

**MAY 20, 2020**

Wednesday, May 20, 2020

4:00 - 5:30 (1.5 PDH)

## CASE HISTORY REVIEW

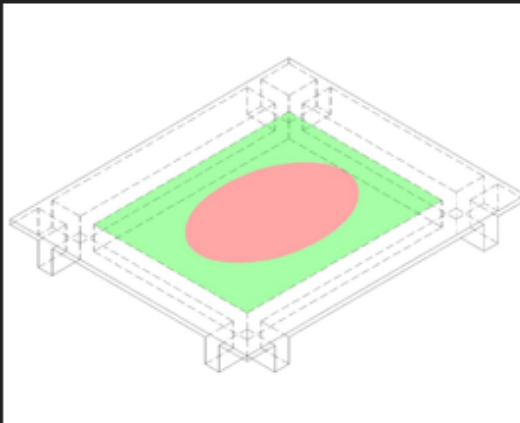
THIS CASE HISTORY REVIEW IS USED AS AN EXAMPLE OF HOW TO:

- IDENTIFY CRITICAL PERFORMANCE ISSUES
- WHAT METHODS SHOULD BE USED IN EVALUATING ELEVATED FOUNDATIONS
- PROVIDING RECOMMENDED DETAILS
- PROVIDE FINAL DESIGN THAT COMPLIES WITH ACI 318 CONCRETE DESIGN CODE WITH LOADS SPECIFIED BY ASCE 7-16, AND SUPPLIES SAFE DUCTILE AND REDUNDANT PERFORMANCE.

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- WHEN A CONCRETE SLAB IS ELEVATED IT IS GENERALLY PLACED IN TWO-WAY BENDING
- TWO-WAY BENDING CAUSES TENSION IN TOP OF SLAB AT THE EDGES AND TENSION AT THE BOTTOM IN THE CENTRAL REGION

**GREEN** – TENSILE FOR TOP EDGES



**RED** – TENSILE FOR BOTTOM CENTRAL REGION

DEPICTION OF A CONCRETE FLAT PLATE BOUNDED BY GRADE BEAMS ON ALL SIDES

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### PRESENTATION

4:00 - 5:30 (1.5 PDH)

Title : Case History and Design Review of a Lifted Slab on Grade Foundation

Speaker : John M. Clark, P.E. w/ John Milton Clark Engineers

John M. Clark, PE is the principal and owner of John Milton Clark Engineers Inc., and is a licensed professional engineer in Texas, New York, and Arizona. Mr. Clark holds a Master of Science in civil engineering from Oklahoma State University in 1976, with emphasis in advanced structural engineering and design, and foundations engineering; and a Bachelor of Science degree in physics from Central State University in Edmond OK in 1972, with minors in mechanical engineering and mathematics. John is also an FPA member of long standing, former board member and past president (2009).

Mr. Clark is a past FPA President and currently sits on the FPA Structural Committee where he co-chairs the FPA-SC-22 Subcommittee on elevating slab on ground foundations multiple feet for flooding or other reasons.

Mr. Clark worked three years in the pre-stressed concrete manufacturing industry as a quality control inspector and engineer. He next spent about one year with an A & E firm in Oklahoma City working on foundation designs and interstate highway bridge design, and about three years in the petrochemical design field at Bechtel in Houston working as a structural design engineer. He spent 12 years with Owens Corning Fiberglas' Non-corrosive Products Division in its Product Development Group in Conroe, TX, working in the areas of fiberglass tanks and buried FRP tanks and pipe.

**ABSTRACT** : This presentation will include the case study of a lifted slab on grade foundation. Testing was performed on an existing lifted slab on grade to determine conditions. An in depth analysis of the foundation was performed and the results compared to repaired state.

This case study will compare the as built repair to the required improvements. The presentation will include a review of ASCE and ACI code requirements for loads and design plus analytical methods employed. The presentation will compare methods of analysis, how to obtain accurate analysis, and a final design that provides ductile behavior with redundancy. The presented methods will demonstrate how to investigate and design a safe elevated foundation that meets code requirements.

Design review includes loads to piers, analysis of slabs with low reinforcing, and how to maintain compliance with design codes.

A brief discussion is provided for slabs without reinforcing.

## **PAST PRESENTATION SUMMARIES**

To read summaries of previous FPA presentations by John M. Clark, please click:

[November 9, 2019](#) - Bulkhead Failures - Inspections, Repair and Analysis

[June 10, 2015](#) - Seismic Design of Flexible Buried Structures - Applied to tanks, Pipe Lines and Rigid Rectangular Culverts

[August 13, 2013](#) - The PTI Ver. 3 Design Method for MATHCAD 15

[May 8, 2013](#) - How to use Mathcad to do contour and surface plots for foundations

[November 9, 2005](#)- Homebuyers Guide for Foundation Evaluation

[February 20, 2002](#)- Design of Buried Structures and Some Similarities to Residential Foundation Design