

Experimental evaluation of conjugate flaws on rock dynamic fracturing

Supplementary data


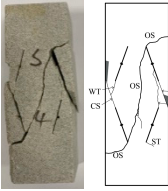
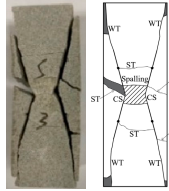
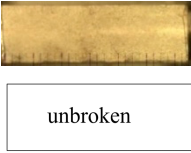
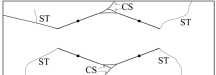
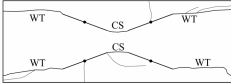
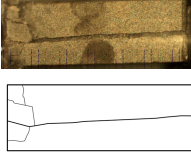
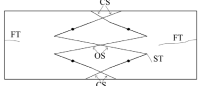
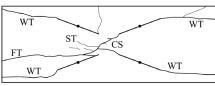
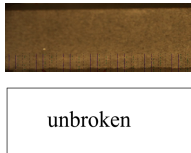
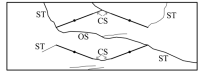
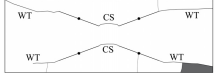
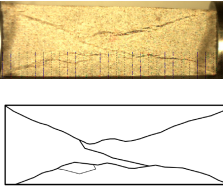
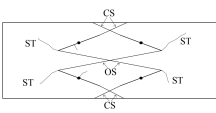
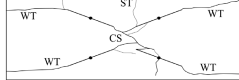

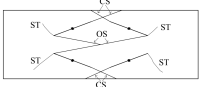
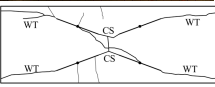

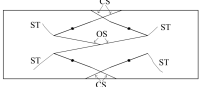
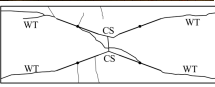
To investigate the effects of the geometry setting of conjugate flaws and the loading conditions on the fracturing behavior and failure mechanism of the white sandstone specimens, for each group of specimens, three levels of pre-stress ratio (i.e., 0, 30% and 50%) and three different loading rates are conducted, as shown in Table S1.

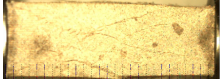


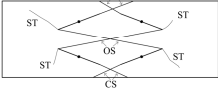

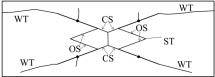
Table S1 Geometrical dimensions and loading conditions of white sandstone specimens.

Specimen No.	L/mm	W/mm	T/mm	Flaw		Static stress (percentage of peak stress)/MPa	Pre-stress peak rate/GPa • s ⁻¹	Loading rate/GPa • s ⁻¹	Remark
				L _f /mm	α /°				
G0 ₀	101.04	35.49	34.69	-	-	-	-	-	Uniaxial compression
G1 ₀	100.43	35.16	34.85	20	20	-	-	-	
G2 ₀	99.89	35.48	35.30	20	-20	-	-	-	
G0-0-0.3	101.10	34.92	35.17	-	-	0(0%)		1318.59	Intact specimen
G0-0-0.5	100.98	35.44	35.00	-	-	0(0%)		1530.58	
G0-0-0.6	100.24	35.02	34.57	-	-	0(0%)		1628.54	
G0-30-0.3	100.39	35.13	35.00	-	-	32.64(30%)		1506.75	
G0-30-0.5	100.84	34.90	35.09	-	-	32.64(30%)		1818.62	
G0-30-0.6	101.06	34.65	34.82	-	-	32.64(30%)		1893.83	
G0-50-0.3	100.03	35.08	35.39	-	-	54.41(50%)		1414.83	Intermittent conjugate-flawed specimen
G0-50-0.5	100.46	35.36	34.91	-	-	54.41(50%)		1606.38	
G0-50-0.6	101.49	34.90	35.36	-	-	54.41(50%)		1968.77	
G1-0-0.3	100.66	34.78	35.47	20	20	0(0%)		1483.41	
G1-0-0.5	100.57	34.68	34.53	20	20	0(0%)		1913.22	
G1-0-0.6	99.69	35.49	34.63	20	20	0(0%)		2081.16	
G1-30-0.3	99.61	34.78	35.25	20	20	17.49(30%)		1334.82	
G1-30-0.5	100.40	35.44	34.96	20	20	17.49(30%)		1557.43	
G1-30-0.6	99.70	35.05	35.05	20	20	17.49(30%)		1793.46	
G1-50-0.3	100.64	34.77	34.74	20	20	29.16(50%)		1257.62	
G1-50-0.5	100.58	35.30	35.00	20	20	29.16(50%)		1471.52	
G1-50-0.6	101.23	34.92	35.45	20	20	29.16(50%)		1982.35	
G2-0-0.3	101.43	35.04	35.07	20	-20	0(0%)		1284.34	
G2-0-0.5	100.74	34.96	35.16	20	-20	0(0%)		1741.56	
G2-0-0.6	100.58	34.78	35.10	20	-20	0(0%)		1793.40	
G2-30-0.3	101.47	34.94	35.40	20	-20	21.07(30%)		1275.48	
G2-30-0.5	100.32	35.12	35.12	20	-20	21.07(30%)		1447.67	
G2-30-0.6	99.36	35.26	35.25	20	-20	21.07(30%)		1639.84	
G2-50-0.3	101.01	34.87	34.86	20	-20	35.11(50%)		1354.27	
G2-50-0.5	100.2	35.01	35.12	20	-20	35.11(50%)		1607.60	
G2-50-0.6	199.94	35.36	34.31	20	-20	35.11(50%)		1749.27	

Table S2 displays representative failure modes of intact and intermittent conjugate-flawed specimens under three loading conditions: quasi-static, individual dynamic and coupled static-dynamic.

Table S2. The failure modes of intact and intermittent conjugate-flawed white sandstone specimens under different loading conditions (The loading direction is horizontal)

Specimen group			G0	G1	G2
Loading condition					
Quasi-static loading					
Coupled static-dynamic loading	Pre-stress level	Loading rate/ $\text{GPa} \cdot \text{s}^{-1}$	G0	G1	G2
	0%	1310-1480			
		1620-2090			
	30%	1270-1510			
		1630-1900			
		1250-1420			
	50%	1250-1420			

		1740-1990	 	 	 
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