

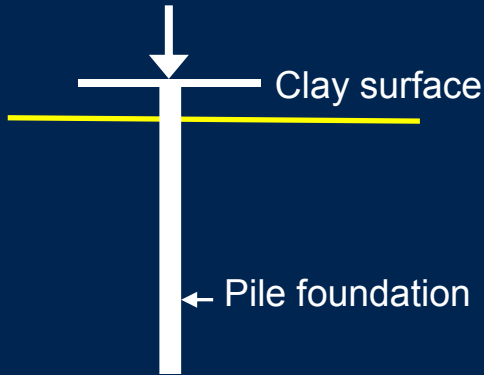
# **Assessment of Existing Foundations and Foundation Improvement Using Micropile Groups**

**Leonora Begaj-Qerimi**



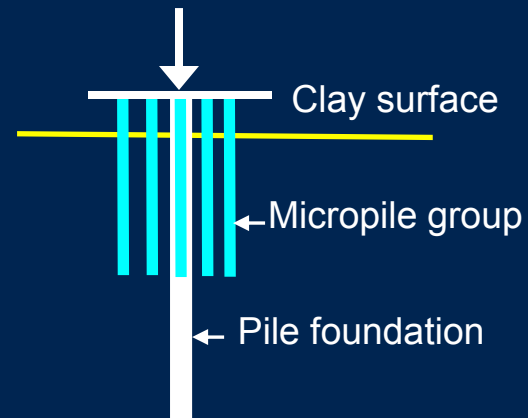
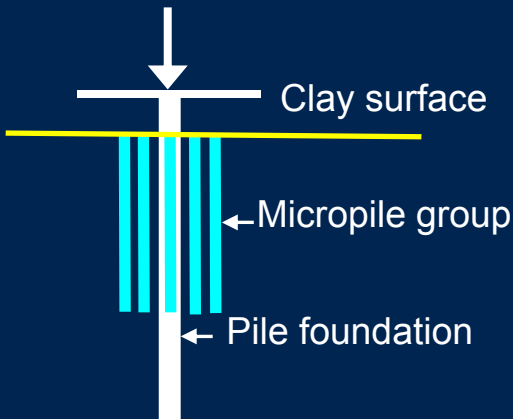
**Would you re-use these?**

