

Milling solutions for emerging SCM's: from concept to commissioning

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A paradigm shift from conventional to new SCMs



Conventional practice

- Blended hydraulic cement is primarily produced using by-products from other industries.
- Fly ash, GGBF slag, silica fume
- Combining clinker with additives during the grinding process was common and did not require any specific adjustments.

Road ahead

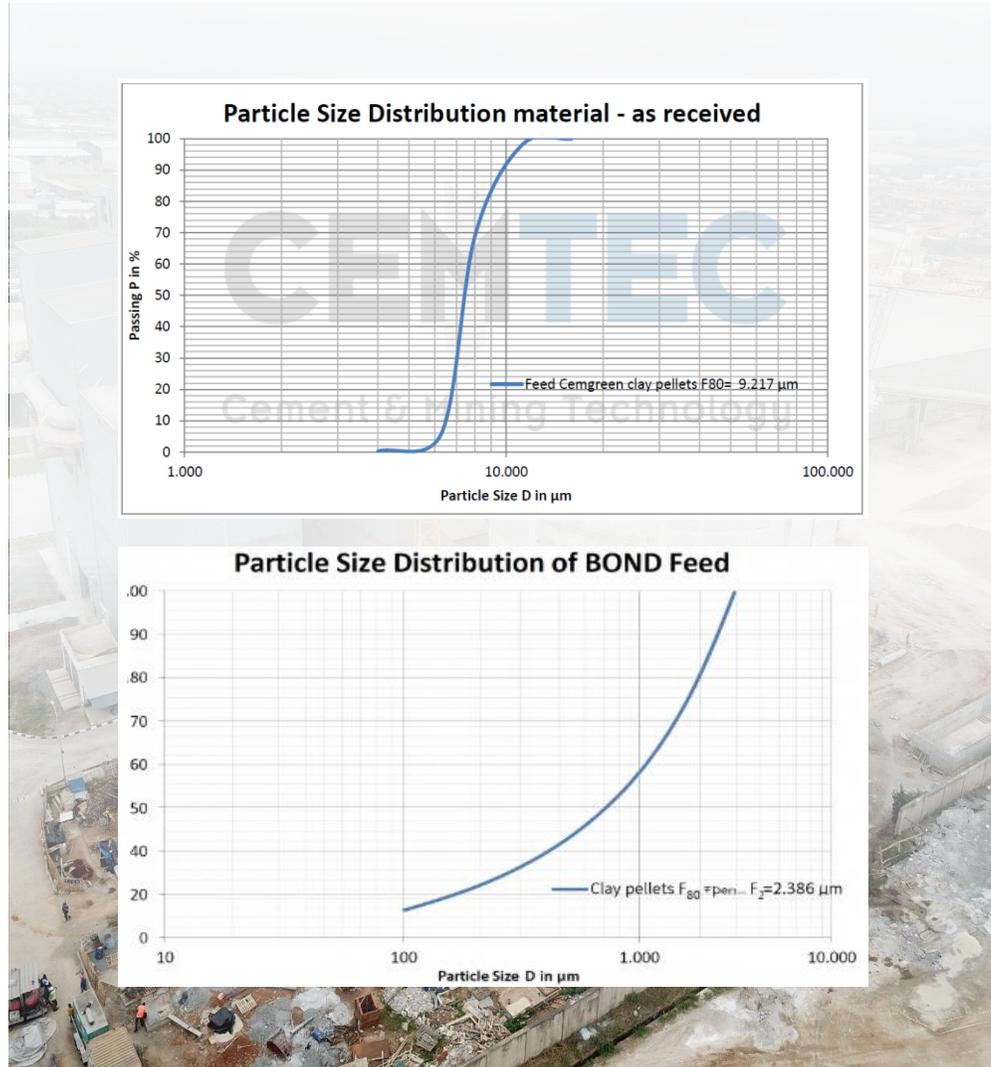
- Significantly reducing clinker factor requires a large amount of SCM
- In parallel, fly ash and GGBF resources are limited, resulting in the need for new SCMs
- Requirement for a larger specific surface area
- New materials in cement require research on reactivity and grindability.

