# Cement Based Binding Agent


**TEAM CCM**

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## PROBLEM STATEMENT

Our goal with this project was to develop a cost-effective, high-performance cement-based binding agent for bonding tiles to concrete. We did so by optimizing an existing product sold by our sponsor, Oldcastle.

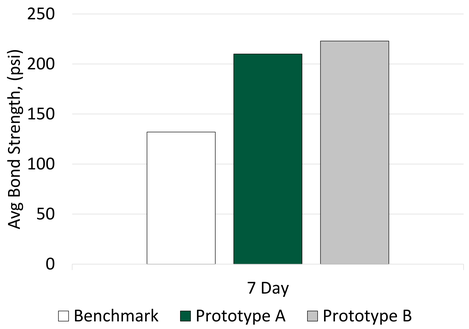
## METHODS

1. Technical Performance Measures of cost and bond strength were established
2. A unique "Tile Shear" test was developed to test bond strength performance
3. An existing product (benchmark) was used to find target values for TPMs
4. Approximately 24 trial batches were made to evaluate prototype mix designs

## ANALYSIS/RESULTS

Two prototypes were developed with superior performance to benchmark.

| Design | Cost Savings | Tile Shear (psi) |
|---|---|---|
| Benchmark | - | 132 |
| Prototype A | Equivalent | 210 |
| Prototype B | $0.10/bag | 224 |





**Special Acknowledgments:**
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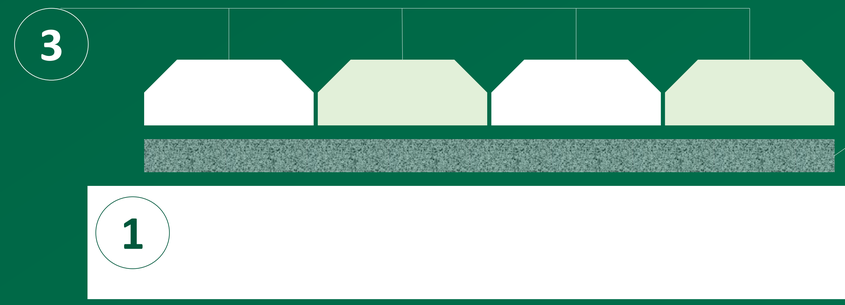
Oldcastle APG
A CRH COMPANY

Team CCM reverse engineered an existing product to design a **cheaper** and **stronger** alternative, **TileSeal.** TileSeal can adhere tiles onto **existing** concrete, without the complications of old installation techniques:




Just **3** simple steps to installation:

1. Clean and prepare your concrete surface
2. Place a thin layer of TileSeal powder on surface
3. Place tiles on top of TileSeal and water with a hose

For more info:

UF Integrated Product and Process Design

IPPD

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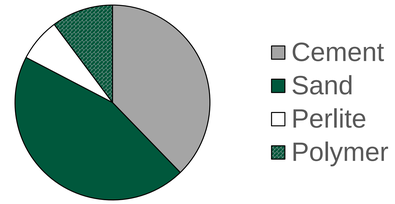
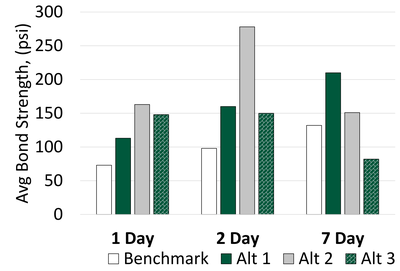
## EXTRA FIGURES

### Approximate Proportions

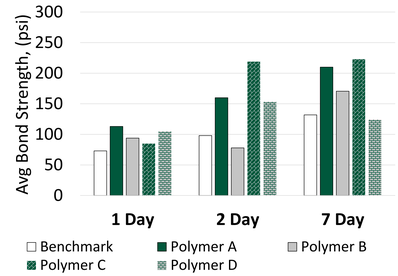



### Prototype Testing Results

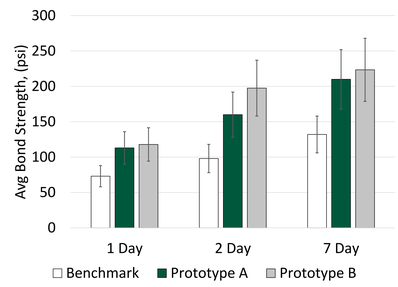
Perlite replacements:




Alternative polymers:




Final prototype selection graphs, accounting for experimental error:





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