

Table S1: Data used for modeling

| Ref. | Fiber volume (%) | CA/FA | Limestone powder (Kg/m <sup>3</sup> ) | w/b  | Nano-silica (Kg/m <sup>3</sup> ) | SP/B  | Age (days) | CS (MPa) |
|------|------------------|-------|---------------------------------------|------|----------------------------------|-------|------------|----------|
| [1]  | 0                | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 73       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 74.3     |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 81.5     |
|      | 0.5              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 78       |
|      | 0.1              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 71.7     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 69.3     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 66.6     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 82       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 78.5     |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 7          | 72.8     |
|      | 0                | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 75       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 77.5     |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 82.7     |
|      | 0.5              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 78.2     |
|      | 0.1              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 73.6     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 70.8     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 68       |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 82.6     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 80.5     |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 16.5                             | 0.02  | 7          | 78.7     |
|      | 0                | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 86       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 85.7     |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 88       |
|      | 0.5              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 87.2     |
|      | 0.1              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 82.6     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 78.7     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 76.5     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 88.7     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 84       |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 33                               | 0.02  | 7          | 83.6     |
|      | 0                | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 85       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 85.2     |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 86.7     |
|      | 0.5              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 86.1     |
|      | 0.1              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 79.6     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 77       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 82.3     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 86.5     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 83       |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 49.6                             | 0.02  | 7          | 82.7     |
|      | 0                | 0.958 | 0                                     | 0.48 | 0                                | 0.005 | 7          | 42.1     |
|      | 0.1              | 0.96  | 0                                     | 0.48 | 0                                | 0.005 | 7          | 43       |
|      | 0                | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 65       |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 62       |
|      | 0.3              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 64.5     |
|      | 0.5              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 65       |
|      | 0.1              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 64.5     |
|      | 0.15             | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 63.7     |
|      | 0.2              | 0.874 | 288.9                                 | 0.39 | 0                                | 0.02  | 28         | 60.6     |

|      |       |       |      |      |      |    |      |
|------|-------|-------|------|------|------|----|------|
| 0.15 | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 28 | 61   |
| 0.2  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 28 | 59   |
| 0.3  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 28 | 59   |
| 0    | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 68.5 |
| 0.2  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 65   |
| 0.3  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 65.7 |
| 0.5  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 66   |
| 0.1  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 65.4 |
| 0.15 | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 64   |
| 0.2  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 61.5 |
| 0.15 | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 62.5 |
| 0.2  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 60.7 |
| 0.3  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 28 | 59.3 |
| 0    | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 78.7 |
| 0.2  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 77.2 |
| 0.3  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 79.2 |
| 0.5  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 79   |
| 0.1  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 74.5 |
| 0.15 | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 72.5 |
| 0.2  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 71.7 |
| 0.15 | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 69.5 |
| 0.2  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 66   |
| 0.3  | 0.874 | 288.9 | 0.39 | 33   | 0.02 | 28 | 64.4 |
| 0    | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 75   |
| 0.2  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 74   |
| 0.3  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 74.3 |
| 0.5  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 73.2 |
| 0.1  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 72.3 |
| 0.15 | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 67.4 |
| 0.2  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 68.5 |
| 0.15 | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 67   |
| 0.2  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 64.7 |
| 0.3  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02 | 28 | 64   |
| 0    | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 80   |
| 0.2  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 81   |
| 0.3  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 85.3 |
| 0.5  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 83   |
| 0.1  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 74.8 |
| 0.15 | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 71.3 |
| 0.2  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 68.2 |
| 0.15 | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 84.7 |
| 0.2  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 80   |
| 0.3  | 0.874 | 288.9 | 0.39 | 0    | 0.02 | 90 | 77   |
| 0    | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 82.2 |
| 0.2  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 82   |
| 0.3  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 84.6 |
| 0.5  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 82.5 |
| 0.1  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 75   |
| 0.15 | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 73.7 |
| 0.2  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 70   |
| 0.15 | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 85   |
| 0.2  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 82.7 |
| 0.3  | 0.874 | 288.9 | 0.39 | 16.5 | 0.02 | 90 | 80.3 |

[2]

