

ARE WE TAKING CONCRETE REPAIR SERIOUSLY- AN INDUSTRY POINT OF VIEW

Md Sarwar Siddiqui , Ph.D.

David J. Rodler, P.E.

SK&A Engineers, Potomac, MD

Outline

- Definitions
- Repair Challenges
- Are we taking concrete seriously?
- Halsey Field House Column Repair
- Conclusions

Definition

Repair: to replace or correct deteriorated, damaged, or faulty materials, components, or elements of a structure.

Rehabilitation: the process of repairing or modifying a structure to a desired useful condition.

Restoration: the process of reestablishing the materials, form, and appearance of a structure to those of a particular era of the structure.

Repair Challenges?

- Pre-existing condition
- Unforeseen condition
- Resource constrain (One stage vs multi state repair)
- Unavailability of construction documents
- Access issue
- Constrain in repair methodology
- Work schedule
- Weather Condition
- Aesthetic/ Architectural
- Historic Structure

Are we Taking Concrete Seriously?

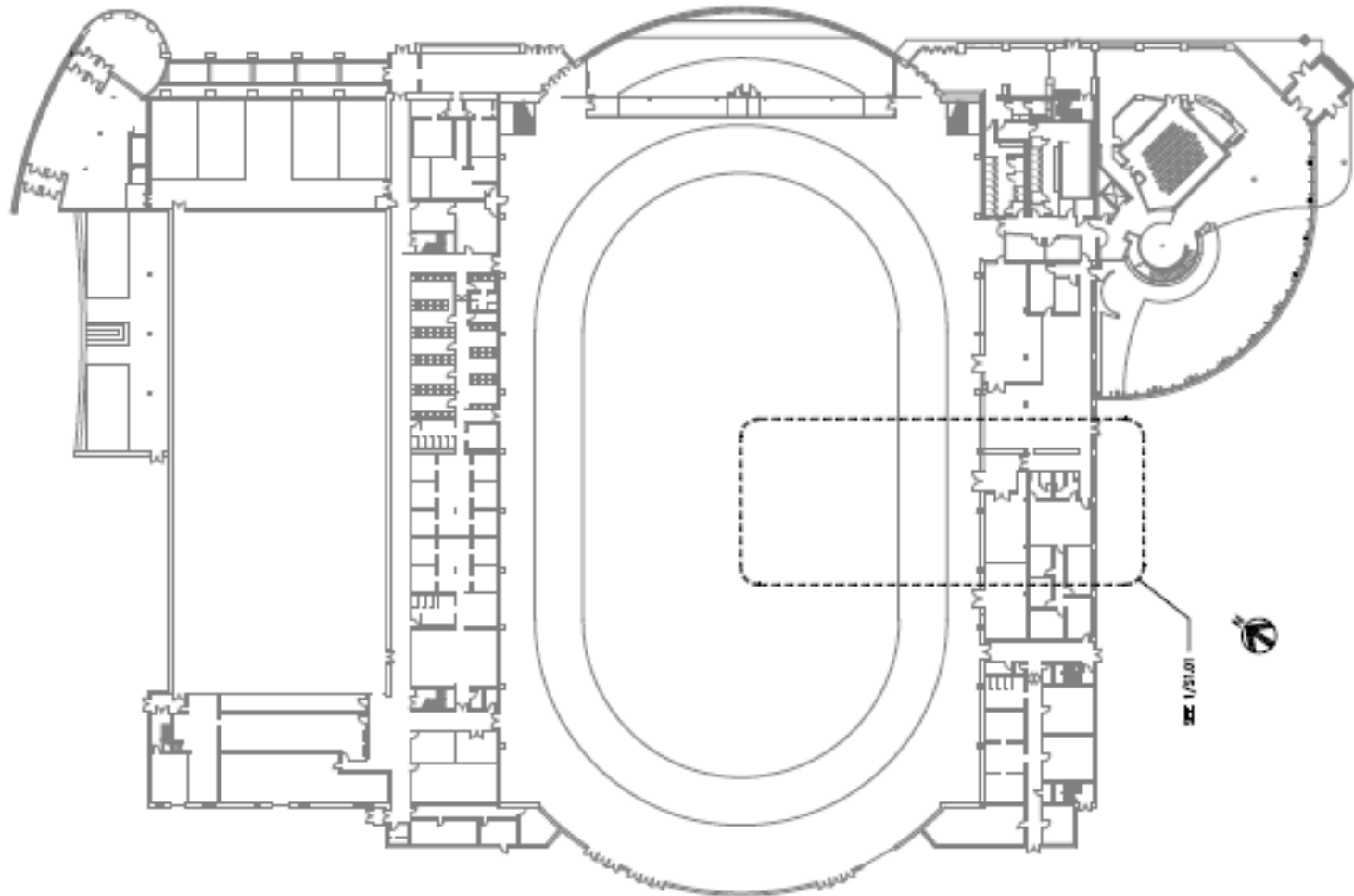
- Insufficient knowledge of concrete
- Concrete is cheap; a mix of water, cement and aggregate (stone)
- Poor quality control
- Lack of skilled repair workers
- Moisture intrusion protection

