

GEOTECHNICAL RESEARCH ON UNDERGROUND PIPELINES AND WIND TURBINE FOUNDATIONS

Dwight D. Eisenhower Transportation Fellowship Program

Stuart Crooks
Civil Engineering Major
Howard University Class of 2012

Acknowledgements

- Dwight D. Eisenhower Transportation Fellowship Program
- University of Rhode Island Transportation Department (URITC) Staff
- Dr. Bradshaw P.E.
- Dr. Baxter P.E.
- Dr. Rhoulac P.E

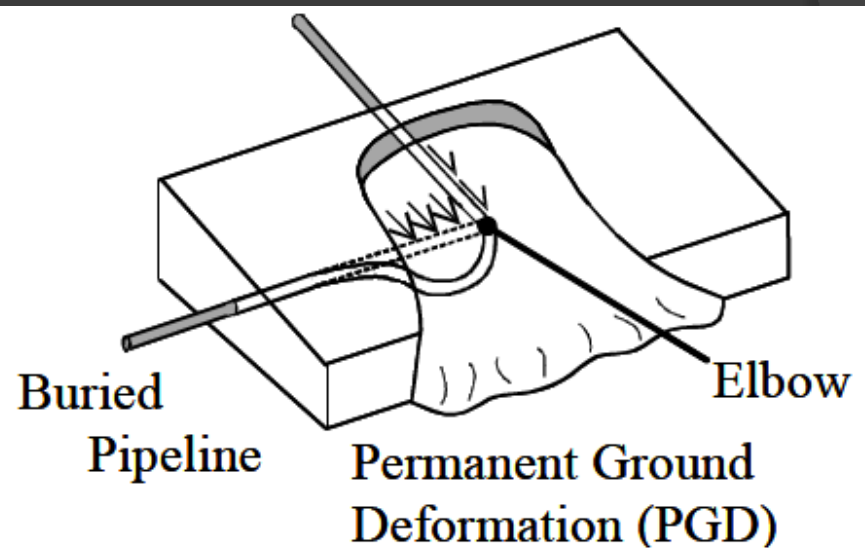
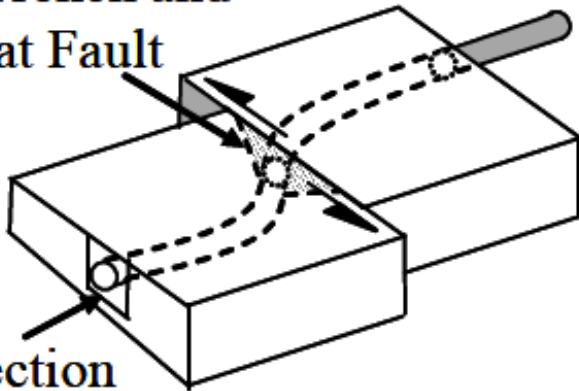
Outline

- ① Research on health monitoring of buried pipelines.
- ② Research on offshore wind turbine foundations.

The objective of this project is to develop a system for monitoring the structural health of buried concrete pipe lines.

Special Trench and
Backfill at Fault
Crossing

Pipe
Trench
Cross-section



The pipeline test was performed at the Large Displacement Testing Facility at Cornell University.



For this experiment segmented precast concrete pipes were used.



Conventional structural sensors were installed on the pipeline.