Challenges in Processing New SCM's

- Materials come from different sources and processes
- Big variation in terms of the grindability properties
- Materials have different moisture
- Different relation between fines and specific surface area
- Demand to grind finer



The Path



- Conduct comprehensive testing to determine optimal material combinations
- Understand the customer and their needs
- Select and size equipment based on test results
- Select optimal site, considering:
 - ✓ Raw material
 - ✓ Transport infrastructure (road, rail, water)
 - ✓ Availability of key utilities (electricity, gas)
 - ✓ Minimal environmental & landscape disruption

Design and Manufacturing Phase

Design phase



- Select process-specific equipment, complying with local regulations
- Design plant flexibility to allow for:
 - ✓ New or additional raw materials
 - ✓ Varying drying needs
 - ✓ Changing market demands
- Design components for easy transport and erection
- Explore potential for using waste heat economically

Manufacturing phase



- Comply with destination standards & certifications
- Employ state-of-the-art manufacturing technologies
- Maintain rigorous quality control throughout production
- Implement sustainable production practices
- Enhanced pre-assembly to achieve shorter erection phases and improved site safety
- Clear labeling & documentation for safe handling and correct storage procedures

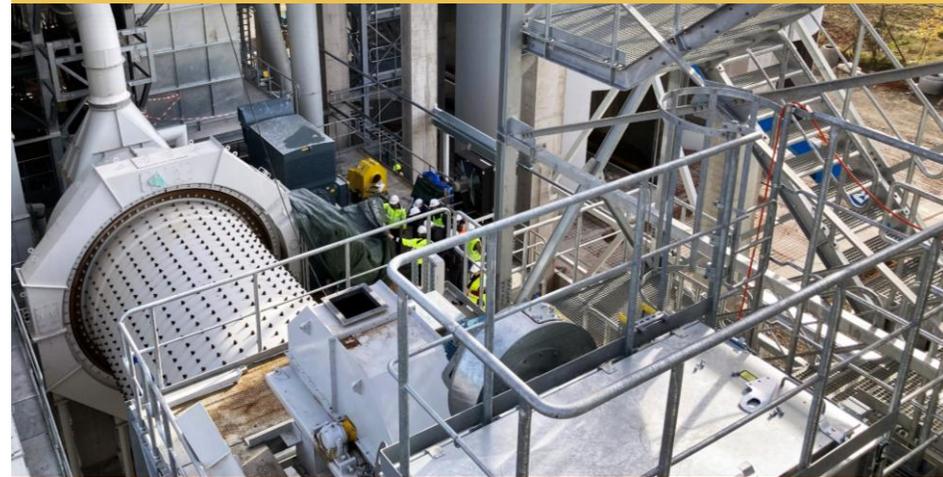
Construction and Commissioning Phase

Construction phase



- Prioritize local contractors to reduce cost and logistics
- Use just-in-time delivery to minimize on-site transport
- Enhanced pre-assembly to achieve shorter erection phases and improved site safety
- Sequence assembly for maximum efficiency and safety
- Employ a qualified and certified workforce to minimize errors during manufacturing and erection
- Engage maintenance team early in the erection phase

Commissioning phase



- Implement an optimized, resource-efficient commissioning sequence
- Employ a qualified and certified workforce to minimize errors during commissioning
- Involve the future operations team to ensure a smooth handover
- Provide targeted training to enable seamless plant operation

Optimization and Lessons Learned



- Compare actual plant performance against design expectations
- Apply necessary adjustments and promote continuous improvement
- Use technologies such as online particle sizing to optimize the process
- Maintenance planning and spare parts management aligned with the production schedule

References of project milestones



Dry Grinding Plant

- **Location:** Western Europe
- **Application:** Cement industry



Technical Details



Material:
Tuff, FlyAsh



Throughput:
40 mtph



Product quality:
80%@30µm



**Equipment
type**

1 x Ball mill
ø 3,8 x 10,5 m
2.500 kW installed power

3rd gen. separator
CTC-090 with
90.000 m³/h

References of project milestones



Dry Grinding Plant

- **Location:** Switzerland
- **Application:** Aggregate



Technical Details



Material:
SCM



Throughput:
1-2 mtp



Product quality:
99%@125µm



**Equipment
type**

1 x Ball mill
ø 1,2 x 2,7 m
2x 18,5 kW installed power

Including auxiliary
equipment

References of project milestones



Dry Grinding Plant

- **Location:** Denmark
- **Application:** SCM

Technical Details



Material:
Calcined Clay



Throughput:
23 mtp



Product quality:
50%@10µm

1 x Ball mill
ø 2,8 x 8,0 m
800 kW installed power

Including auxiliary
equipment



“A satisfied customer is the best business strategy of all.”
Michael LeBoeuf