

HOLCIM DUQUESNE SLAG

AIR COOLED BLAST FURNACE SLAG

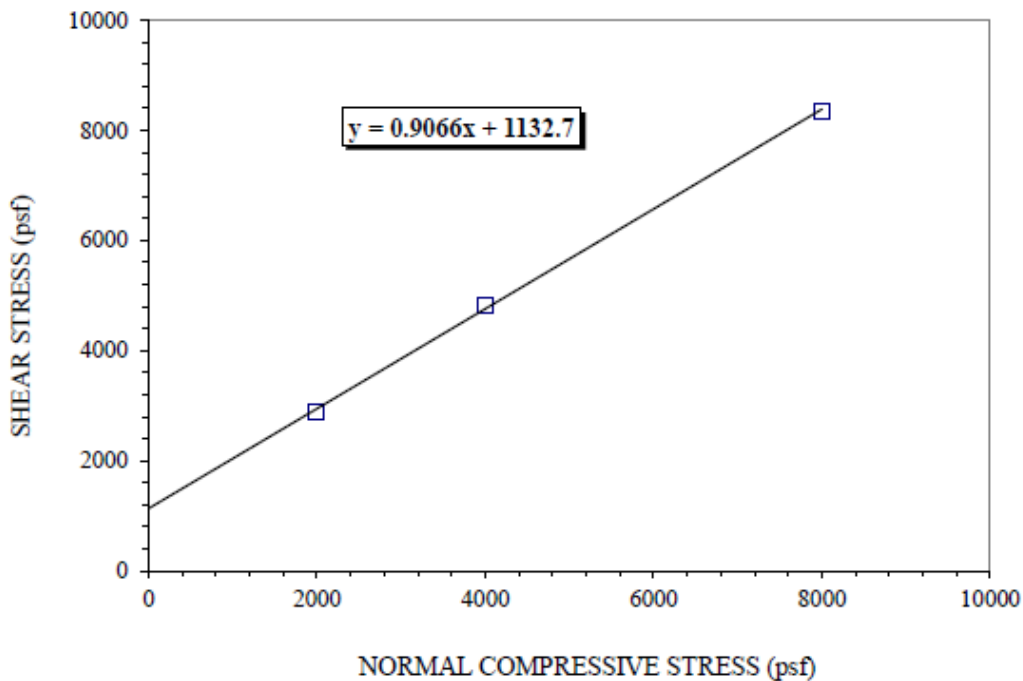
2A Shear
Test Results

INTERFACE : 12" Direct Shear of #2A Aggregate
@ 106.0 pcf & 7.8 % M.C.

PEAK SHEAR

FRICITION ANGLE (deg) : $\Phi = 42.2$
COEFFICIENT OF FRICTION : = 0.907
COHESION [Calculated] (psf): a = 1133

- NOTES:
- 1.) Specimen was lightly compacted at the as-received moisture content.
 - 2.) The specimen was loaded & seated for 1 hour prior to shearing.
 - 3.) The peak friction angle was calculated using linear regression on the three data points.



In the United States, Holcim is the leader in innovative and sustainable building solutions. Our customers rely on us to help them design and build better communities that deliver structural integrity and eco-efficiency.

Duquesne Slag Operations
890 Noble Drive
West Mifflin, PA 15122
Tel.: 412-461-1163
www.holcim.us

