Appendix

Table A1

Peak strength of samples containing a single flaw.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Material | *σ*i(MPa) | *σ*c (MPa) | *σ*c/*σ*i | Source |
| 0° | 15° | 30° | 45° | 60° | 75° | 90° | 0° | 15° | 30° | 45° | 60° | 75° | 90° |
| Rock-like material | 47.29 |  | 35.45 | 36.29 | 38.9 | 43.32 | 45 |  |  | 0.75 | 0.77 | 0.82 | 0.92 | 0.95 |  | Zhuang et al. (2014) |
| Rock-like material | 27.21 | 16.89  | 15.59  | 18.25  | 19.34  | 21.65  | 25.65  | 26.94  | 0.62  | 0.57  | 0.67  | 0.71  | 0.80  | 0.94  | 0.99  | Jin et al. (2017) |
| Rock-like material | 27.21 | 16.61  | 14.25  | 16.58  | 18.71  | 19.59  | 23.57  | 25.29  | 0.61  | 0.52  | 0.61  | 0.69  | 0.72  | 0.87  | 0.93  | Jin et al. (2017) |
| Sandstone | ~50 | 20.14  | 21.85  | 25.37  | 29.84  | 35.48  | 41.01  | 48.13  | 0.4 | 0.44  | 0.51  | 0.6 | 0.71  | 0.82  | 0.96  | Miao et al. (2018) |
| Sandstone | 212.08 |  | 139.28 |  | 115.17 | 149.96 | 181.71 |  |  | 0.86 |  | 0.54 | 0.71 | 0.86 |  | Yang and Jing (2011) |
| Sandstone  | ~72.3 |  | 42.96  | 44.11  | 50.21  | 61.48  | 67.78  |  |  | 0.59  | 0.61  | 0.69  | 0.85  | 0.94  |  | Zhu et al. (2016) |
| Sandstone | 77.91 |  | 58.02 | 59.66 | 60.78 | 63.84 | 67.33 |  |  | 0.74  | 0.77  | 0.78  | 0.82  | 0.86  |  | Li et al. (2019b) |
| Granite | 171.83 | 116.2 | 115.64 | 120.69 | 130.15 | 143.08 | 152.26 | 165.1 | 0.68  | 0.67  | 0.7 | 0.76  | 0.83  | 0.89  | 0.96  | Yang et al. (2019) |
| Granite | 171.83 |  | 106.74 | 129.2 | 132.29 |  | 162.33 | 157.3 |  | 0.62 | 0.75 | 0.77 |  | 0.94 | 0.92 | Yang et al. (2019) |
| Gypsum | 47.4 |  | 29.34  | 23.68  | 30.2 | 22.37  | 30.93  |  |  | 0.62  | 0.5 | 0.64  | 0.47  | 0.65  |  | Zhao et al. (2019) |
| Coal | 14.5 | 8.06  | 9.02  | 9.52  | 10.06  | 10.54  | 11.16  | 13.61  | 0.56  | 0.62  | 0.66  | 0.69  | 0.73  | 0.77  | 0.94  | Li et al. (2019a) |

Note: *σi* is the peak strength of intact samples, *σc* is the peak strength of pre-cracked samples, the symbol “~” means the datum was obtained from figures.

Table A2

Elastic modulus of samples containing a single flaw.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Material | *E*i(GPa) | *E*c (GPa) | *E*c/*E*i | Source |
| 0° | 15° | 30° | 45° | 60° | 75° | 90° | 0° | 15° | 30° | 45° | 60° | 75° | 90° |
| Sandstone | 35.95 |  | 32.86 |  | 28.11 | 32.25 | 33.97 |  |  | 0.91  |  | 0.78  | 0.9 | 0.94  |  | Yang and Jing (2011) |
| Sandstone  | ~13.47 |  | 8.77  | 9.07  | 10.39  | 11.11  | 12.16  |  |  | 0.65  | 0.67  | 0.77  | 0.82  | 0.9 |  | Zhu et al. (2016) |
| Sandstone | 8.85 |  | 7.61 | 7.44 | 7.49 | 7.74 | 7.78 |  |  | 0.86  | 0.84  | 0.85  | 0.87  | 0.88  |  | Li et al. (2019b) |
| Granite | 44.94 | 31.78 | 29.61 | 35.26 | 32.74 | 41.02 | 42.02 | 41.83 | 0.71  | 0.66  | 0.78  | 0.73  | 0.91  | 0.94  | 0.93  | Yang et al. (2019) |
| Granite | 44.94 |  | 30.15 | 37.22 | 35.77 |  | 41.08 | 42.37 |  | 0.67  | 0.83  | 0.8 |  | 0.91  | 0.94  | Yang et al. (2019) |

Note: *E*i is the elastic modulus of intact samples, *E*c is the elastic modulus of pre-cracked samples.