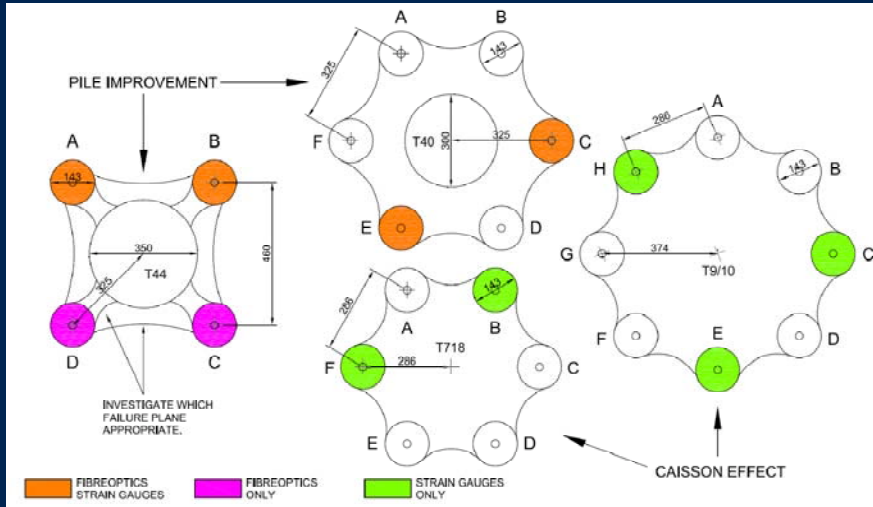
**Or remove them and start again?**



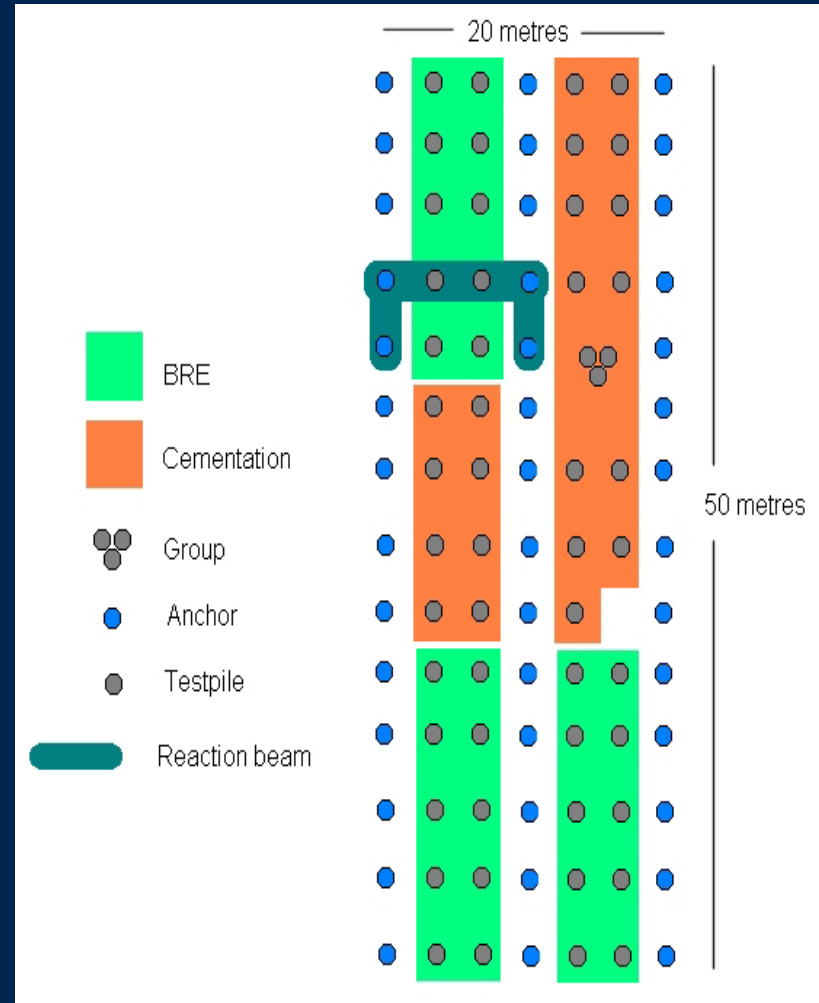
– Performance of existing foundations  
Load – Unload – Reload

### The improvement of foundation using micropile group

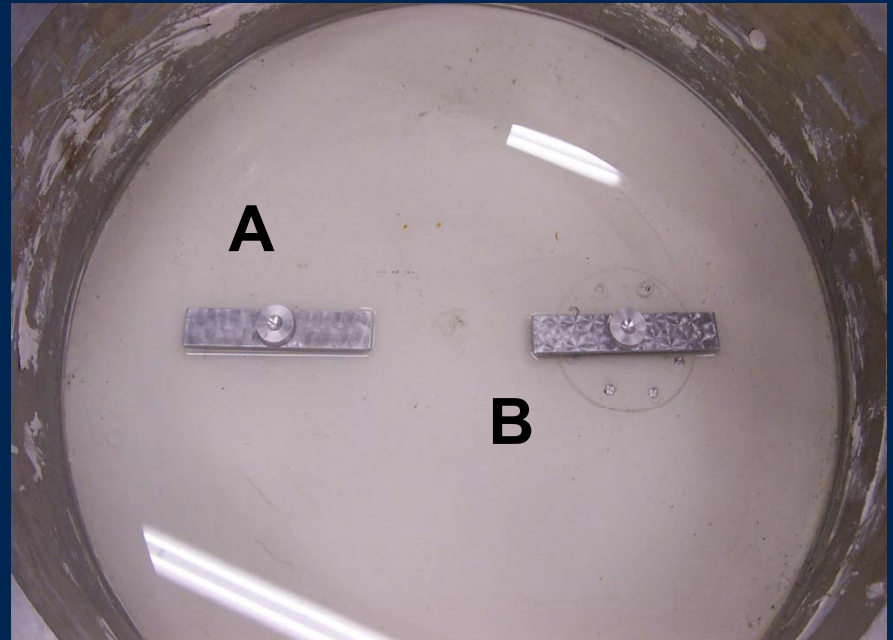
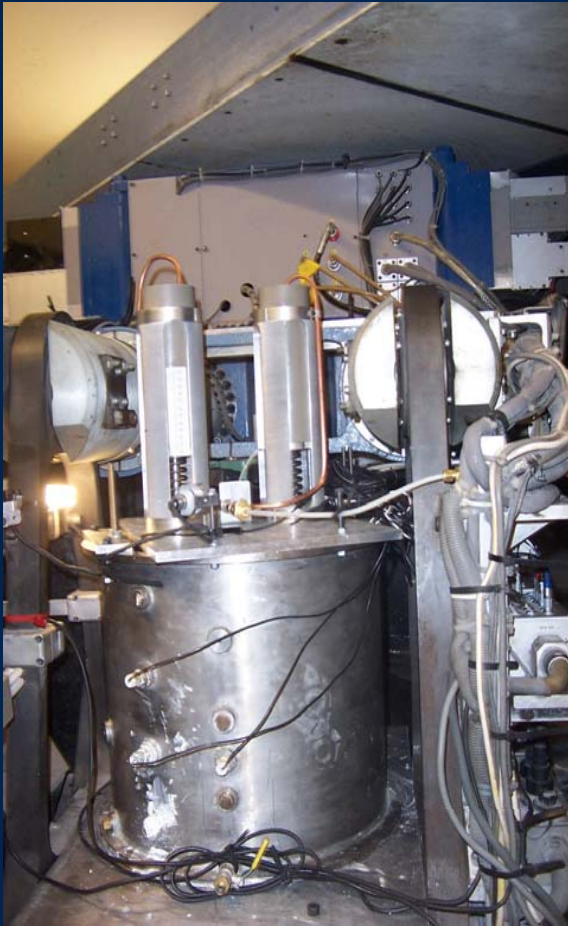