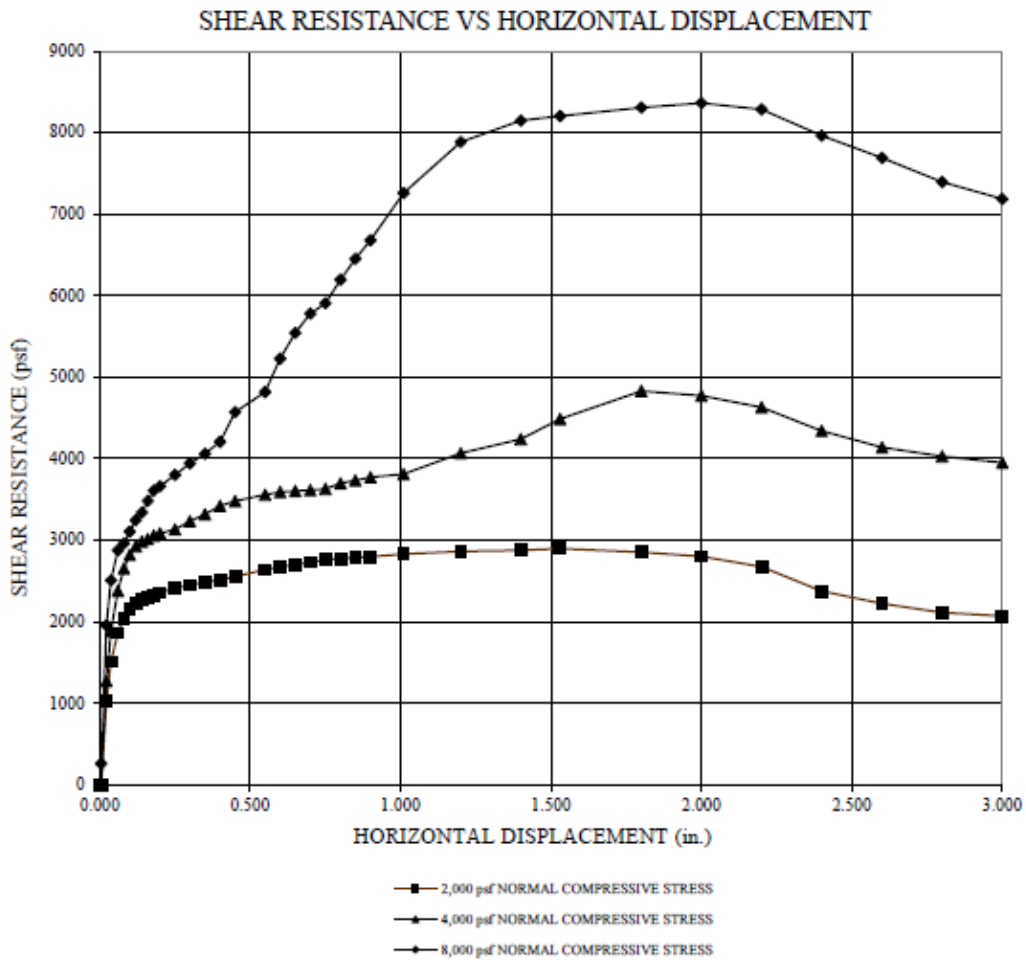


HOLCIM DUQUESNE SLAG

AIR COOLED BLAST FURNACE SLAG

2A Shear Test Results

INTERFACE : 12" Direct Shear of #2A Aggregate
@ 106.0 pcf & 7.8 % M.C.



In the United States, Holcim is the leader in innovative and sustainable building solutions. Our customers rely on us to help them design and build better communities that deliver structural integrity and eco-efficiency.

Duquesne Slag Operations
890 Noble Drive
West Mifflin, PA 15122
Tel.: 412-461-1163
www.holcim.us



HOLCIM DUQUESNE SLAG

2A Shear Test
Results

AIR COOLED BLAST FURNACE SLAG

INTERFACE: 12" Direct Shear of #2A Aggregate
@ 106.0 pcf & 7.8 % M.C.

