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

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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
Project description
Project description

- Damaged column to be repaired
- Conduit to be relocated before demolition of CMU wall; see MEP drawing
- Furring to be demolished 5 feet clear on either side of column, and replaced after repair
- All outlets to be free and covered during work. Verify in field if any outlets or switches exist within the area of demolition.
- Junction box to remain will be moved up 6'-10' before demolition of CMU wall; conduit to remain; see MEP
- Switch to be unconnected from column, and reconnected after repair; see MEP
- Outlet to be removed; see MEP
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

SECOND FLOOR SLAB

10" WIDE STRIP (TYP)

WRAP HORIZ MasterBrace
REINF. 16" MIN ONTO CURVED SIDE OF COLUMN FABRIC WILL SKEW ALONG FACE AS SHOWN.

ONE LAYER MasterBrace FIB 600/50 CFS WRAPPED AROUND COLUMN WITH FIBERS ORIENTED HORIZ (TYP)

EXISTING CONC COL/ARCH

TEN LAYERS MasterBrace FIB 600/50 CFS WITH FIBERS ORIENTED VERT APPLIED TO EACH SIDE OF COLUMN

FIRST FLOOR SLAB
CFRP design

5/8" Ø COARSE THREADED HS STEEL ROD (Fy = 125-ksi) INSTALLED IN 1-1/8" Ø DRILLED HOLE AND GROUTED WITH MasterEmaco ADH 1490, ADH 1420, OR ADH 1090RS

STEEL L5" x 5" x 3/4" VERT LEG PREPARED TO NEAR WHITE METAL AND BONDED TO CARBON FIBER WITH MasterBrace SAT 4500

VERT MasterBrace REINF.
HORIZ MasterBrace REINF.

20' EMBEDMENT MIN.

EXISTING CONC COLARCH
5/8" Ø HS COARSE THREADED ROD BOLTED THRU STEEL ANGLE WITH WASHER AND NUT
15" MIN OVERLAP (TYPICAL EA SIDE)
STEEL ANGLE BONDED TO CARBON FIBER WITH MasterBrace SAT 4000

HORIZ MasterBrace REINF.
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?

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