# Trials: Chattenden

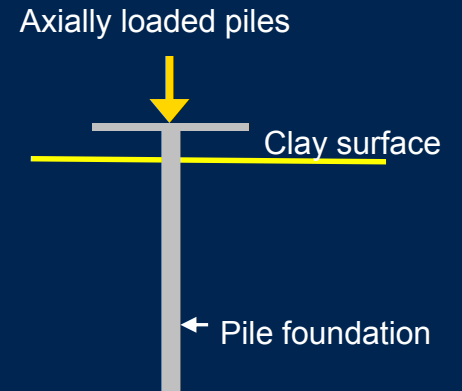
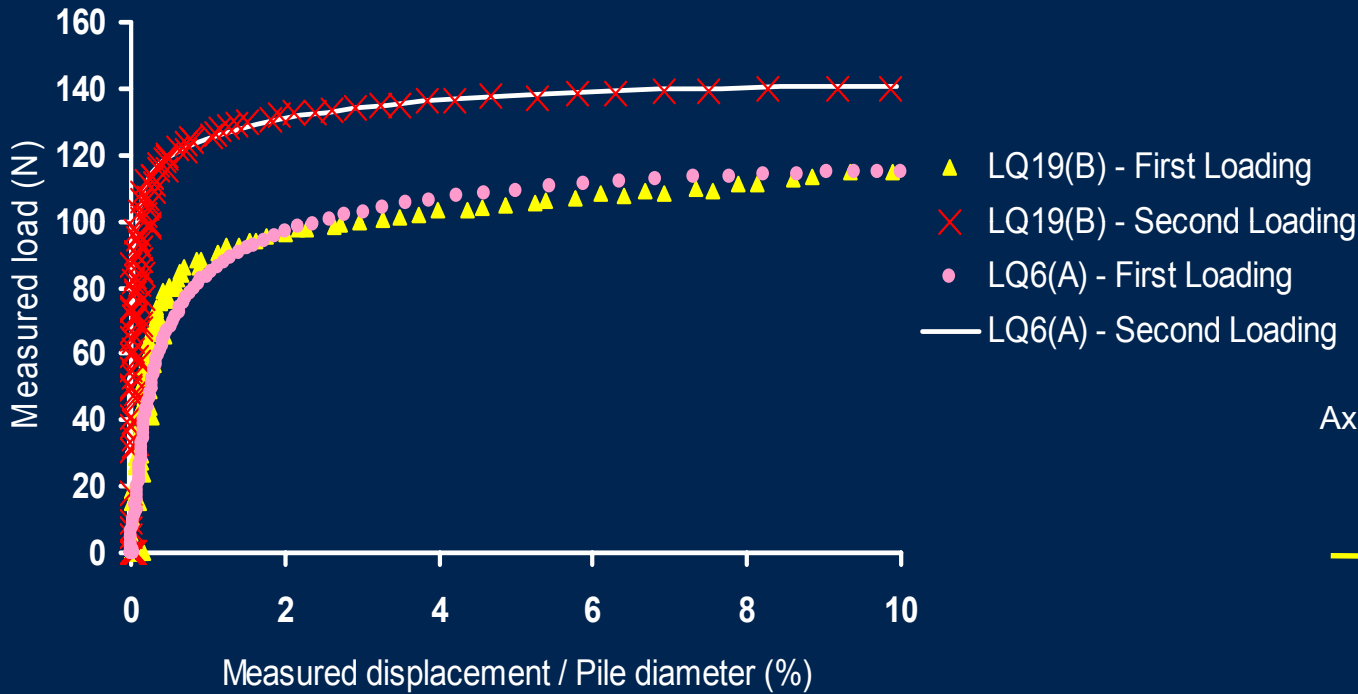


