

WALTER P MOORE

REVITALIZATION OF A DYING GARAGE

Answers to the Whats, Hows, and Whys

Sunil Puri, P.E.

October 16, 2015

ICRI: Modern Trends in the Repair Industry

Learning Objectives

1. Learn the critical aspects of **condition assessment** of a historic garage.
2. Learn about **strategies** to attain durable repair solutions.
3. Learn how **revitalization** prepares the parking structure for the next generation.

Agenda

Introduction

Assessment

Repairs

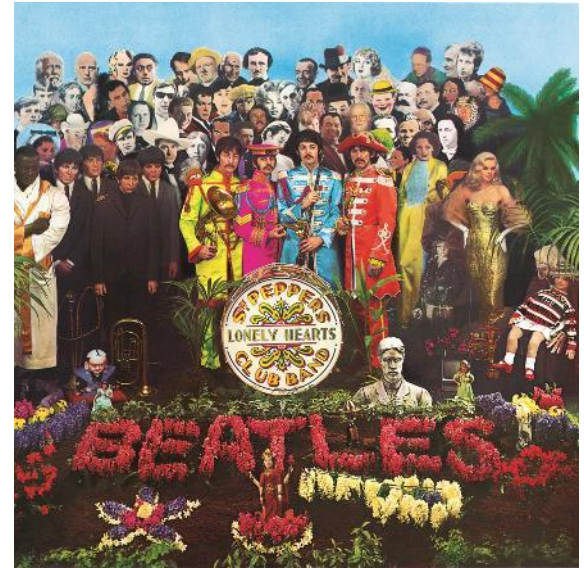
Delivery

Impact

WALTER P MOORE

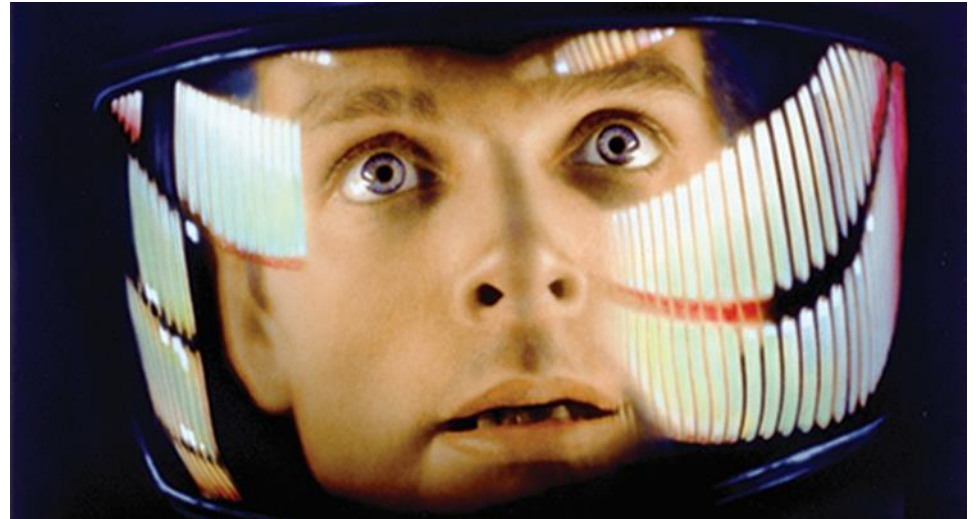
1960s

Beatle's *Sgt Pepper's Lonely Hearts Club Band* wins Grammy



1960s

2001: A Space Odyssey
is released



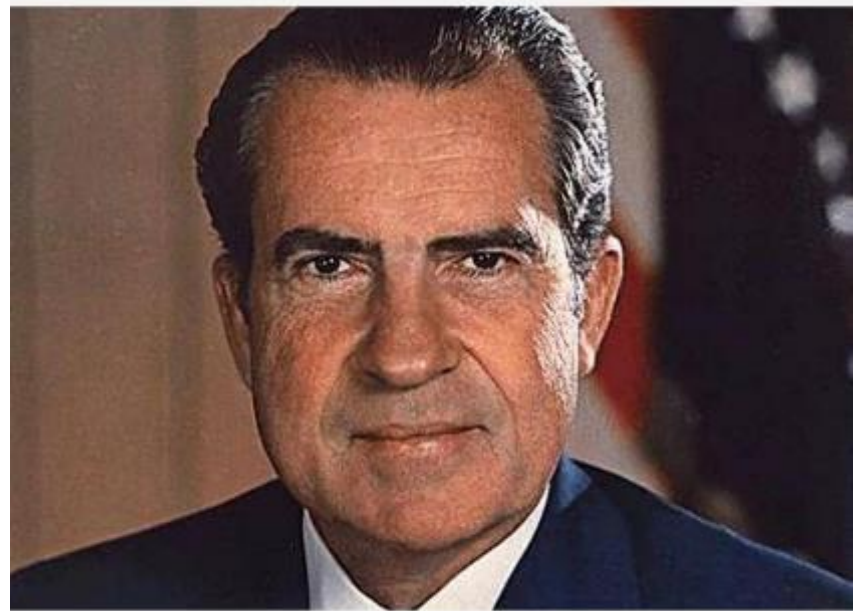
1960s

First Boeing 747
was launched



1960s

Richard Nixon
becomes president



Remember When...