Halsey Field House Column Repair

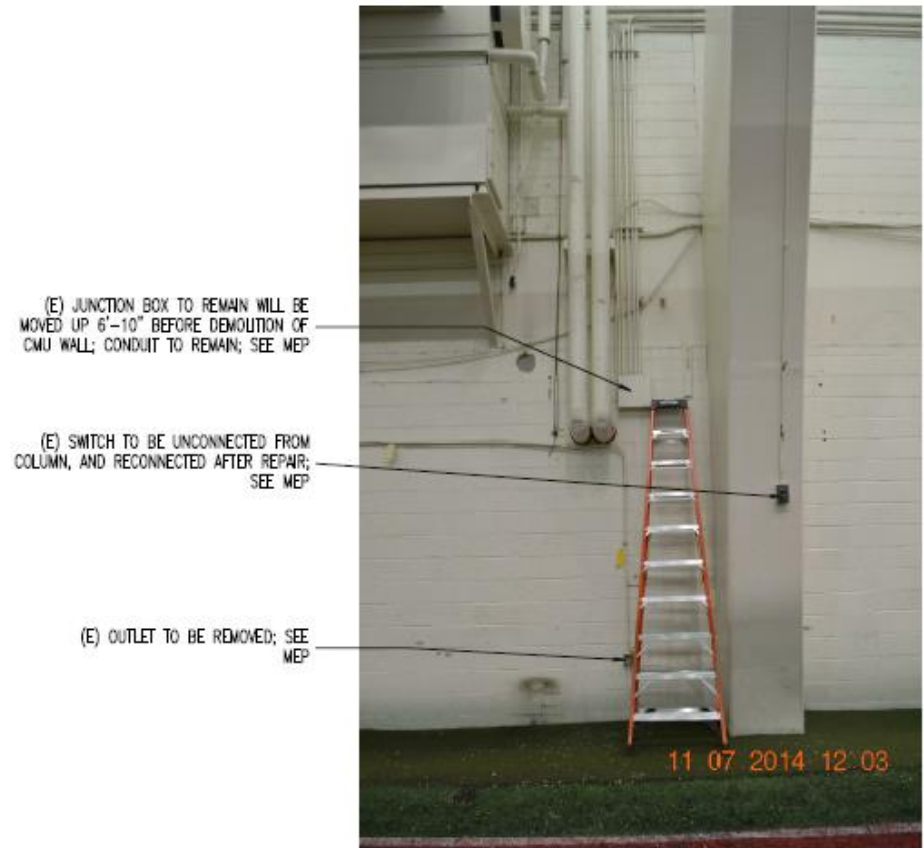
SK&A



Project description



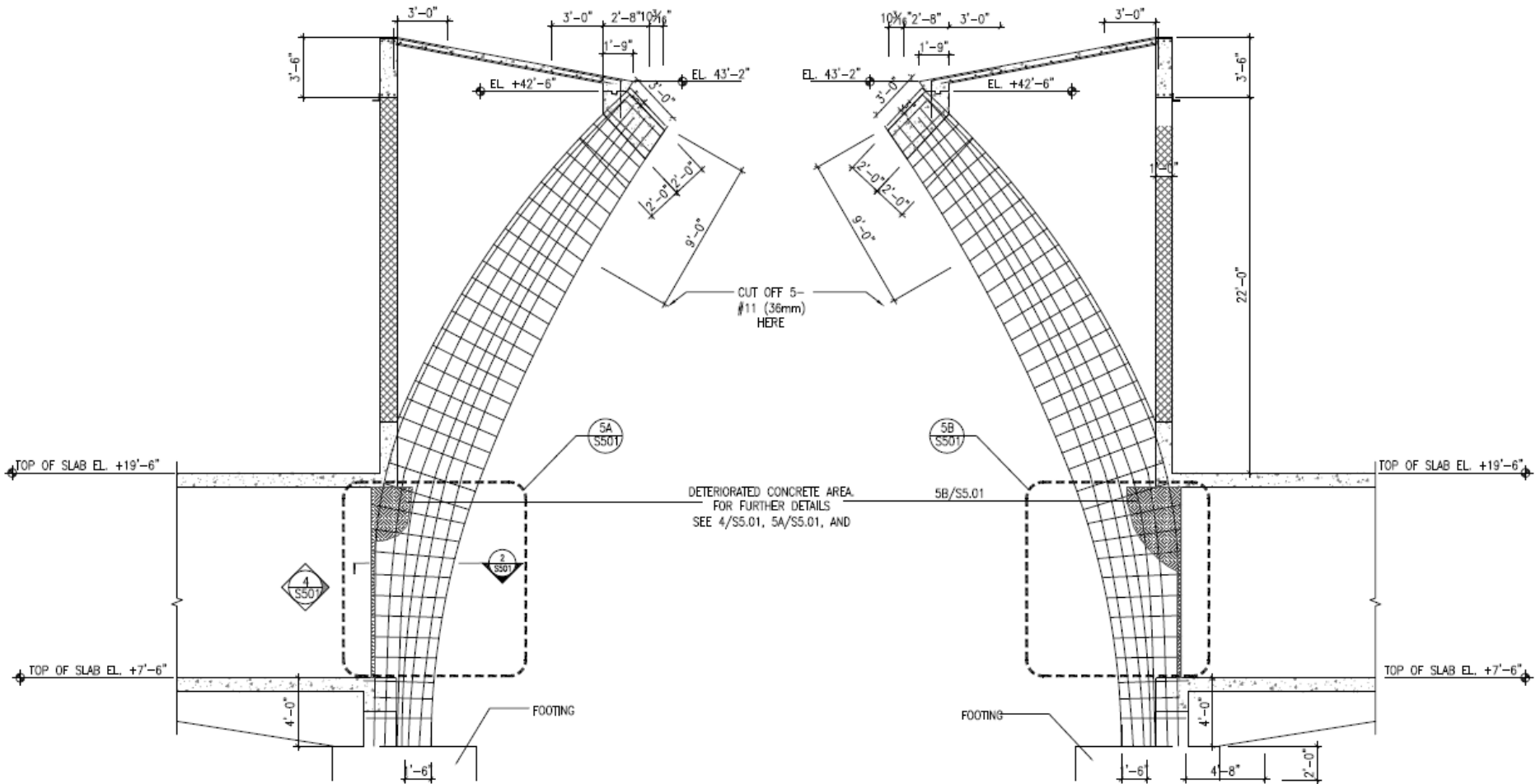
Project description