Strain Gages



Potentiometers



Load Cells

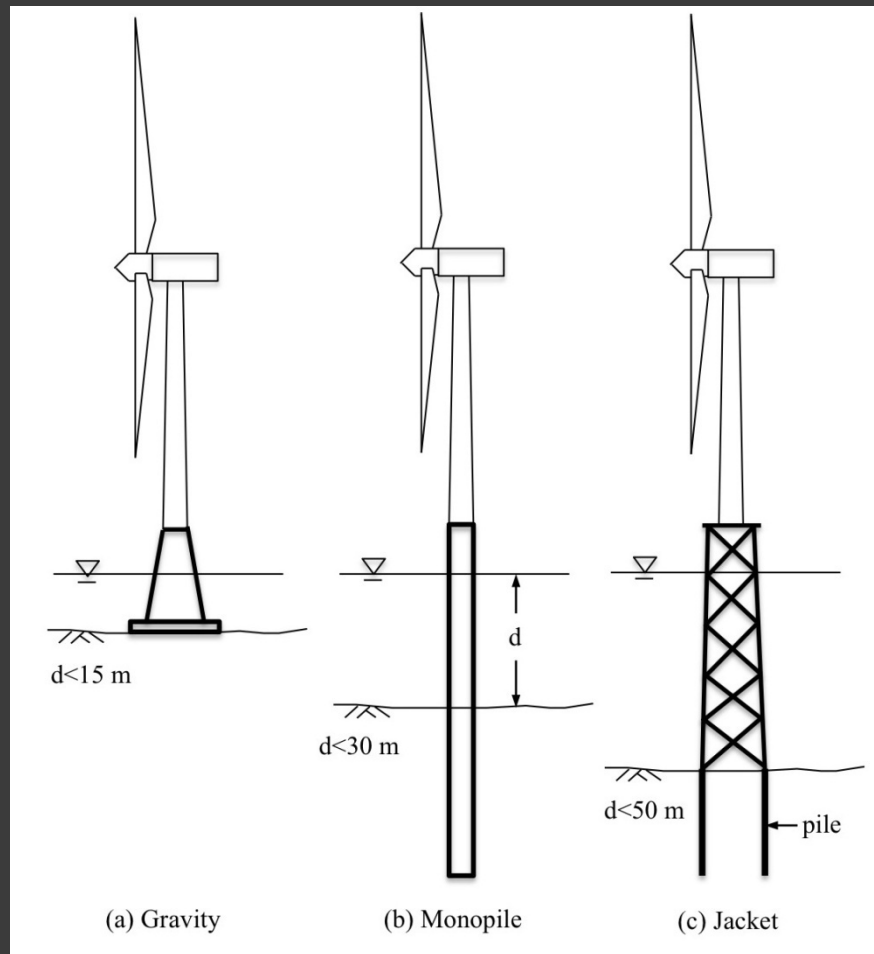
Backfill was carefully placed and then compacted in lifts.



Pipeline failure was concentrated at the joints.



The objective of this project is to improve design methods for offshore wind foundations.

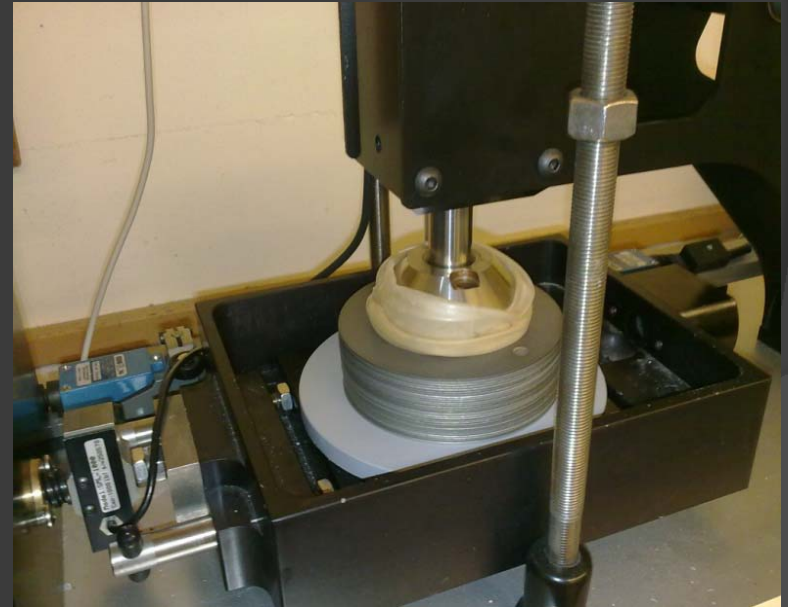


The apparatus used for the cyclic simple shear test was developed by Geocomp™ Corporation.