1960s



Introduction

Assessment

Repairs

Delivery

Impact

WALTER P MOORE

1960s

Protests against
the Vietnam War

Helix Garage
was built





COUNTY CLERK

LEFT LANE
MUST
TURN LEFT

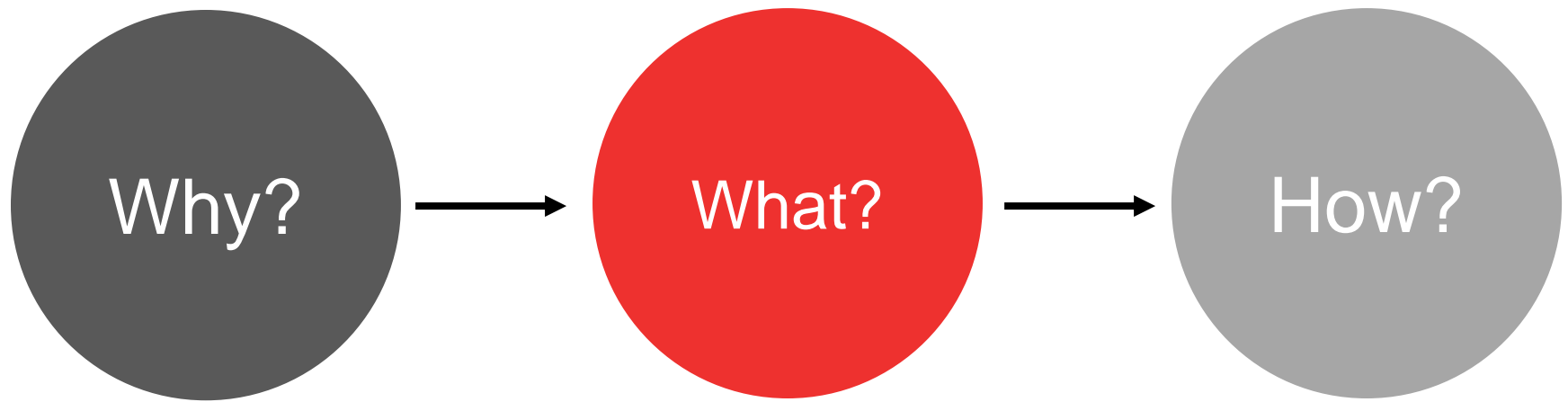
ANNEX GARAGE

WORLD OF PIZZA

PHILIP'S

A red-tinted photograph of an industrial interior. The scene shows a concrete wall on the left with a grid-like pattern, possibly a brick or block wall. In the center, there is a doorway or opening leading to a darker area. To the right, there is a large, dark rectangular structure, possibly a door or a piece of machinery. The floor is dark and appears to be made of concrete. The overall atmosphere is dim and industrial. The word "ASSESSMENT" is overlaid in white, bold, sans-serif capital letters in the center of the image.

ASSESSMENT



Half-century
OLD

28,600
sq. ft. / level



6
levels

Cast in place,
Conventionally reinforced
CONCRETE



1 Visual Assessment

2 Partially Destructive Testing

3 Nondestructive Testing

Healthy?



