

A CASE HISTORY

Restore a Settled Pedestrian Bridge

Job Description:

The pedestrian bridge was constructed in 1989 to provide a link across a parking area at a manufacturing facility in Frankfort, Kentucky. The walkway was supported on concrete encased W10x39 columns. The framework of the walkway used W24x68 girder beams. The failed foundation supports were on shallow concrete footings.

Background Information:

Excessive settlement was observed at two of the columns resulting in an obvious sag in the structure, cracks in the drywall and buckling of the ceiling tiles. The pavement around the columns was depressed, which allowed for ponding water. The engineers estimated settlement at 3 to 5 inches.

Cause of the Problem:

A review of the topographic survey by the engineers indicated that a line of karst ("sinkhole") depressions passed between the manufacturing buildings connected by the walkway. The walkway traverses the edge of the deepest of the filled depressions. Soil borings near the



failed footings revealed 13 feet of fill consisting of clay and rock fragments. Below the fill were 3 to 7

feet of silty to very silty clay with traces of organic matter. Refusal was encountered.

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Quick installation: Technician installs one of the four Atlas Resistance® Piers that supported and restored the footing and column. Notice that the hydraulic drive cylinder, the pier pipe and the pier head are carefully maintained in vertical alignment.

PROJECT SUMMARY

Number of Piers: 8
Part Numbers: AP-2-UF-3500.165 Pier
Avg. Pier Depth: 17.5 feet
Avg. Drive Force: 35,200 Pounds
Amount of Lift: 2-1/4" to 2-3/4"
Avg. Lift Force: 7,700 lbs. (Col. A); 15,450 lbs. (Col. B)
Factor of Safety: 4.3 : 1 (Col. A); 2 : 1 (Col. B)

Gentle, accurate lift: After each pier is driven to a suitable bearing stratum and tested (please see Installation Summary), the piers are gently and uniformly lifted using a manifold system and a hand operated hydraulic pump. Technicians carefully monitor the piers at all stages of installation.

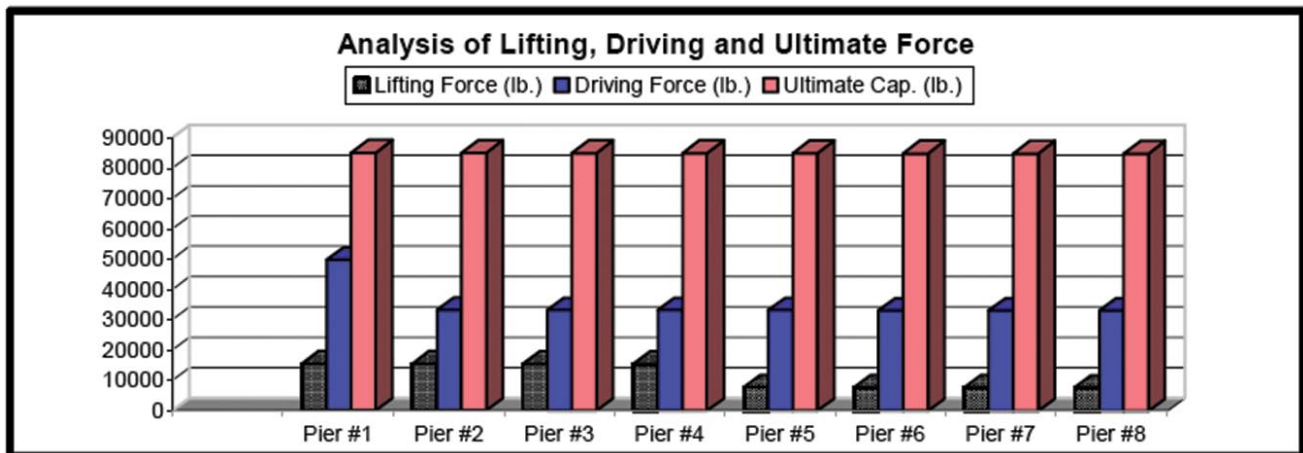


Success: Pier configuration after installation and restoration of the structure. Notice void below the footing indicating the 2-3/4 inch lift of the footing and structure.

INSTALLATION SUMMARY

Pier Installation Log

Pier Section	Location and Driving Force - pounds							
	Pier #1	Pier #2	Pier #3	Pier #4	Pier #5	Pier #6	Pier #7	Pier #8
Section #1	4,145	4,145	4,974	2,487	4,145	4,145	1,658	4,974
Section #2	6,632	5,803	6,632	5,803	7,461	9,948	7,461	6,632
Section #3	8,290	10,777	9,948	9,119	11,606	12,435	9,948	11,606
Section #4	16,680	13,264	14,922	33,160	33,160	33,160	33,160	33,160
Section #5	49,740	33,160	33,160					



Results

Location	Lifting Force (lb.)	Driving Force (lb.)	Ultimate Cap. (lb.)	Working F.S.	Ultimate F.S.
Pier #1	15,450	49,740	85,000	3.22 : 1	5.50 : 1
Pier #2	15,450	33,160	85,000	2.15 : 1	5.50 : 1
Pier #3	15,450	33,160	85,000	2.15 : 1	5.50 : 1
Pier #4	15,450	33,160	85,000	2.15 : 1	5.50 : 1
Pier #5	7,725	33,160	85,000	4.29 : 1	11.0 : 1
Pier #6	7,725	33,160	85,000	4.29 : 1	11.0 : 1
Pier #7	7,725	33,160	85,000	4.29 : 1	11.0 : 1
Pier #8	7,725	33,160	85,000	4.29 : 1	11.0 : 1

Factor of Safety

Approximate Lift (in.)	Depth to Bearing
2-3/4"	18' - 8"
2-3/4"	20' - 6"
2-3/4"	21' - 10"
2-3/4"	16' - 11"
2-1/4"	15' - 10"
2-1/4"	16' - 0"
2-1/4"	14' - 10"
2-1/4"	14' - 9"