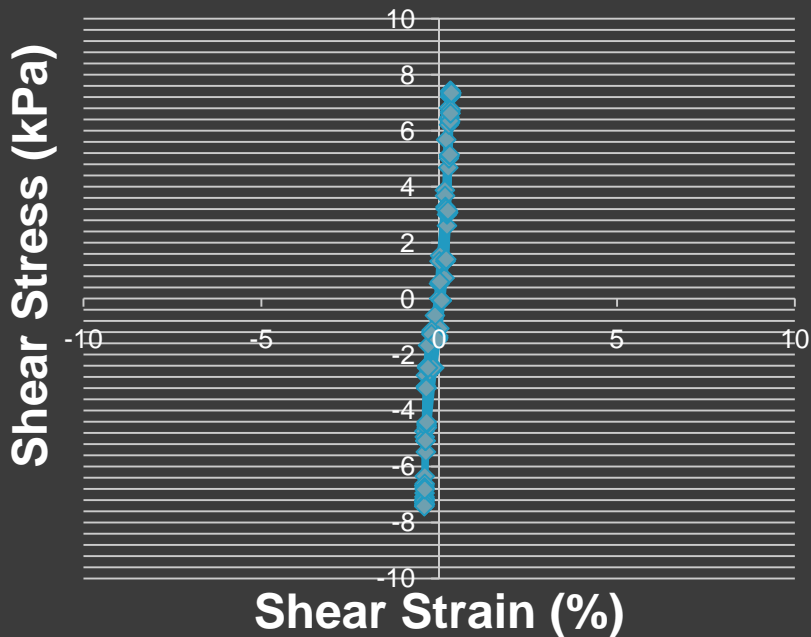
Shear Track II-DSS

In preparation of the sample different pieces of equipment were used.

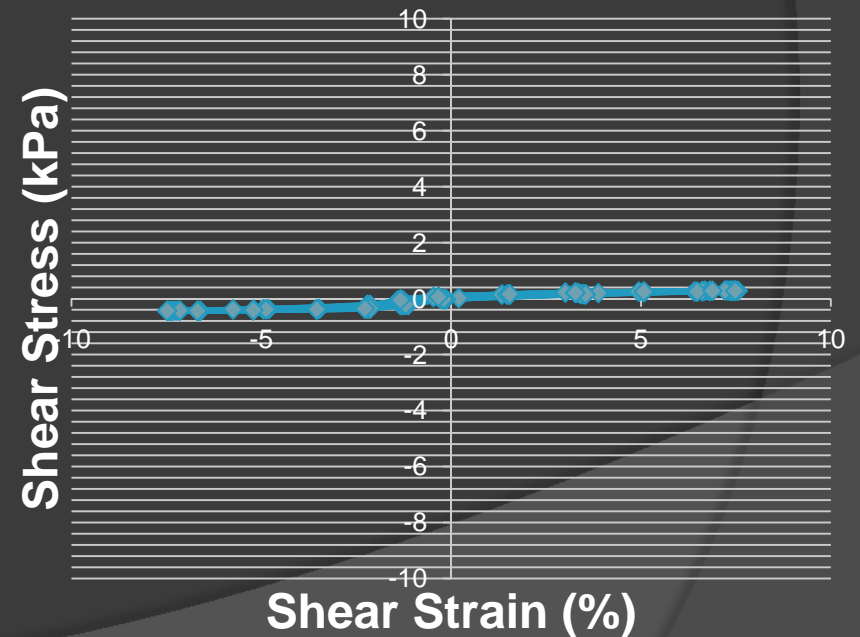


Based on the results obtained from one test there was modulus degradation.

**Shear Stress vs Shear Strain
(Cycle #1 to Cycle #5)**



**Shear Stress vs Shear Strain
(Cycle #1995 to Cycle #2000)**



Conclusion

- I have acquired a special interest in the field of geotechnical engineering, with a keen focus on bridge foundation.