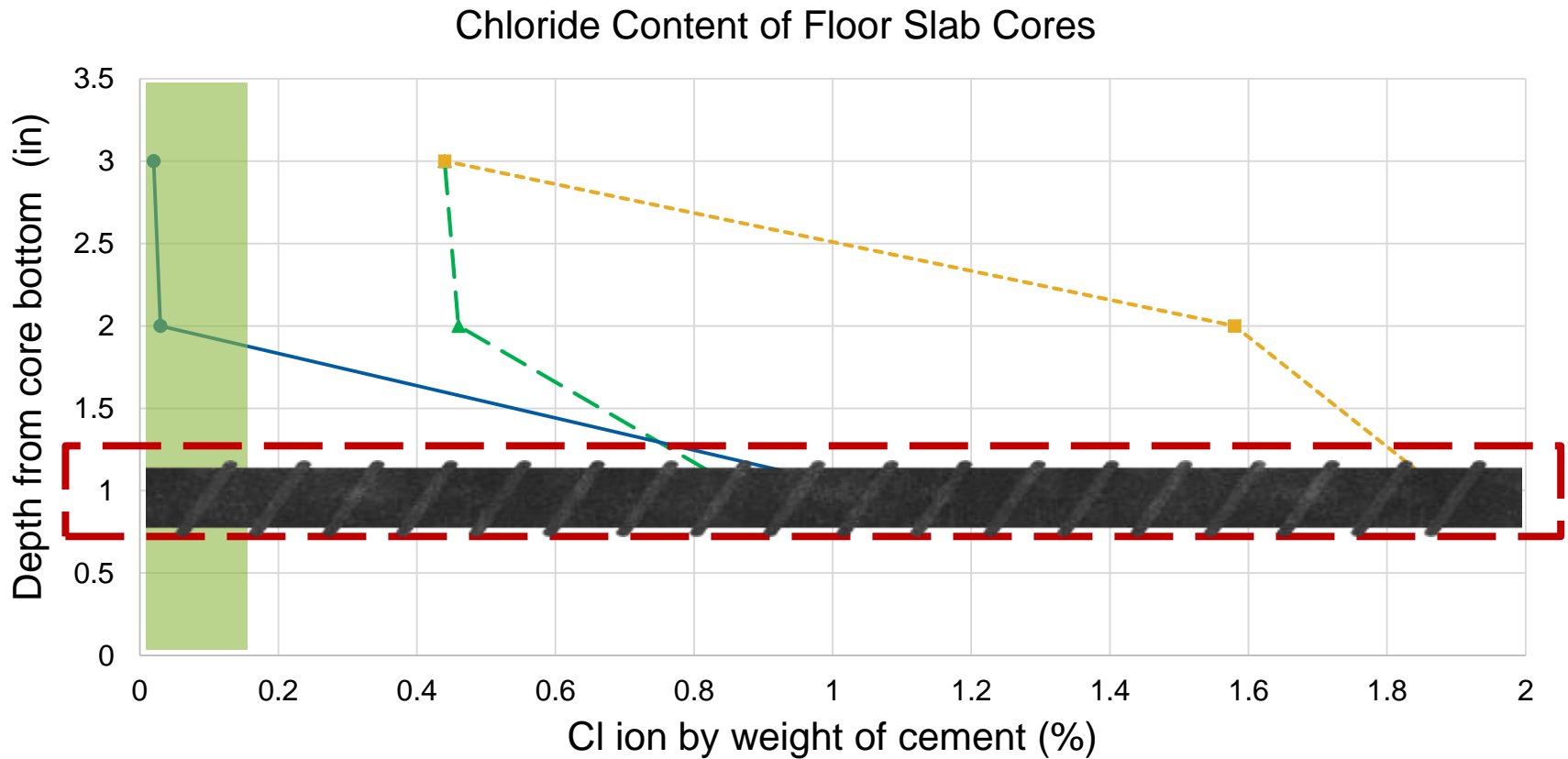
1 Visual Assessment



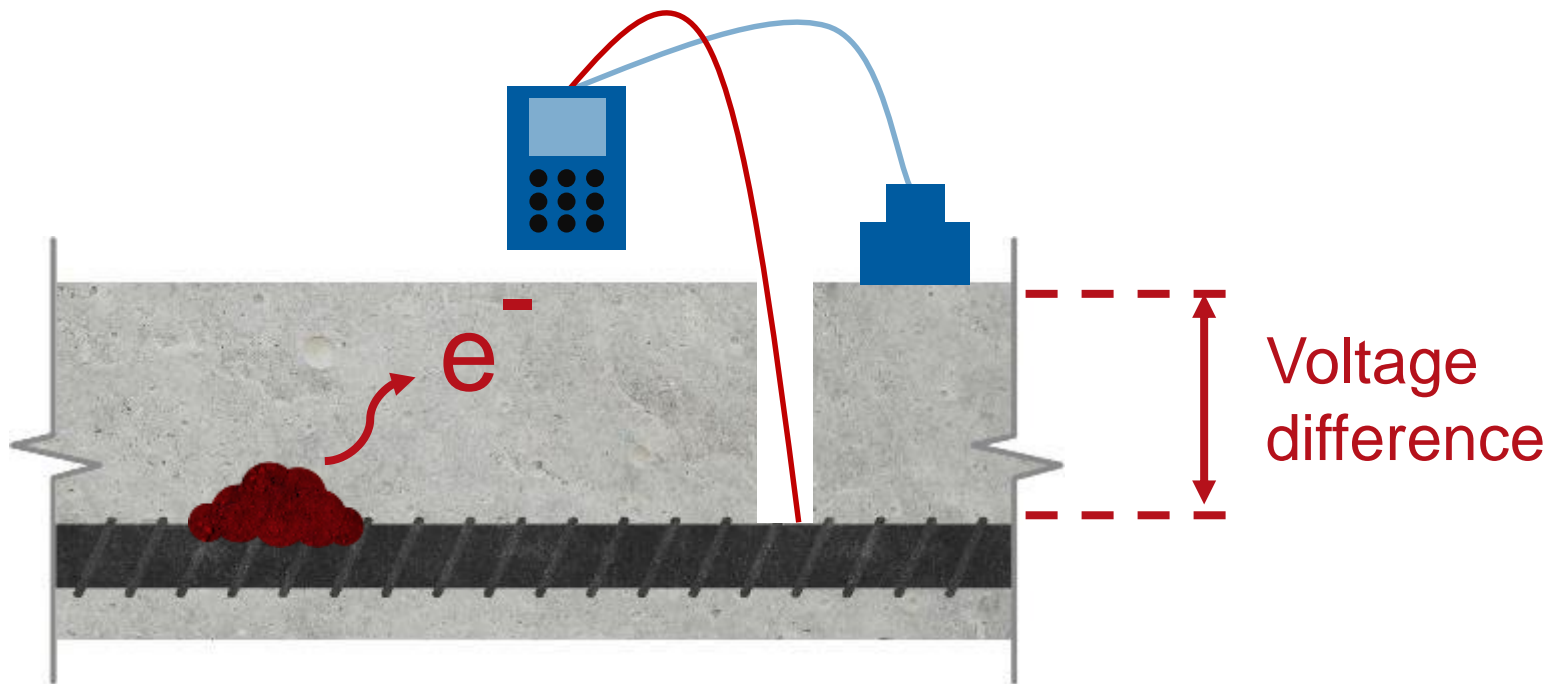
1 Visual Assessment



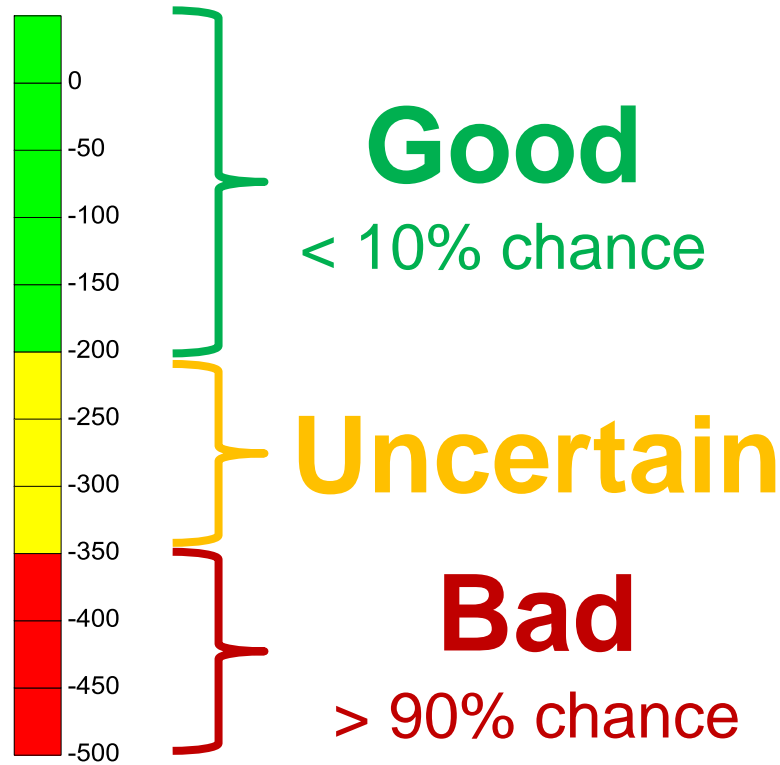
2 Partially Destructive Testing → Chloride Content



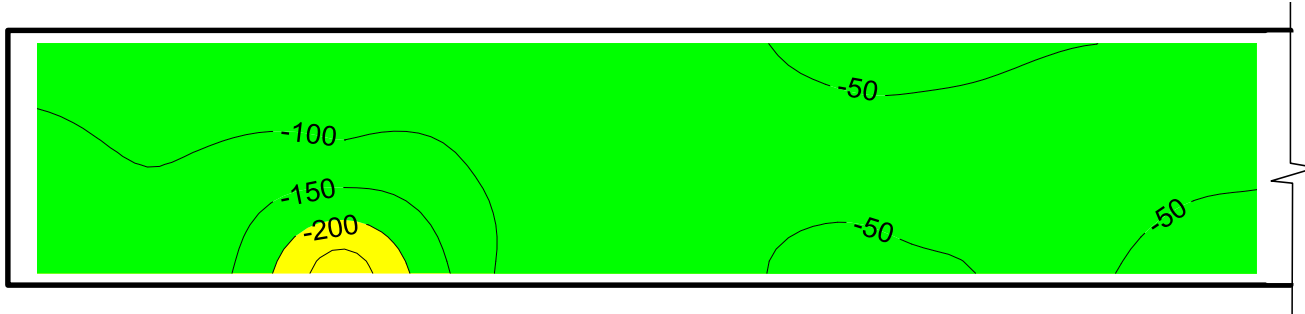
3 Nondestructive Testing → Half-cell Corrosion Potential