# Single pile foundation A and enhanced pile foundation B

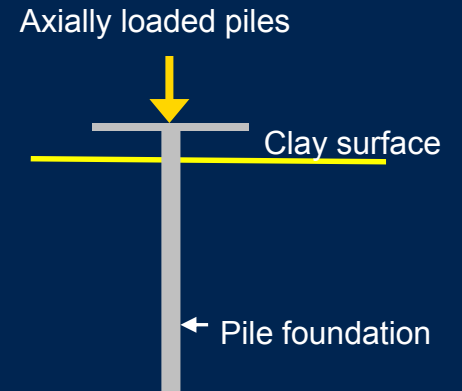
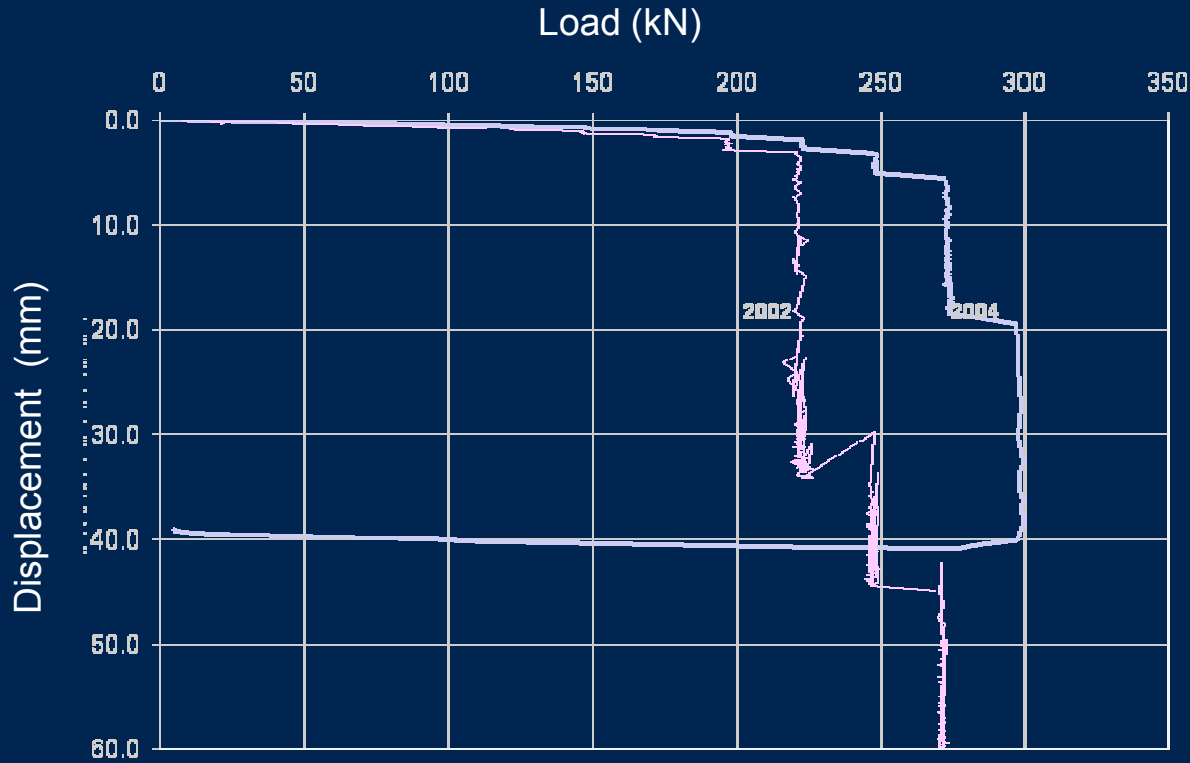