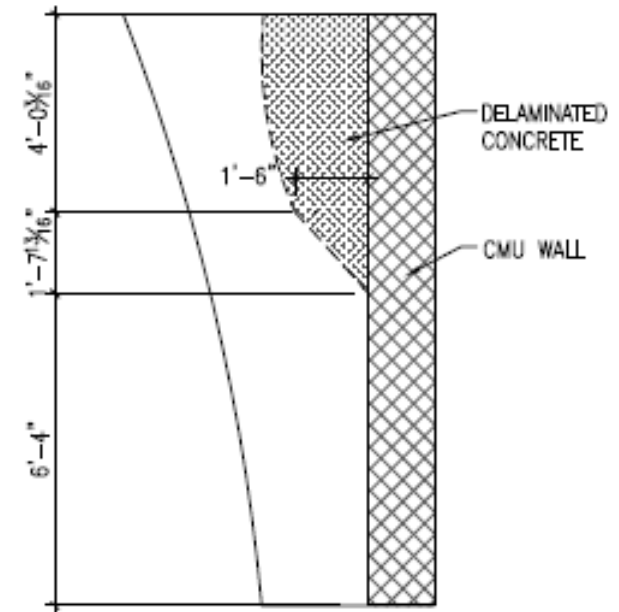
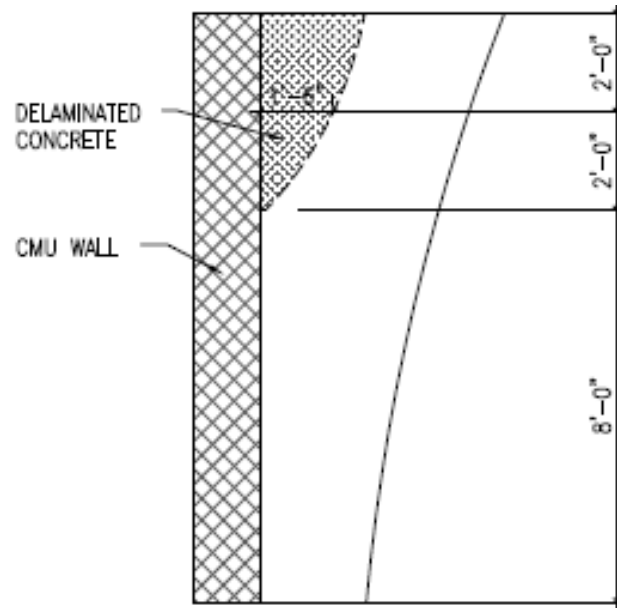
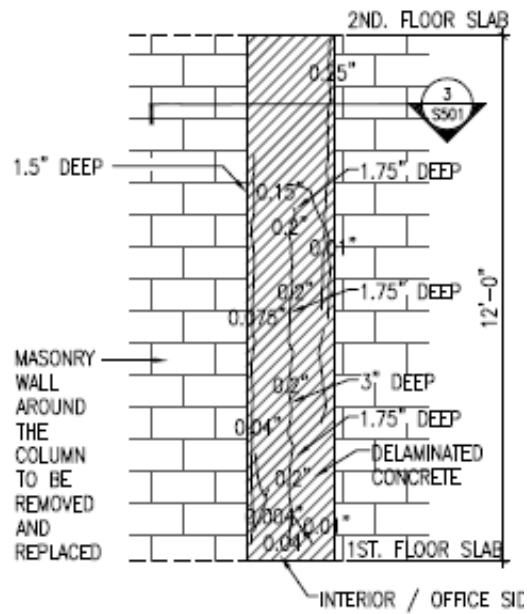
What are the challenges?