STRAIN RATE (in / min) : 0.04

DIRECT SHEAR UNIT: Durham Geo

PLACEMENT CONDITION: Dry

NORMAL LOAD: Hydraulic Cylinder

NORMAL LOAD (psf)			NORMAL LOAD (psf)			NORMAL LOAD (psf)		
2000			4000			8000		
PEAK SHEAR STRESS (psf)			PEAK SHEAR STRESS (psf)			PEAK SHEAR STRESS (psf)		
2898			4830			8362		
PEAK SECANT ANGLE (deg)			PEAK SECANT ANGLE (deg)			PEAK SECANT ANGLE (deg)		
55.4			50.4			46.3		
RESIDUAL SHEAR (psf)			RESIDUAL SHEAR (psf)			RESIDUAL SHEAR (psf)		
2071			3951			7186		
RESID. SECANT ANGLE (deg)			RESID. SECANT ANGLE (deg)			RESID. SECANT ANGLE (deg)		
46.0			44.6			41.9		
HORIZONTAL			HORIZONTAL			HORIZONTAL		
DISPLACE.	SHEAR FORCE	STRESS	DISPLACE.	SHEAR FORCE	STRESS	DISPLACE.	SHEAR FORCE	STRESS
(in.)	(lbs)	(psf)	(in.)	(lbs)	(psf)	(in.)	(lbs)	(psf)
0.000	0	0	0.000	0	0	0.000	0	0
0.005	2	2	0.005	3	3	0.005	263	263
0.023	1037	1037	0.023	1275	1275	0.023	1958	1958
0.038	1512	1512	0.038	1887	1887	0.038	2509	2509
0.060	1865	1865	0.060	2380	2380	0.060	2876	2876
0.080	2046	2046	0.080	2656	2656	0.080	2962	2962
0.100	2153	2153	0.100	2821	2821	0.100	3107	3107
0.120	2220	2220	0.120	2926	2926	0.120	3248	3248
0.140	2266	2266	0.140	2983	2983	0.140	3342	3342
0.160	2295	2295	0.160	3016	3016	0.160	3485	3485
0.180	2328	2328	0.180	3058	3058	0.180	3610	3610
0.200	2356	2356	0.200	3083	3083	0.200	3664	3664
0.250	2413	2413	0.250	3133	3133	0.250	3803	3803
0.300	2451	2451	0.300	3234	3234	0.300	3943	3943
0.350	2486	2486	0.350	3319	3319	0.350	4063	4063
0.400	2517	2517	0.400	3422	3422	0.400	4208	4208
0.450	2554	2554	0.450	3482	3482	0.450	4571	4571
0.550	2639	2639	0.550	3559	3559	0.550	4820	4820
0.600	2677	2677	0.600	3593	3593	0.600	5227	5227
0.650	2700	2700	0.650	3605	3605	0.650	5544	5544
0.700	2732	2732	0.700	3614	3614	0.700	5781	5781
0.750	2760	2760	0.750	3631	3631	0.750	5906	5906
0.800	2776	2776	0.800	3699	3699	0.800	6197	6197
0.850	2788	2788	0.850	3733	3733	0.850	6453	6453
0.900	2797	2797	0.900	3772	3772	0.900	6681	6681
1.010	2832	2832	1.010	3813	3813	1.010	7259	7259
1.200	2863	2863	1.200	4070	4070	1.200	7883	7883
1.400	2877	2877	1.400	4240	4240	1.400	8149	8149
1.530	2898	2898	1.530	4488	4488	1.530	8202	8202
1.800	2855	2855	1.800	4830	4830	1.800	8306	8306
2.000	2801	2801	2.000	4773	4773	2.000	8362	8362
2.200	2675	2675	2.200	4632	4632	2.200	8283	8283
2.400	2378	2378	2.400	4342	4342	2.400	7964	7964
2.600	2224	2224	2.600	4141	4141	2.600	7689	7689
2.800	2115	2115	2.800	4031	4031	2.800	7395	7395
3.000	2071	2071	3.000	3951	3951	3.000	7186	7186

In the United States, Holcim is the leader in innovative and sustainable building solutions. Our customers rely on us to help them design and build better communities that deliver structural integrity and eco-efficiency.

Duquesne Slag Operations
890 Noble Drive
West Mifflin, PA 15122
Tel.: 412-461-1163
www.holcim.us