3 Nondestructive Testing → Half-cell Corrosion Potential



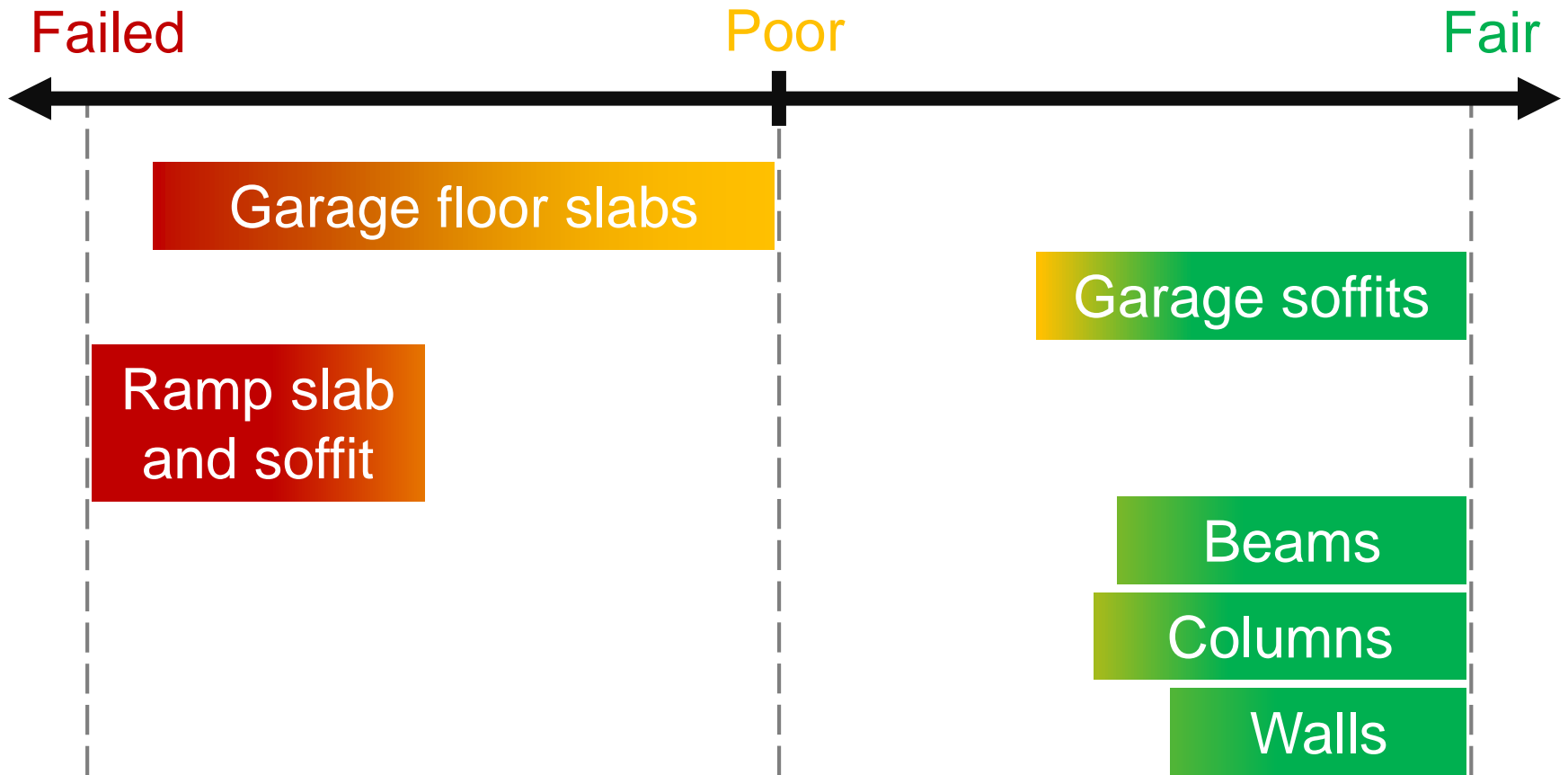
3 Half-cell Corrosion Potential



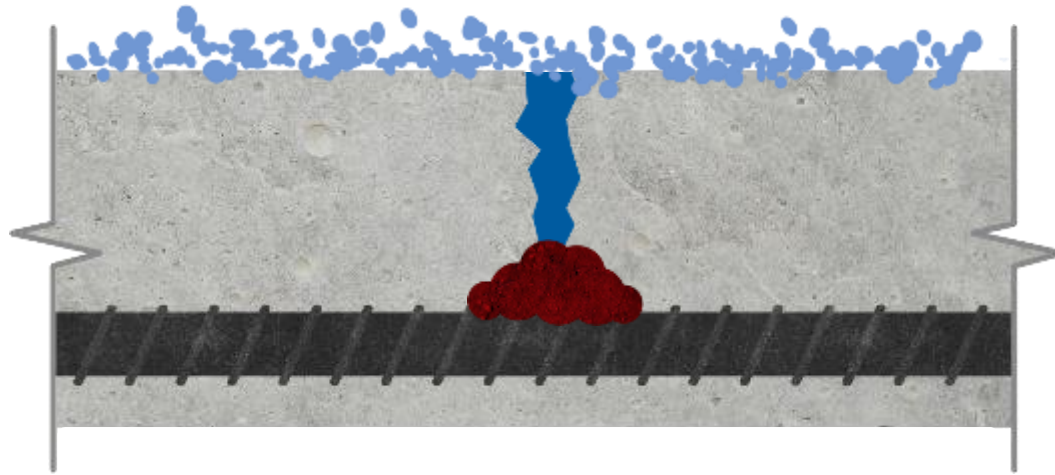
3 Half-cell Corrosion Potential



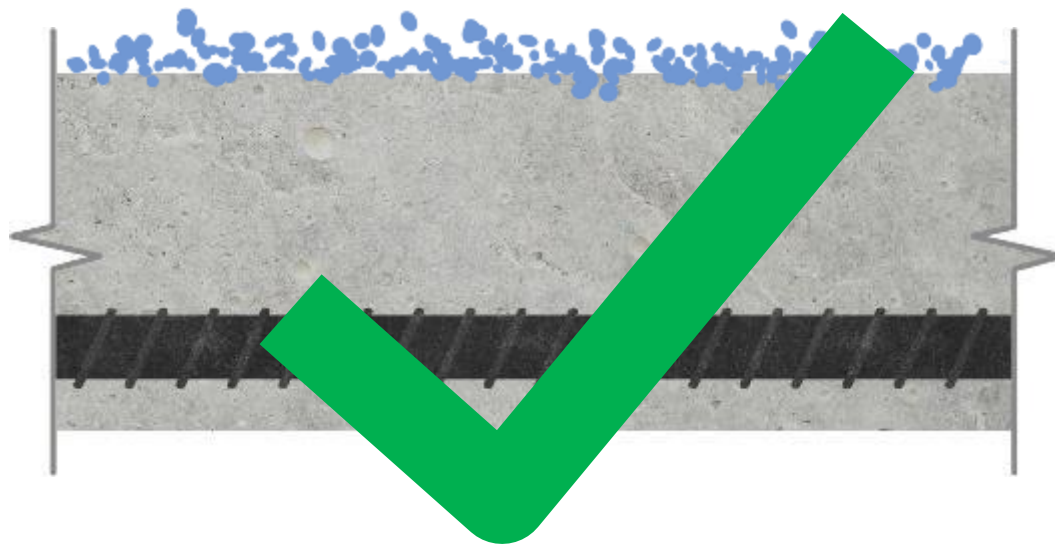
Results



Results



Results



An aerial photograph of a large stadium, likely a football stadium, with a red overlay. The stadium's seating tiers and central pitch are visible. The text "REPAIR OPTIONS" is centered in white, bold, uppercase letters.

