Workshop on Limestone Calcined Clay Cements (LC³)

A South African Perspective

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AfriSam (South Africa)

Cape Town - November 2019
South African cement volumes in world perspective

2017
Main world producers

EU28
175.1 Mt

USA
88.5 Mt

CHINA
2 316 Mt

INDIA
280 Mt

The G20 Group

South Africa
13.6 Mt
CEMBUREAU 2050 roadmap 5 parallel routes

1. Resource efficiency
   - Alternative fuels
   - Raw material substitution
   - Novel cements
   - Transport efficiency

2. Energy efficiency
   - Electrical energy efficiency
   - Thermal energy efficiency

3. Carbon sequestration and reuse
   - Carbon sequestration and reuse
   - Biological carbon capture

4. Product efficiency
   - Low carbon concrete
   - Recycling concrete
   - Recarbonation
   - Sustainable construction

5. Downstream
   - Smart buildings & infrastructure development
   - Recycling concrete
   - Recarbonation
   - Sustainable construction

Clinker Substitution
Impact of SA Carbon Tax on Cement Industry

- Carbon Tax as promulgated: R 120/ton of CO₂
- International Clinker FOB price estimated to be $40/t - R590/t
- CO₂ tax ± 20% of clinker FOB price
- Currently Sephaku impact R40 mio/a  PPC R100 mio/a
- Next 3 years escalating at CPI + 2% annually
- No indication yet of what will happen from year 4/5 onwards
SA SCM Landscape: Clinker Substitutes

**Slag Plants**
1. Saldanha (Corex)
2. Vanderbijl
3. Newcastle

**Fly Ash Sources**
4. Lethabo
5. Kelvin
6. Matla
7. Kriel / Kendal
SA SCM Landscape: Clinker Substitutes

Breakdown of Eskom ash usage and sales FY17/18 (Mt)

<table>
<thead>
<tr>
<th></th>
<th>Mt</th>
<th>21.27</th>
<th>2.73</th>
<th>2.66</th>
<th>4.99</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash produced¹</td>
<td>31.65</td>
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<tr>
<td>Required for effluent</td>
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<tr>
<td>sink</td>
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<tr>
<td>Ash sold</td>
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<td>Contracted to be sold</td>
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<tr>
<td>but not collected</td>
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<tr>
<td>Ash available to sell</td>
<td></td>
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</tbody>
</table>

Northern Cape

Lesotho

Border / Transkei

Western Cape

Eastern Cape

November 2019
SA SCM Landscape: Kaolin

Kaolin sources

1. Bronkhorstspruit
2. Ottosdal
3. Western Cape
4. Eastern Cape
## Cement strength classes in South Africa

<table>
<thead>
<tr>
<th>Strength Class</th>
<th>Application</th>
<th>Est Clinker Content</th>
<th>Potential to reduce CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>52,5 N &amp; R</td>
<td>CPM's Readymix Blenders Construction</td>
<td>95% 80%</td>
<td>Low, High early performance  High, Use of SCM’s in concrete  Low, Extend further to the max High, Conservative engineering frat</td>
</tr>
<tr>
<td>42,5 N</td>
<td>Residential Construction Unsophisticated CPM's</td>
<td>50 - 85%</td>
<td>Med, SCM availability and cost</td>
</tr>
<tr>
<td>32,5 N &amp; R</td>
<td>Small builders Civil Construction</td>
<td>30 - 65%</td>
<td>Low, North mostly CEM III, IV &amp; V  Med, South mostly CEM II</td>
</tr>
<tr>
<td>12,5 &amp; 22,5</td>
<td>Mortar and Plaster</td>
<td>45% - 65%</td>
<td>High, mismatch between strength requirements and specifications</td>
</tr>
</tbody>
</table>
Cement product application in South Africa (est)

- Mortar & wall finish: 30%
- Footings, Floors, slabs: 39%
- Paving: 2%
- Other Civil products: 2%
- Pipes, poles and retaining walls: 1%
- Other Mining products: 2%
- Roof: 1%
- Wall: 18%
Conclusion

- Cement Carbon reduction is a reality for SA Cement producers
- Carbon Tax has the potential to further change consumer behaviour
- Clinker substitution is an attractive option in SA based on SCM availability and cost
- Low early strength of available SCM’s in high substitution levels hinders customer acceptance
- There is a place for LC3 technology in SA
- How does LC3 technology interact with already available SCM’s to further reduce Clinker Factor?
- How will it fit with **Compulsory** EN 197 (SANS 50197)?
THANK YOU