various distributors for fluidized bed.


2.31. Influence of gas velocity on the bed-wall heat transfer coefficient in fluidized beds.

2.32. Continuous heat exchange between solids and fluidizing gas.

2.33. Model to account for elutriation and entrainment from fluidized beds.
2.34. A model for the continuous drying of solids in a fluidized bed with emulsion temperature.

2.35. Size distribution in a stable reactor-regenerator system.

2.36. Sand scrubbing cell.

2.37. Single Compartment fluid bed calciner.

2.38. Angularity curves for some unconsolidated sands.

2.39. The relation of the bulk density of milled sand to its moisture content.

2.40. The relation of strength and permeability to bulk.

2.41. Mould hardness in relation to ramming technique.

2.42. The transmission of pressure through sand.

2.43. The stress distribution in the segmental core base.

2.44. The bond structure in clay-bonded sand.

2.45. The relation of strength to intensity of ramming.

2.46. The relation of strength to proportion of clay bond.

2.47. Grain relationships in angular sands.

2.48. The relation of strength to the drying and crushing temperatures.

2.49. Cumulative grading curves in relation to permeability.

2.50. Stability relationships between forms of silica

4.1. Reclamation of sodium silicate sand and its evaluation.

4.2. Fluidized bed.

4.3. View of perforated sheet of fluidized bed.

4.4. Fabricated fluidized bed.

4.5. Fluidized bed being enclosed in the refractory container.
4.6. Final assembly of fluidized bed.

4.7. Scrubber.

4.8. View of target in the scrubber.

4.9. Fabricated scrubbing cell.

4.10. Carbon-dioxide sand reclamation unit.

4.11. Thermo-pneumatic reclamation unit of CO$_2$ / silicate sand - fluidized bed being at elevated position than the scrubbing cell.


4.13. Experimental sequence – sand characteristics.


4.15. Step cone casting.

4.16. SFSA test block.

4.17. Experimental sequence reclamation trials.

5.1. Sand characterization test results.

5.2. Fresh sand.

5.3. Unreclaimed sand with Na$_2$O.

5.4. Sand grains drawn to show coating characteristics affecting thermal stability of steel molding sands.

5.5. Bar Chart for pH value.

5.6. Bar Chart for AFS Number.

5.7. Bar Chart for ADV.

5.8. Bar Chart for Na$_2$O content.

5.9. Bar chart for total clay content.
5.10. Bar chart for permeability. 5.19
5.11. Bar chart for water absorption. 5.22
5.12. Bar chart for compactability. 5.25
5.13. Bar chart for mould hardness. 5.27
5.14. Bar chart for L.O.I. 5.29
5.15. Bar chart for compression strength. 5.31
5.16. Standard specimen for surface inspection by comparison–Ra value. 5.33
5.17. Standard specimen for surface inspection by comparison–RMS value. 5.33
5.18. SFSA test block. 5.34
5.19. Test castings produced – front view. 5.35
5.20. Test castings produced – top view. 5.35
5.21. Step cone produced by reclaimed sand - front view (Piece 1). 5.36
5.22. Step cone produced by reclaimed sand - top view (Piece 1). 5.36
5.23. Step cone produced by reclaimed sand - front view (Piece 2). 5.37
5.24. Step cone produced by reclaimed sand - top view (Piece 2). 5.37
5.25. Step cone produced by new sand - front view. 5.38
5.26. Step cone produced by new sand - top view. 5.38
5.27. Step cone produced by used sand - front view. 5.39
5.28. Step cone produced by used sand - top view. 5.39
5.29. Table 5.14. Sl.No.4. Reclaimed Sand of pH - 7.5, AFS – 55. 5.56
5.30. Table 5.15. Sl.No.1. Reclaimed Sand of pH – 9.5, AFS – 42. 5.58
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Table Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.0</td>
<td>Table 5.16</td>
<td>Reclaimed Sand of pH – 7.5, AFS – 5</td>
</tr>
<tr>
<td>6.0</td>
<td>Table 5.17</td>
<td>Reclaimed Sand of pH – 9.5, AFS – 50.</td>
</tr>
<tr>
<td>4.0</td>
<td>Table 5.18</td>
<td>Reclaimed Sand of pH – 8, AFS – 69.</td>
</tr>
<tr>
<td>6.0</td>
<td>Table 5.19</td>
<td>Reclaimed Sand of pH – 8, AFS – 53.</td>
</tr>
<tr>
<td>4.0</td>
<td>Table 5.20</td>
<td>Reclaimed Sand of pH – 8, AFS – 72.</td>
</tr>
<tr>
<td>10.0</td>
<td>Table 5.21</td>
<td>Reclaimed Sand of pH – 9.5, AFS – 56.</td>
</tr>
<tr>
<td>3.0</td>
<td>Table 5.22</td>
<td>Reclaimed Sand of pH – 7.5, AFS – 50.</td>
</tr>
<tr>
<td>4.0</td>
<td>Table 5.23</td>
<td>Reclaimed Sand of pH – 9.5, AFS – 43.</td>
</tr>
<tr>
<td>3.0</td>
<td>Table 5.24</td>
<td>Reclaimed Sand of pH – 7.5, AFS – 59.</td>
</tr>
<tr>
<td>3.0</td>
<td>Table 5.25</td>
<td>Reclaimed Sand of pH – 8, AFS – 57.</td>
</tr>
<tr>
<td>5.0</td>
<td>Table 5.26</td>
<td>Reclaimed Sand of pH – 8, AFS – 70.</td>
</tr>
<tr>
<td>9.0</td>
<td>Table 5.27</td>
<td>Reclaimed Sand of pH – 7, AFS – 58.</td>
</tr>
</tbody>
</table>