REPAIR OPTIONS

Structural Repair Alternatives

Floor Slabs

localized patching **vs.** strip

Helix Ramp

Slab/soffit **vs.** entire ramp

Waterproofing

sealer **vs.** membrane

Expansion Joints

repair **vs.** replace

Immediate

- Replace helix ramp slab
- Floor slab and soffit repair of levels 2 - 3

High

- Floor slab and soffit repair of levels 4 – 6
- Concrete crack and spall repair
- Expansion joint repair

Medium

- Apply waterproofing membrane
- Add cathodic protection to reinforcement steel

Enhancements

- Additional concrete repairs
- Apply waterproofing membrane to walls and columns
- Steel Panels & Lights

Repair Options

I

II

III

IV

Immediate

High

Medium

Enhancements

Repair Options

I

II

III

IV

Immediate

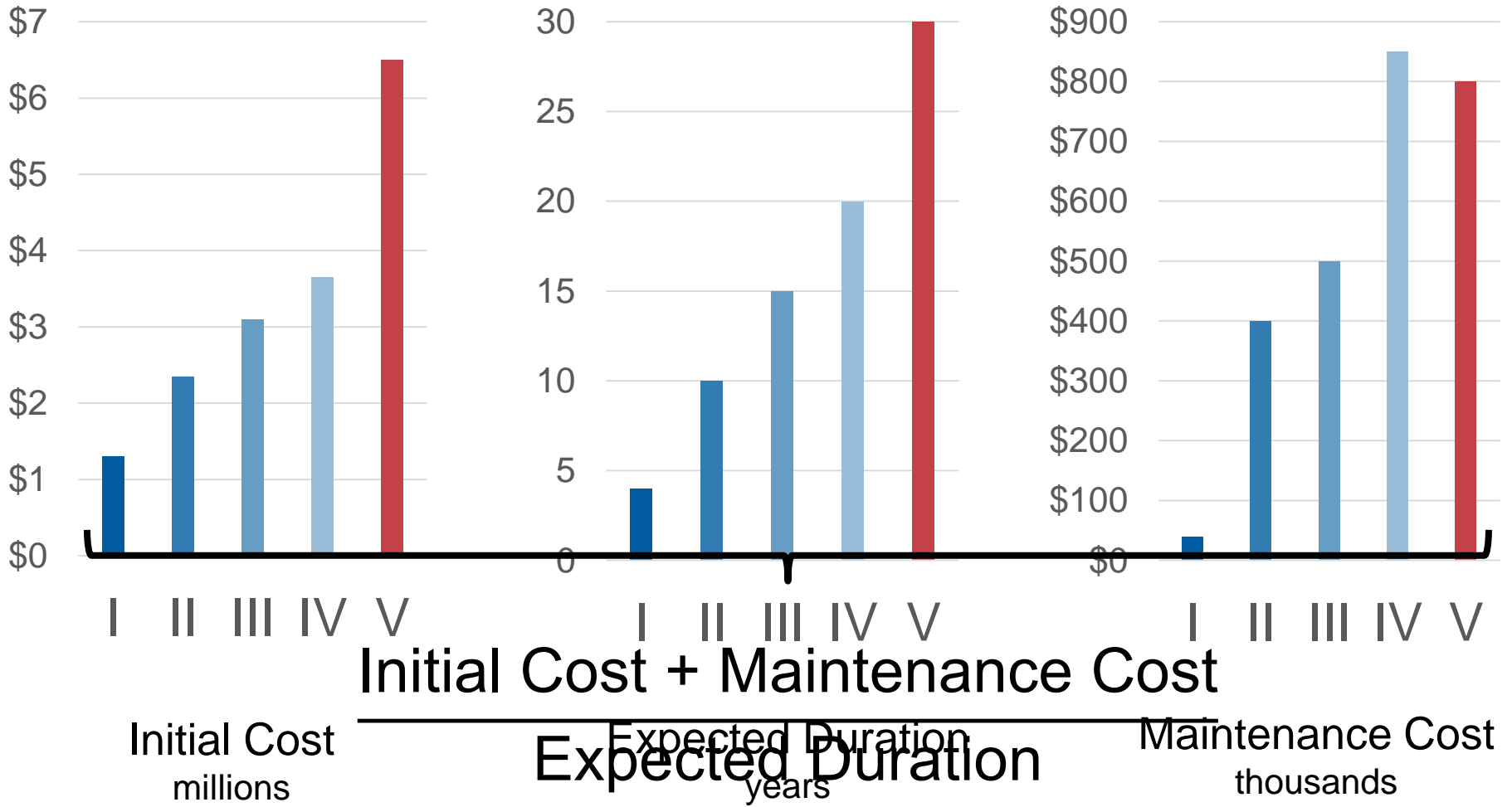
High

Medium

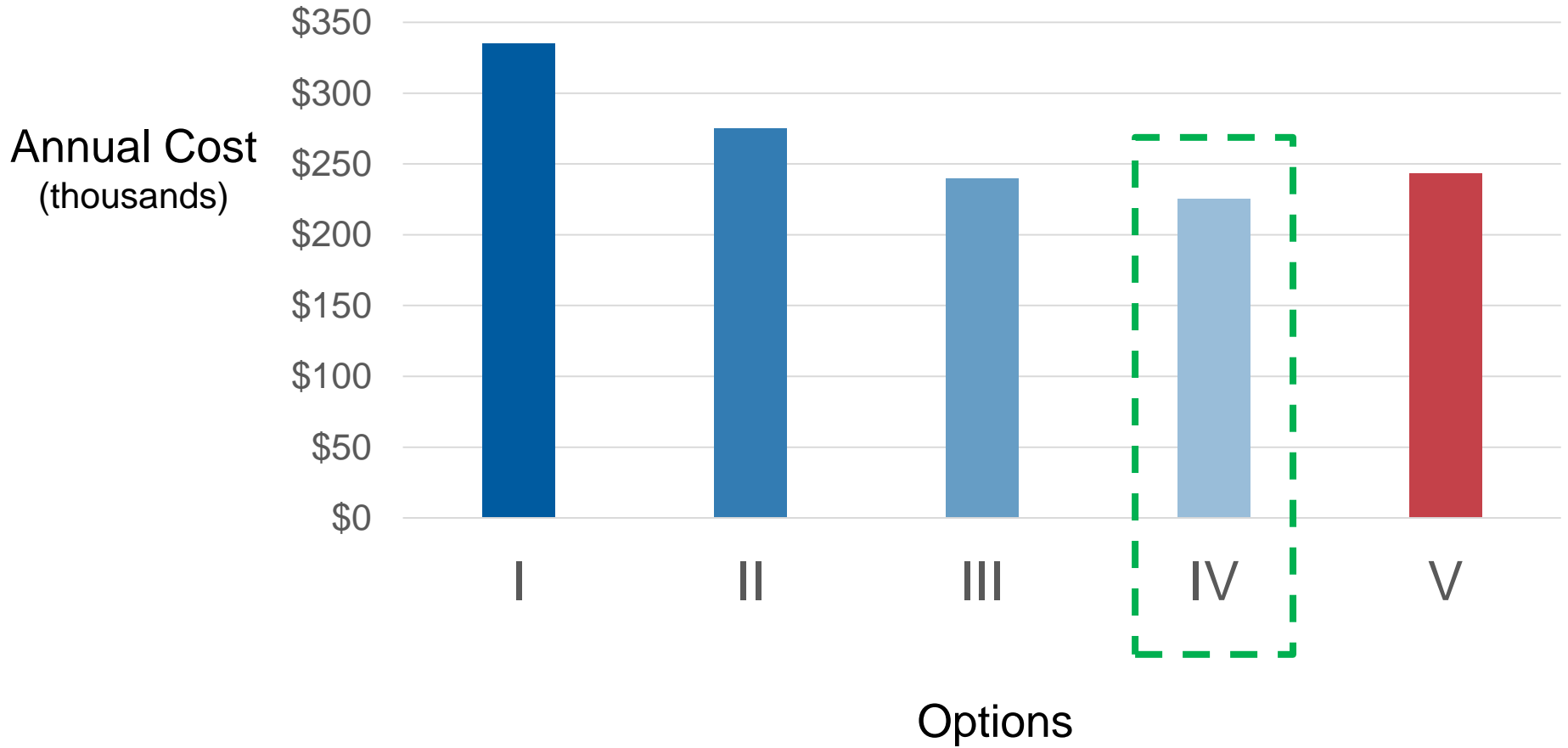
Enhancements

V demolish and replace

Opinion of Probable Cost



Opinion of Probable Cost





DELIVERY

- Dowel pull-out testing
- Concrete cylinder testing
- Reinforcing steel inspection
- Acceptability to receive traffic coating
 - Moisture vapor emission rate
 - Alkalinity
- Membrane pull off testing