|      |       |       |      |      |       |     |      |
|------|-------|-------|------|------|-------|-----|------|
| 0    | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 87.7 |
| 0.2  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 88.3 |
| 0.3  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 91.2 |
| 0.5  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 87.5 |
| 0.1  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 83.2 |
| 0.15 | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 81.1 |
| 0.2  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 80.6 |
| 0.15 | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 89.8 |
| 0.2  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 84.3 |
| 0.3  | 0.874 | 288.9 | 0.39 | 33   | 0.02  | 90  | 84   |
| 0    | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 86.3 |
| 0.2  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 86.7 |
| 0.3  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 87   |
| 0.5  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 86   |
| 0.1  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 81.7 |
| 0.15 | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 82.3 |
| 0.2  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 78.3 |
| 0.15 | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 78.2 |
| 0.2  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 84.5 |
| 0.3  | 0.874 | 288.9 | 0.39 | 49.6 | 0.02  | 90  | 84   |
| 0.2  | 0.962 | 0     | 0.48 | 0    | 0.005 | 7   | 43.5 |
| 0    | 0.964 | 0     | 0.48 | 10.5 | 0.005 | 7   | 49.1 |
| 0.1  | 0.967 | 0     | 0.48 | 10.5 | 0.005 | 7   | 49.8 |
| 0.2  | 0.969 | 0     | 0.48 | 10.5 | 0.005 | 7   | 50.1 |
| 0    | 0.968 | 0     | 0.48 | 17.5 | 0.005 | 7   | 54.8 |
| 0.1  | 0.97  | 0     | 0.48 | 17.5 | 0.005 | 7   | 54.8 |
| 0.2  | 0.972 | 0     | 0.48 | 17.5 | 0.005 | 7   | 55   |
| 0    | 0.971 | 0     | 0.48 | 24.5 | 0.005 | 7   | 52   |
| 0.1  | 0.973 | 0     | 0.48 | 24.5 | 0.005 | 7   | 52.3 |
| 0.2  | 0.975 | 0     | 0.48 | 24.5 | 0.005 | 7   | 52   |
| 0    | 0.958 | 0     | 0.48 | 0    | 0.005 | 28  | 27.1 |
| 0.1  | 0.96  | 0     | 0.48 | 0    | 0.005 | 28  | 27.7 |
| 0.2  | 0.962 | 0     | 0.48 | 0    | 0.005 | 28  | 28.1 |
| 0    | 0.964 | 0     | 0.48 | 10.5 | 0.005 | 28  | 29.2 |
| 0.1  | 0.967 | 0     | 0.48 | 10.5 | 0.005 | 28  | 29.8 |
| 0.2  | 0.969 | 0     | 0.48 | 10.5 | 0.005 | 28  | 30   |
| 0    | 0.968 | 0     | 0.48 | 17.5 | 0.005 | 28  | 31.1 |
| 0.1  | 0.97  | 0     | 0.48 | 17.5 | 0.005 | 28  | 31.5 |
| 0.2  | 0.972 | 0     | 0.48 | 17.5 | 0.005 | 28  | 31.9 |
| 0    | 0.971 | 0     | 0.48 | 24.5 | 0.005 | 28  | 30.1 |
| 0.1  | 0.973 | 0     | 0.48 | 24.5 | 0.005 | 28  | 30.6 |
| 0.2  | 0.975 | 0     | 0.48 | 24.5 | 0.005 | 28  | 30.9 |
| 0    | 0.958 | 0     | 0.48 | 0    | 0.005 | 120 | 47.1 |
| 0.1  | 0.96  | 0     | 0.48 | 0    | 0.005 | 120 | 49.7 |
| 0.2  | 0.962 | 0     | 0.48 | 0    | 0.005 | 120 | 50.9 |
| 0    | 0.964 | 0     | 0.48 | 10.5 | 0.005 | 120 | 60.3 |
| 0.1  | 0.967 | 0     | 0.48 | 10.5 | 0.005 | 120 | 61.2 |
| 0.2  | 0.969 | 0     | 0.48 | 10.5 | 0.005 | 120 | 61.4 |
| 0    | 0.968 | 0     | 0.48 | 17.5 | 0.005 | 120 | 68.3 |
| 0.1  | 0.97  | 0     | 0.48 | 17.5 | 0.005 | 120 | 68.8 |
| 0.2  | 0.972 | 0     | 0.48 | 17.5 | 0.005 | 120 | 69.1 |
| 0    | 0.971 | 0     | 0.48 | 24.5 | 0.005 | 120 | 64.1 |
| 0.1  | 0.973 | 0     | 0.48 | 24.5 | 0.005 | 120 | 64.7 |

|     |     |       |   |      |      |       |     |      |
|-----|-----|-------|---|------|------|-------|-----|------|
| [3] | 0.2 | 0.975 | 0 | 0.48 | 24.5 | 0.005 | 120 | 65.1 |
|     | 0   | 1.135 | 0 | 0.31 | 0    | 0.006 | 7   | 43.9 |
|     | 0   | 1.134 | 0 | 0.31 | 5.2  | 0.008 | 7   | 45.5 |
|     | 0   | 1.134 | 0 | 0.31 | 10.4 | 0.009 | 7   | 47.4 |
|     | 0   | 1.133 | 0 | 0.31 | 15.6 | 0.011 | 7   | 50.4 |
|     | 0.2 | 1.133 | 0 | 0.31 | 15.6 | 0.012 | 7   | 39.5 |
| [4] | 0.1 | 1.133 | 0 | 0.31 | 15.6 | 0.012 | 7   | 51.4 |
|     | 0.2 | 1.133 | 0 | 0.31 | 15.6 | 0.012 | 7   | 44.9 |
|     | 0   | 0.905 | 0 | 0.43 | 0    | 0.017 | 7   | 19.1 |
|     | 0   | 0.905 | 0 | 0.43 | 31.5 | 0.024 | 7   | 35.6 |
|     | 0.9 | 0.905 | 0 | 0.43 | 0    | 0.021 | 7   | 19.9 |
|     | 0.9 | 0.905 | 0 | 0.43 | 31.5 | 0.025 | 7   | 38.1 |
|     | 0   | 0.905 | 0 | 0.43 | 0    | 0.017 | 28  | 30   |
|     | 0   | 0.905 | 0 | 0.43 | 31.5 | 0.024 | 28  | 49.2 |
|     | 0.9 | 0.905 | 0 | 0.43 | 0    | 0.021 | 28  | 31.2 |
|     | 0.9 | 0.905 | 0 | 0.43 | 31.5 | 0.025 | 28  | 52.3 |
|     | 0   | 0.905 | 0 | 0.43 | 0    | 0.017 | 60  | 35.4 |
|     | 0   | 0.905 | 0 | 0.43 | 31.5 | 0.024 | 60  | 56.1 |
|     | 0.9 | 0.905 | 0 | 0.43 | 0    | 0.021 | 60  | 37   |
|     | 0.9 | 0.905 | 0 | 0.43 | 31.5 | 0.025 | 60  | 58   |

CA/FA: ratio of coarse aggregate to fine aggregate, W/B, water to binder ratio, SP superplasticizer, B: binder (cement+nano-silica)

## References

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