- Adjacent office rooms can not be disturbed and will be operational during the construction.
- Dust has to be contained within the work zone. Therefore, no concrete demolition is allowed.
- Repair procedure is specified by the owner.
- Specified repair methodology: Epoxy injection with CFRP strengthening.
- Existing MEP components has to be temporary uninstall and reinstall/relocate after repair.
- Aesthetically has to match with existing.

Project description

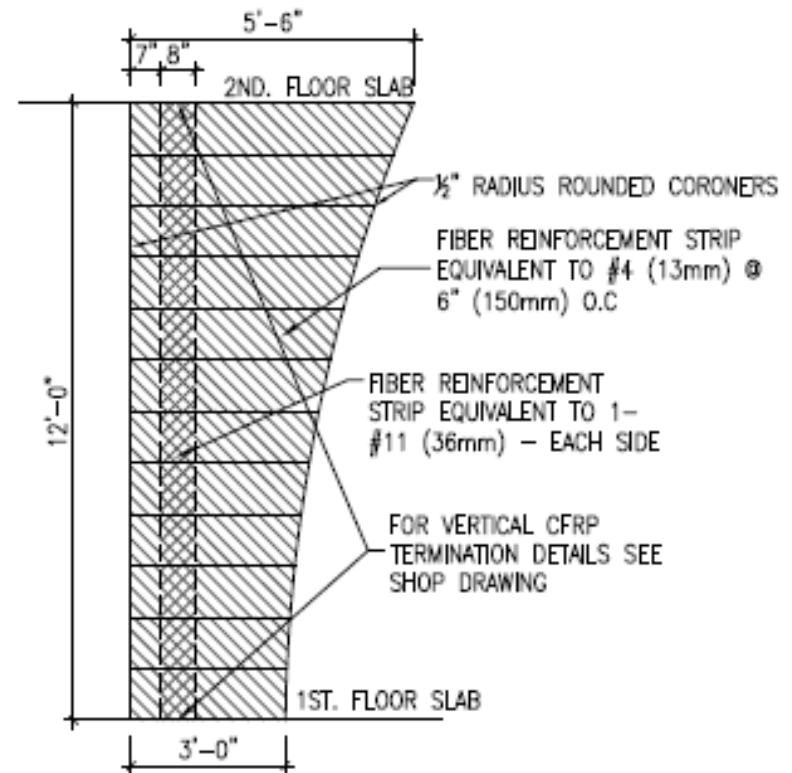
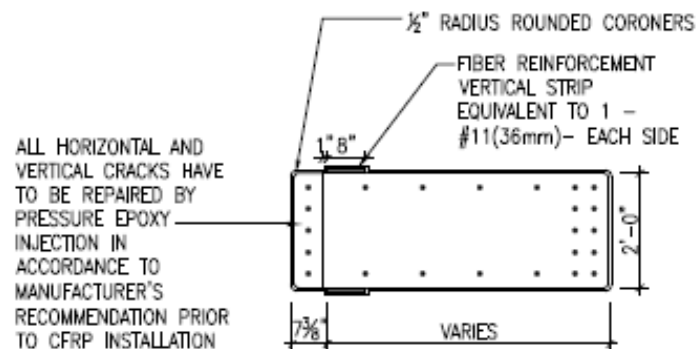


