Park Plaza Post-Tensioned Parking Structure Demolition

Presenter:
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GOALS

• Review the following:
  – Detensioning Operations
  – Project Planning
  – Engineering Details
  – Project Execution
OPPORTUNITY

- Capitol View Corridor – Austin, TX

- It was decided to remove the top deck including columns and ramp

- VSL was brought in to develop a safe detensioning/demolition solution
DESIGN/CONSTRUCTION CHALLENGES

• Detensioning of concrete slab in a controlled manner
• Coordinate detensioning
• Tight project sites
• Mitigate risk to structure
• LEED Silver certification
• Accelerated schedule
THE STRUCTURE

• One Way Slab
  – 7” – 9” Thick

• Shallow-Wide Beams
  – 14” – 18” Thick

• Unbonded
  ½” fabricated strand

• Five Story Garage
  – 50’ – 6” Tall
ACCESS CHALLENGES

- Crane Access Limits
- Phase 2 Demo
- Access Road to Power Plant
- Phase 1 Demo
- RAILROAD WORK LIMITS
SOLUTION

• Engineer temporary shoring plan throughout garage
• “Let down” each post-tensioned tendon in a controlled manner
• Engineer removal process for all concrete elements
• Recycle concrete
DEMOLITION PLAN

1. Shoring
2. Access Definition
3. Piece Layout
4. Detensioning
5. Lifting Process
SHORING

- Stringers
- Walers
- Frame Scaffold
- Post Shores
- Post Shores

(picture of construction site with labeled elements)
ACCESS DEFINITION

• Various tower and crawler cranes were evaluated for use
• A 225 ton truck crane was chosen based off of mobility and ease of setup and teardown
DETENSIONING

1. Located tendons within the concrete deck using GPR (Ground Penetrating Radar)

2. Placed barricades around the perimeter deck

3. Cut tendons individually along lines that would be used to delineate pieces

4. Detensioning done during off peak hours

5. Detensioning done on Live End of tendon
LIFTING PROCESS

SHORT* RECTANGULAR / SQUARE SECTIONS
3 POINT PICK
*LONG SIDE LESS THAN 9'-6"
SHORT SIDE MAX = 8'-0"
CONCRETE REMOVAL - LAYOUT

Lug Locations

Concrete Piece Outline
The typical detensioning response was the pocket patch concrete coming loose and the strand releasing about 3” out of the slab.
CONCRETE REMOVAL - ACCESS

Phase 1A:
Max Radius – 100’-0”
Max Load – 15,000 LBS

Phase 1B:
Max Radius – 120’-0”
Max Load – 11,000 LBS

Phase 1C:
Max Radius – 140’-0”
Max Load – 9,000 LBS

Phase 1D:
Max Radius – 100’-0”
Max Load – 9,000 LBS

Phase 2A:
Max Radius – 165’-0”
Max Load – 5,000 LBS

Phase 2B:
Max Radius – 165’-0”
Max Load – 5,000 LBS
CONCRETE REMOVAL - LIFTING
CONCRETE REMOVAL - COLUMNS
PROJECT STATISTICS

• Duration:
  – 4 Months with a Month Delay Between Phases

• Resources:
  – 5,000 Man Hours Used to Complete Project

• Safety Results:
  – Zero OSHA Recordables
PROJECT STATISTICS

• Concrete Removed and Recycled:
  – 3,800,000 LBS or 425 Pieces or 25,000 SF
  – 40 Columns

• Cables Detensioned:
  – 575 Tendons

• Project was completed on time, on budget, safely and with a high level of...
CONCLUSIONS

• High level of planning created buy in by the project team
• Understanding and planning for hazards involved
• Project was able to move along efficiently and effectively
QUESTIONS?

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