Table A3

Peak strain of samples containing a single flaw.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Material | *ε*i (%) | *ε*c (%) | *ε*c/*ε*i | Source |
| 0° | 15° | 30° | 45° | 60° | 75° | 90° | 0° | 15° | 30° | 45° | 60° | 75° | 90° |
| Sandstone | 1.17 |  | 1.02 | 1.07 | 1.05 | 1.01 | 1.08 |  |  | 0.87  | 0.91  | 0.9 | 0.86  | 0.92  |  | Li et al. (2019b) |
| Sandstone | 0.75 |  | 0.57 |  | 0.48 | 0.59 | 0.63 |  |  | 0.76  |  | 0.64 | 0.79 | 0.84 |  | Yang and Jing (2011) |
| Sandstone  | 0.72 |  | 0.62  | 0.63  | 0.63  | 0.7 | 0.74  |  |  | 0.86  | 0.88  | 0.87  | 0.97  | 1.03  |  | Zhu et al. (2016) |
| Granite | 0.61 | 0.48 | 0.55 | 0.48 | 0.56 | 0.53 | 0.55 | 0.58 | 0.79  | 0.9 | 0.79  | 0.92  | 0.87  | 0.90  | 0.95  | Yang et al. (2019) |
| Granite | 0.61 |  | 0.5 | 0.56 | 0.52 |  | 0.54 | 0.59 |  | 0.82  | 0.92  | 0.85  |  | 0.89  | 0.97  | Yang et al. (2019) |

Note: *ε*i is the elastic modulus of intact samples, *ε*c is the elastic modulus of pre-cracked samples.

Table A4

Crack initiation stress and initiation angle of samples containing a single flaw.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Material | *σ*p(MPa) | *β* (°) | *σ*ci /*σ*p | Source |
| 0° | 15° | 30° | 45° | 60° | 75° | 90° | 0° | 15° | 30° | 45° | 60° | 75° | 90° |
| Rock-like material | 47.29 |  | 85 | 69.1 | 54.6 | 46.7 | 27.6 |  |  | 0.85  | 0.85  | 0.86  | 0.93  | 0.95  |  | Zhuang et al. (2014) |
| Rock-like material | 47.29 |  | 88.7 | 74.7 | 64.4 | 55.6 | 36 |  |  | 0.86  | 0.86  | 0.87  | 0.95  | 0.96  |  | Zhuang et al. (2014) |
| Rock-like material | 47.29 |  | 101.8 | 81.7 | 75.2 | 57.9 | 37.4 |  |  |  |  |  |  |  |  | Zhuang et al. (2014) |
| Rock-like material | 47.29 |  |  | 109.3 | 86.8 | 73.8 | 64.9 | 40.2 |  |  |  |  |  |  |  | Zhuang et al. (2014) |
| Rock-like material | 55 |  |  |  |  |  |  |  | 0.49 |  | 0.51 | 0.5 | 0.6 | 0.7 | 0.73 | Lee and Jeon (2011) |
| Rock-like material |  | 126 | 110 | 99 | 89 | 87 |  |  |  |  |  |  |  |  |  | Lin et al. (2019a) |
| Sandstone | ~50 | 90 | 88 | 90 | 81 | 35 |  |  | 0.56 | 0.6 | 0.77 | 0.82 | 0.87 | 0.99 | 0.9 | Miao et al. (2018) |
| Sandstone | ~50 | 90 | 81 | 72 | 53 | 25 |  | 0 | 0.87 | 0.81 | 0.86 | 0.88 | 0.89 | 0.82 | 0.99 | Miao et al. (2018) |
| Sandstone | ~50 | 78 | 46 | 71 | 50 |  | 27 |  | 0.74 | 0.93 | 0.69 | 0.75 | 0.96 | 0.97 | 0.97 | Miao et al. (2018) |
| Sandstone | ~50 | 77 | 85 |  | 30 |  |  |  | 0.79 | 0.91 | 0.89 | 0.51 | 0.46 | 0.73 | 0.38 | Miao et al. (2018) |
| Gypsum |  | 95 |  | 95.5 | 88.1 | 79.7 | 53.8 |  | 0.81 |  | 0.81 | 0.93 | 0.99 |  |  | Wong and Einstein (2006) |
| Gypsum |  | 89.7 | 108.7 | 106.1 | 95.5 | 75.4 | 51.7 |  | 0.46 | 0.7 | 0.80 | 0.91 | 0.97 | 1 |  | Wong and Einstein (2006) |
| Gypsum | 47.4 |  |  |  |  |  |  |  |  | 0.77 | 0.83 | 0.83 | 0.67 | 0.9 |  | Zhao et al. (2019) |
| Marble | 113.4 |  |  |  |  |  |  |  | 0.74 |  | 0.95 | 0.98 |  |  |  | Liu et al. (2020) |
| PMMA | 139 |  |  |  |  |  |  |  | 0.31 |  | 0.20 | 0.19 | 0.24 | 0.43 |  | Lee and Jeon (2011) |

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