Project description

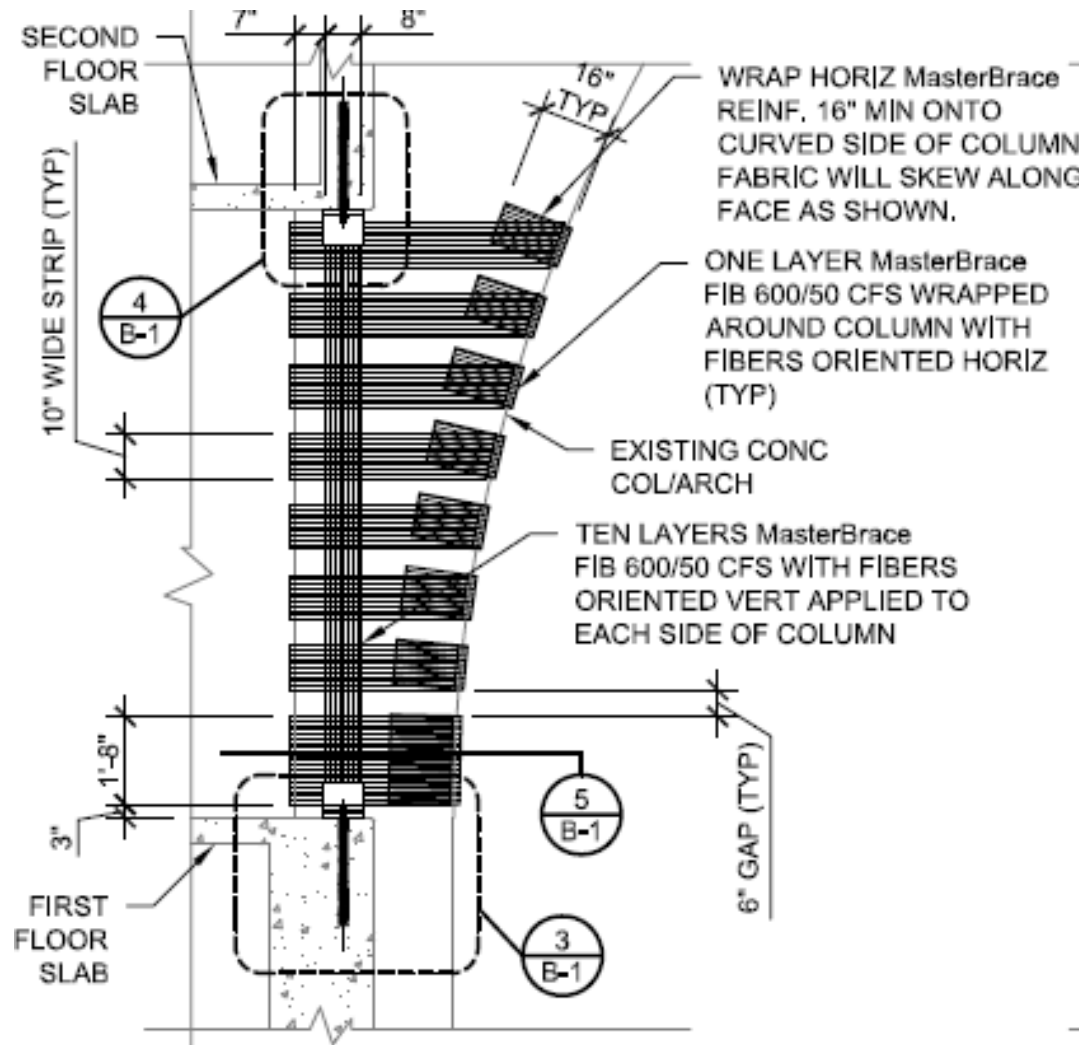


Repair criteria

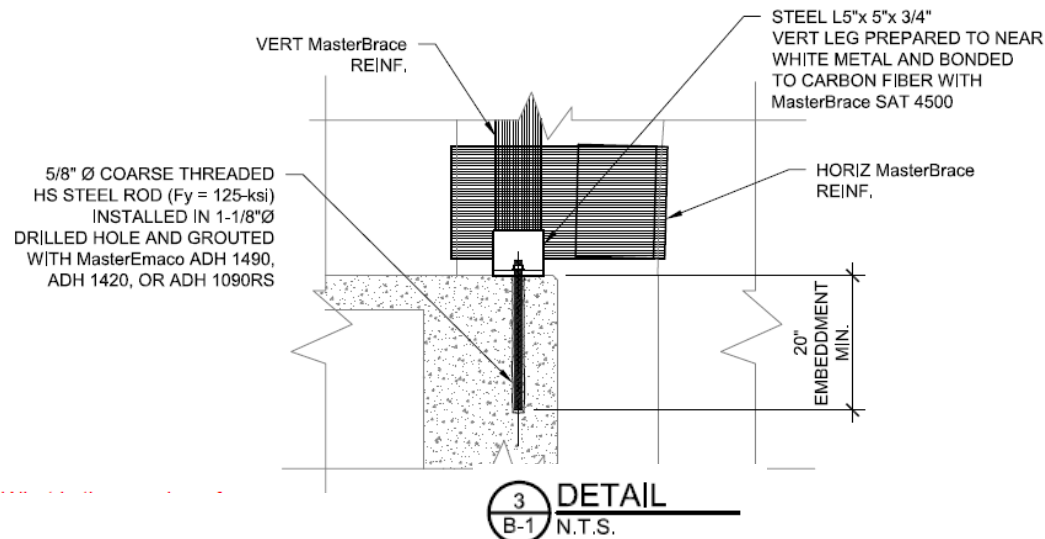
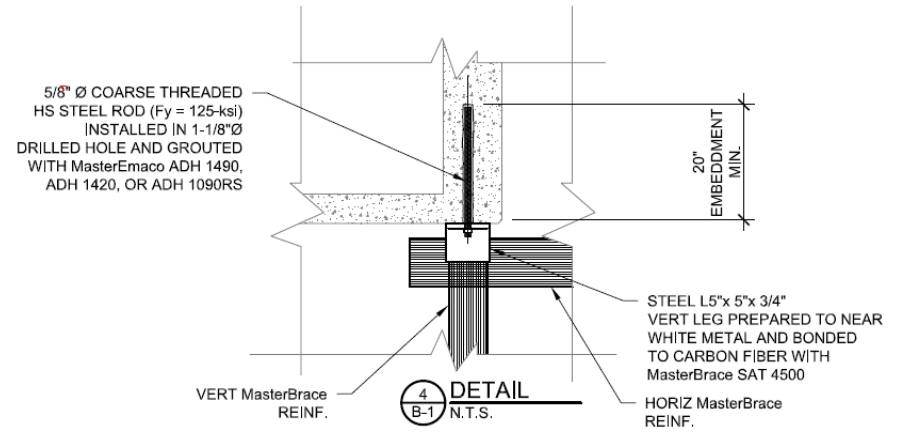
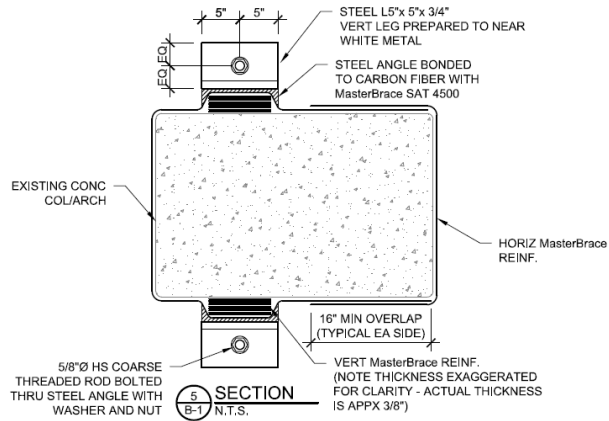
- Epoxy injection for existing cracks
- CFRP to address reinforcement loss



CFRP design



CFRP design



Conclusions

- Repair is challenging. Existing condition, unforeseen condition, resource constrain are some of the few important causes of these challenges.
- One repair may have multiple viable solutions.
- Best solution always may not be the viable solution for a particular project. Repair scheme should be selected based on the existing constraints and needs of the client.
- Selecting a correct solution is important. But, Quality Control is more important.







THANK YOU

Questions ?

Sarwar Siddiqui

sarwars@skaengineers.com