Quality Assurance – Dowel Pull-Out Test

24

dowels / level

Loaded to

4500lb

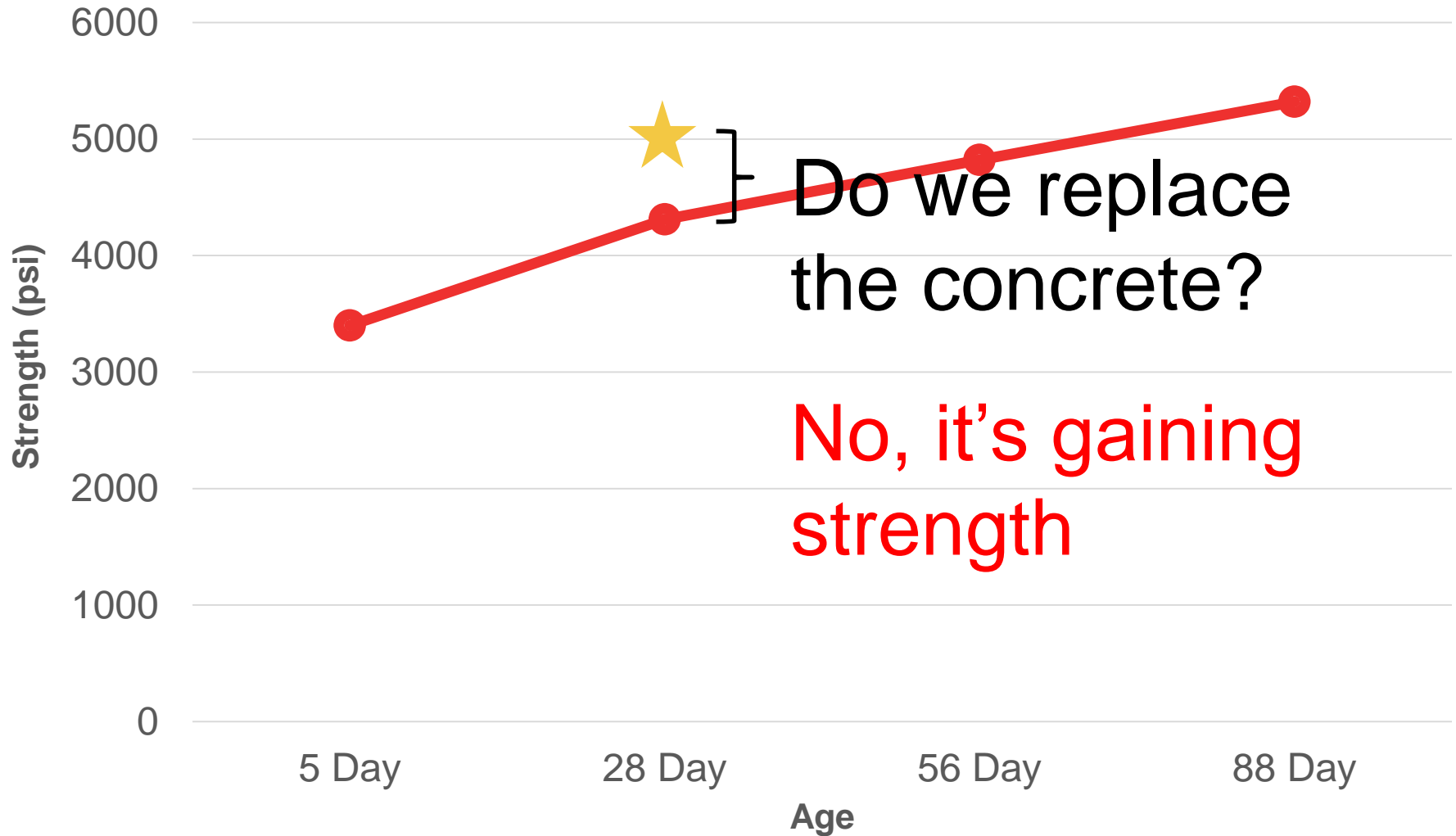
In tension

Held to verify

creep



Quality Assurance – Concrete Compressive Strength



Unique details

1 Helix ramp

2 Beam shear strengthening with supplemental ties

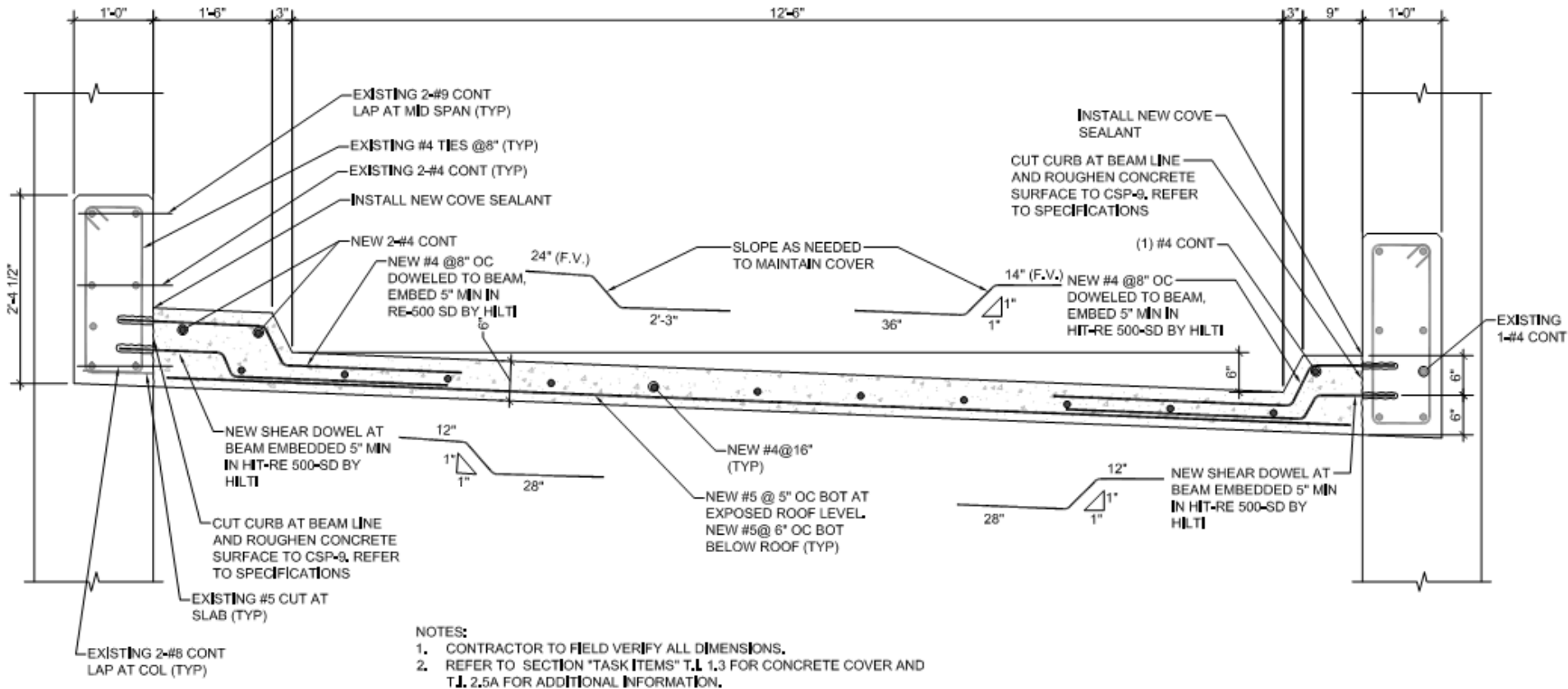
3 Column strengthening



Helix Ramp - Shoring



Helix Ramp



Helix Ramp



Helix Ramp



Introduction

Assessment

Repairs

Delivery

Impact

WALTER P MOORE

Helix Ramp



Introduction

Assessment

Repairs

Delivery

Impact

WALTER P MOORE

Floor Slabs



Introduction

Assessment

Repairs

Delivery

Impact

WALTER P MOORE

Waterproofing



Introduction

Assessment