Model in the centrifuge swing

# Single pile foundations

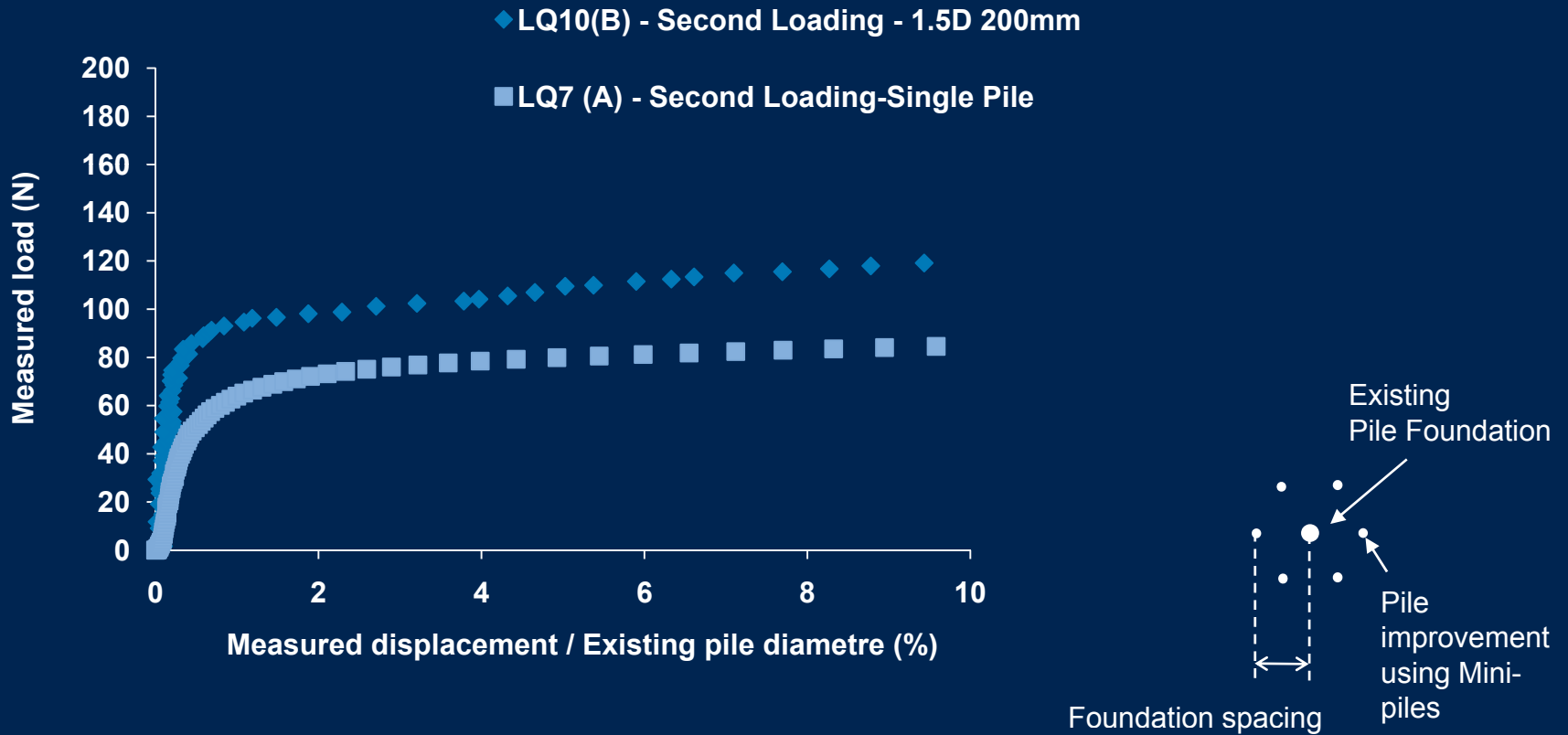


# Single micropile foundations



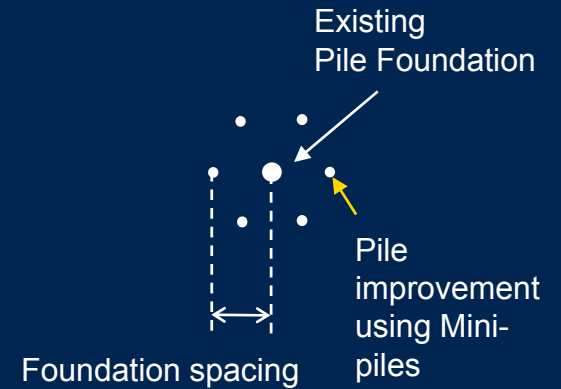
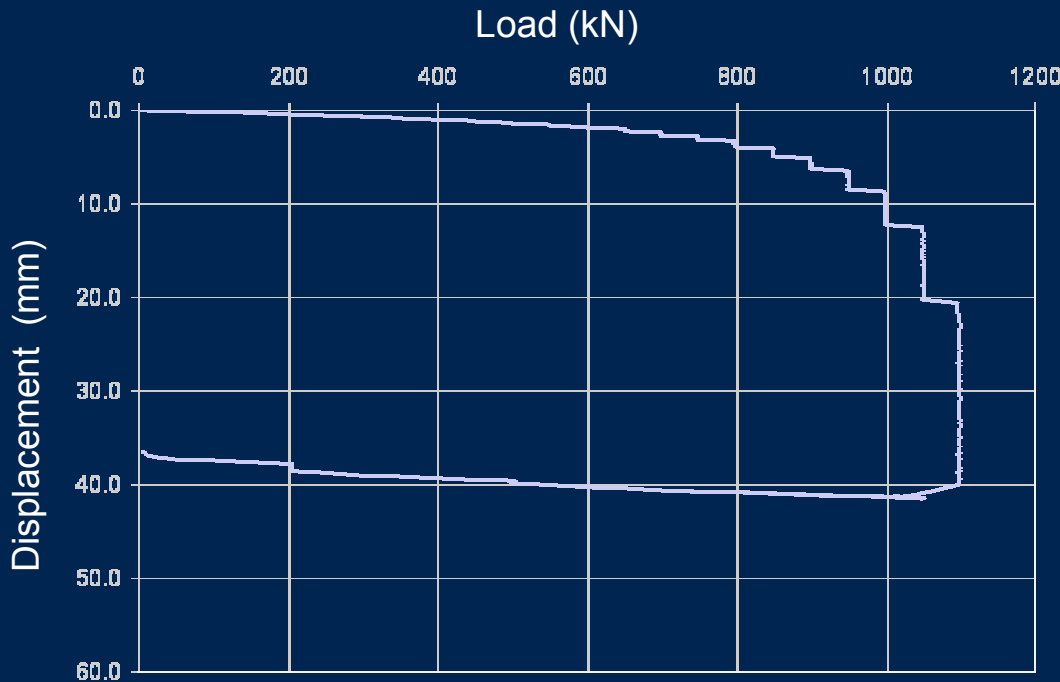
**Trials: Chattenden**

# The effect of micropile group on the existing pile foundation





# The effect of micropile group on the existing pile foundation



Test ID	Description	Pile/group resistance		
		@ 4mm	@ 10mm	Ultimate
T40	300 dia. Pile + 6 no. 143mm dia. Micropiles	850	1000	1100

Test ID	Description	1 <sup>st</sup> Loading	2 <sup>nd</sup> Loading	3 <sup>rd</sup> Loading
T40	Existing 300mm dia. Micropile	225	300	
T40	300mm dia. + 6 no. 143mm dia. Micropiles (novel pile group load tested)			1100
	<b>Centrifuge Model Tests</b> (Foundations loaded to ultimate load)			
LQ5	Single foundation – 10mm diameter	110	130	
LQ6	Single Foundation – 10mm diameter	115	140	

When subjected to second loading, field test data and centrifuge model tests suggested an increase in capacity in a range of 20% to 25%.

Test ID	Description	1 <sup>st</sup> Loading	2 <sup>nd</sup> Loading
	<b>Centrifuge Model Tests</b> (Foundations loaded initially to working load)		
LQ7	Single foundation – 10mm diameter	50	85
LQ13	Single Foundation – 10mm diameter	50	88
LQ10	Single Foundation – 10mm diameter	50	
LQ10	10mm dia. + 8 no. 5mm dia. Micropiles (existing centre pile loaded only)		119

Micropile group increased the capacity of the existing pile foundation by 40%.

# Conclusions

- Single pile foundations show an increase in capacity when subjected to load / un-load / reload cycle.
- This model study strongly suggests that foundation capacity increases when improved by supplementary micropiles. The increase of capacity observed was in a range of 40%.