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Discussion

Strength of Fabric Reinforced Sand Under Axisymmetric Loading by B. Chandrasekaran, Bengt B. Broms & Kai S. Wong[a]

The authors have reported very interesting laboratory results and proposed a semi-empirical method relating the force in the fabric to increased strength, yielding a good correlation with test results.[1] It has been observed that the friction factor (f), as suggested by the authors, appears to be a function of the ratio of the radius with the spacing, the soil–geotextile type and confining pressure. Experimental work has been in progress at the Indian Institute of Technology, Delhi on triaxial behaviour of reinforced sand. Some preliminary results have also been reported in recent conferences in India.[2,3]

Several series of drained triaxial compression tests have been conducted on large size specimens (diameter 100 mm × 200 mm high) on sands using two types of geotextile reinforcement manufactured in India. Two types of sands, namely fine grained Yamuna sand at a relative density of 0·6, and Ottawa sand (medium to coarse grained) at a relative density of 0·7 were studied. The geotextiles used for reinforcements were a polypropylene multifilament woven fabric and a polypropylene non-woven needle punched fabric. The circular discs (100 mm diameter) of geotextiles were placed within sand layers and the number of such reinforcement layers were varied at 1, 3, 5 and 7. Five different confining pressures, up to a maximum value of 400 kPa were applied.

The axial load capacity (P_{max}) has been computed from modified model as per eqn (7) suggested by the authors and also from the original model proposed by Broms.[4] These are presented in Tables 1 and 2. The Figs 1–4 which show the comparison between experimental and computed values

[a]See Ref. 1.

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TABLE 1

A Comparison of Observed and Predicted Values of P_{max} for Yamuna Sand Reinforced with Non-Woven Geotextile

No. of layers	σ_3 *(kPa)*	*D (mm)*	*R/D*	K_a	K_{av}	*Axial load obsvd* P_{max} *(kN)*	α	*Modified calc. P (kN)*	*Broms P (kN)*	*Predicted* P_{max} *for* $\alpha = 0{\cdot}45$ *(kN)*
1	25			0·22	0·32	3·1		1·45	1·25	1·08
	50			0·22	0·32	5·2		2·90	2·50	2·17
	100	100	0·5	0·22	0·32	7·0		5·80	4·90	4·33
	200			0·22	0·32	10·0	0·90	10·90	9·90	8·67
	400			0·22	0·32	17·5	0·55	18·00	19·20	17·33
3	25			0·22	0·32	4·0		2·51	3·00	1·33
	50			0·22	0·32	6·0		5·02	5·90	2·66
	100	50	1·0	0·22	0·32	9·4		10·04	11·50	5·32
	200			0·22	0·32	12·4	0·60	12·38	23·50	10·64
	400			0·22	0·32	19·5	0·45	20·00	48·20	21·30
5	25			0·22	0·32	4·9		4·62	8·80	1·65
	50			0·22	0·32	8·8		9·30	17·20	3·30
	100	33·3	1·5	0·22	0·32	12·2	0·80	12·10	36·00	6·61
	200			0·22	0·32	14·5	0·50	14·30	71·60	13·20
	400			0·22	0·32	23·2	0·40	25·00	144·00	26·30
7	25			0·22	0·32	7·3	0·95	7·50	31·30	2·07
	50			0·22	0·32	13·0	0·90	12·98	61·00	4·14
	100	25	2·0	0·22	0·32	17·0	0·75	17·00	125·40	8·30
	200			0·22	0·32	22·5	0·60	22·47	251·00	16·60
	400			0·22	0·32	29·6	0·40	29·80	496·80	33·16

	200			0·22	0·32	8·7	0·65	9·30	9·60	8·60
	400			0·22	0·32	15·6	0·35	16·45	19·20	17·20
3	25			0·22	0·32	2·5		2·40	2·80	1·31
	50			0·22	0·32	5·2		4·76	5·60	2·62
	100	50	1·0	0·22	0·32	7·2	0·75	7·10	11·20	5·24
	200			0·22	0·32	10·0	0·50	10·90	22·40	10·48
	400			0·22	0·32	17·8	0·30	18·30	44·80	20·96
5	25			0·22	0·32	5·2		4·22	7·80	1·60
	50			0·22	0·32	7·0	0·95	7·60	15·60	3·22
	100	33·3	1·5	0·22	0·32	8·0	0·60	8·10	31·20	6·43
	200			0·22	0·32	11·4	0·40	11·90	62·40	12·87
	400			0·22	0·32	20·0	0·30	20·80	124·90	25·74
7	25			0·22	0·32	6·8	0·95	6·73	19·05	2·00
	50			0·22	0·32	9·8	0·85	10·22	38·10	4·00
	100	25	2·0	0·22	0·32	11·7	0·63	11·77	76·20	8·00
	200			0·22	0·32	15·3	0·45	15·90	152·40	16·00
	400			0·22	0·32	22·0	0·30	23·80	304·70	32·00

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