Repairs

Delivery

Impact

WALTER P MOORE

Waterproofing



Introduction

Assessment

Repairs

Delivery

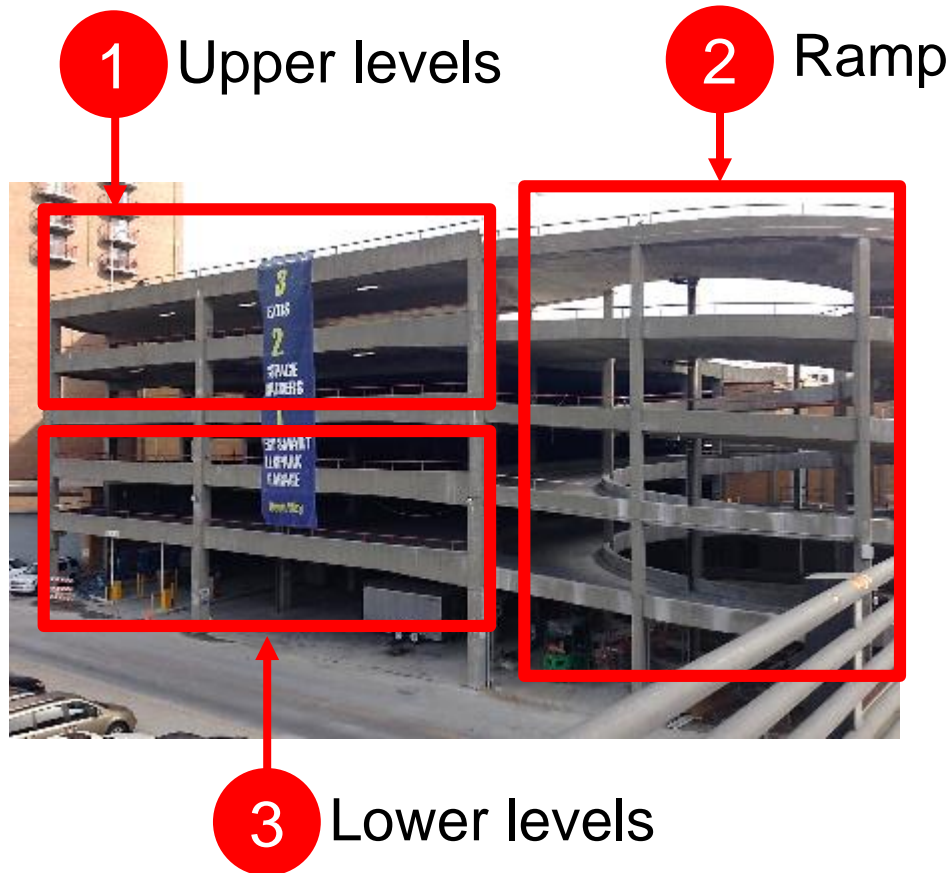
Impact

WALTER P MOORE

On Site Challenges

- 1 Existing office under first supported level
- 2 Fuel tank on ground level
- 3 Electrical room complications
- 4 Noise and dust





Garage remains
open
during early phases

Contractor provides
\$50,000
deduct for access

Schedule reduced by
8 weeks

Q-1: How many parking levels garage has?

A-1: - Six

Q-2: Which nondestructive testing method was used to evaluate structural members?

A-2: Half-Cell Corrosion Potential Testing

Q-3: Which repair alternatives were considered for floor slab repairs?

