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16. Abstract A research project has been carried out to ensure construction safety and verification of design assumptions, and to gain insights on the foundation structure behavior of Bridge CUY-90-15.24, the Central Viaduct, also known as the Inner Belt Bridge, which is part of the Interstate Highway System in Cleveland, Ohio. The objectives include: (i) providing real-time measurements to allow project engineers to make sensible but critical decisions, (ii) long-term monitoring as part of bridge maintenance program to assess maintenance needs, (iii) re-assess design assumptions so that new knowledge can be gained and applied for future projects, (iv) Advance the knowledge on soil structure interactions and slope stabilization techniques, (v) form valuable database for current FHWA development of LRFD (Load Resistance Factor Design) for substructures, (vi) Perform FEM (Finite element Method) Simulation (Verified with Field Measurements) to provide further details of substructure behavior. During the course of the project, the following tasks have been successfully accomplished. (a) A series of analyses were performed for the existing slope condition to assess the strength parameters of the soil, in particular, the strength parameters of the slip surfaces. (b) As part of the planning process, the instrumentation plan of various types of sensors was developed and incorporated in the final design plan. (c) Real-time monitoring of all sensors has been successfully carried out. (f) As part of the study, a FEM program PLAXIS was employed to perform a numerical simulation. The FEM simulation process involved the calibration of soil properties to match the initial inclinometer reading from B-103 during initial site excavation. (g) After the installation of the drilled shafts, a lateral load test on drilled shafts # 1 and # 3 was successfully conducted. (h) Instrumented anchors # 1, # 8, and # 17 were performance tested. Instrumented anchor # 9 was creep tested. (i) The measured data, together with detailed FEM simulation results, have provided a powerful and insightful picture of the behavior of the slope and the foundation structures.			
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