A-3: Localized Patching & Strip Repairs

Aesthetic Improvements – Façade



Option I



Option II



Option III

Aesthetic Improvements – Façade



Aesthetic Improvements – Façade



Introduction

Assessment

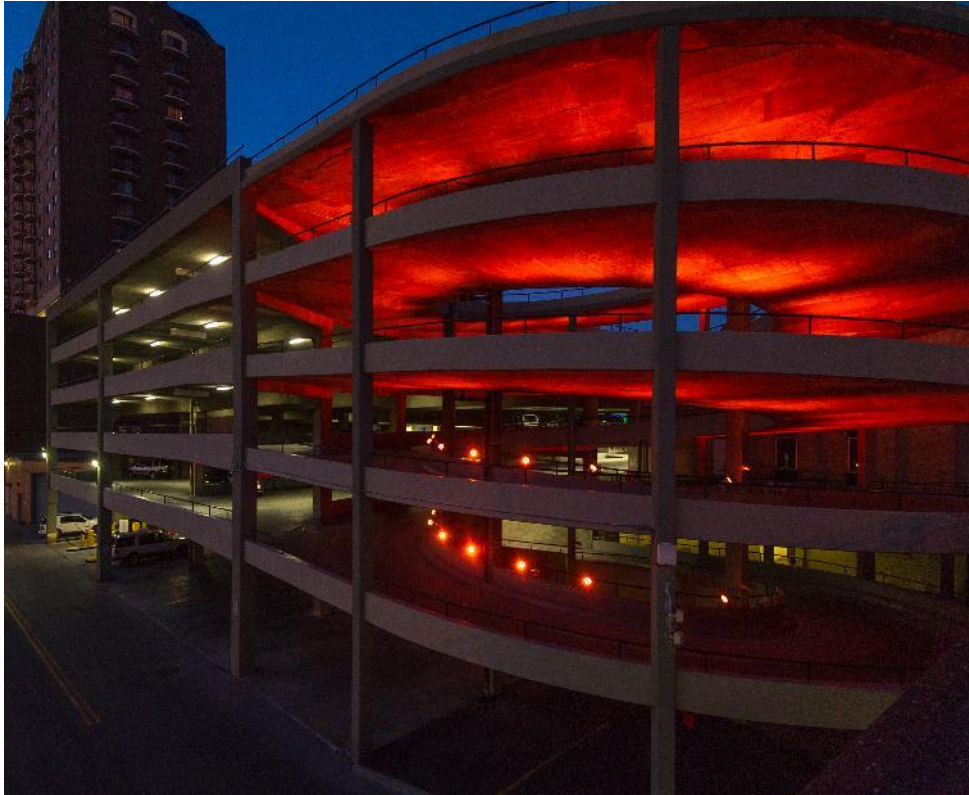
Repairs

Delivery

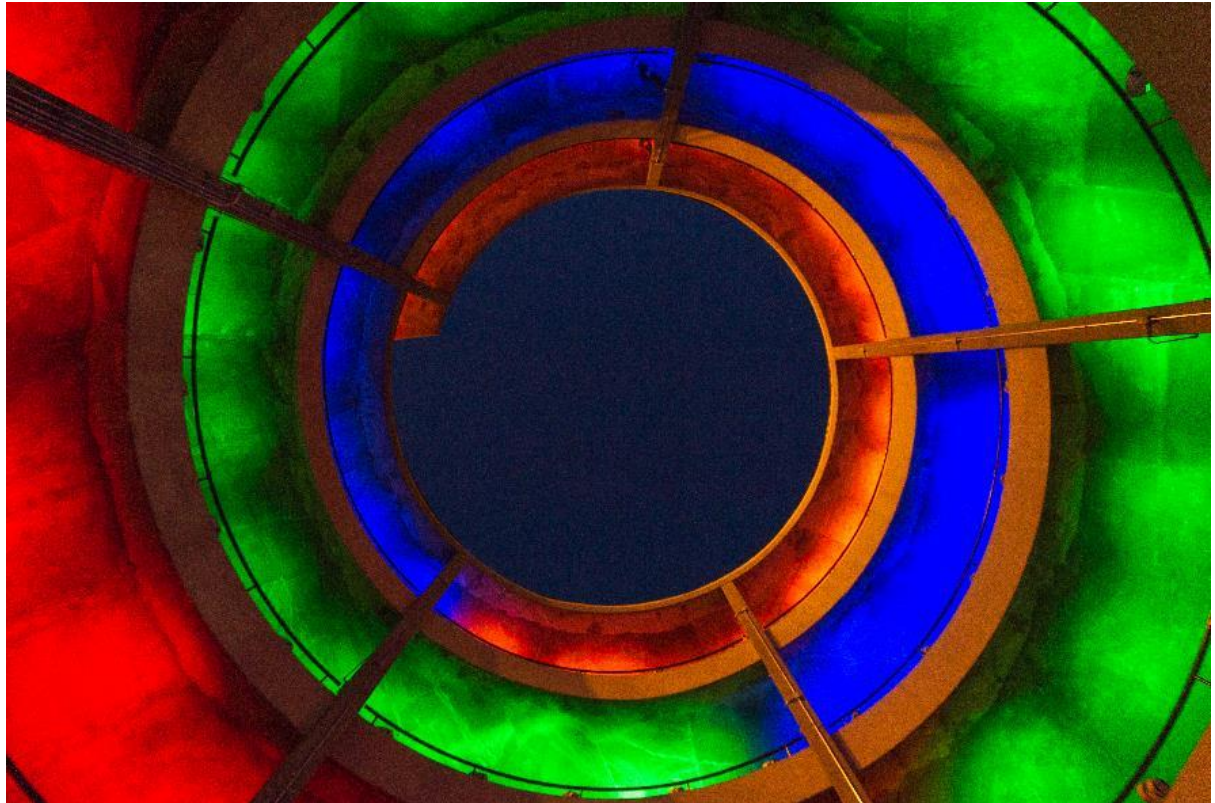
Impact

WALTER P MOORE

Aesthetic Improvements – Programmable LEDs



Aesthetic Improvements – Programmable LEDs



Aesthetic Improvements



Introduction

Assessment

Repairs

Delivery

Impact

WALTER P MOORE

The background of the image is a photograph of a modern building's exterior, characterized by a repeating pattern of slanted, rectangular panels. The entire image is overlaid with a uniform red color. The word "IMPACT" is centered in the middle of the image in a white, bold, sans-serif font.

IMPACT

Part of Community



Introduction

Assessment

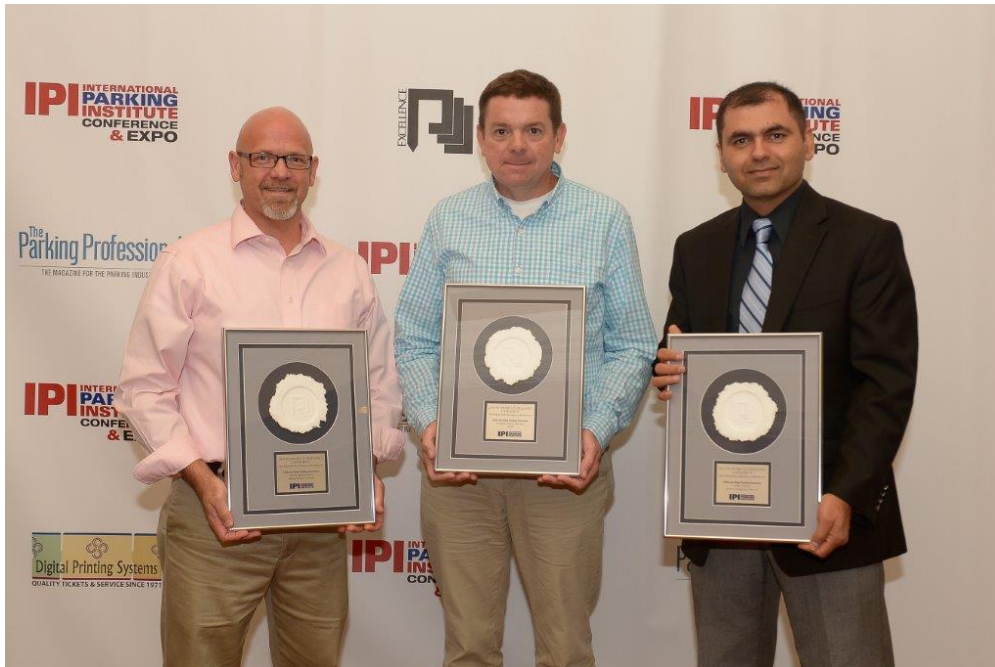
Repairs

Delivery

Impact

WALTER P MOORE

Industry Recognition



Introduction

Assessment

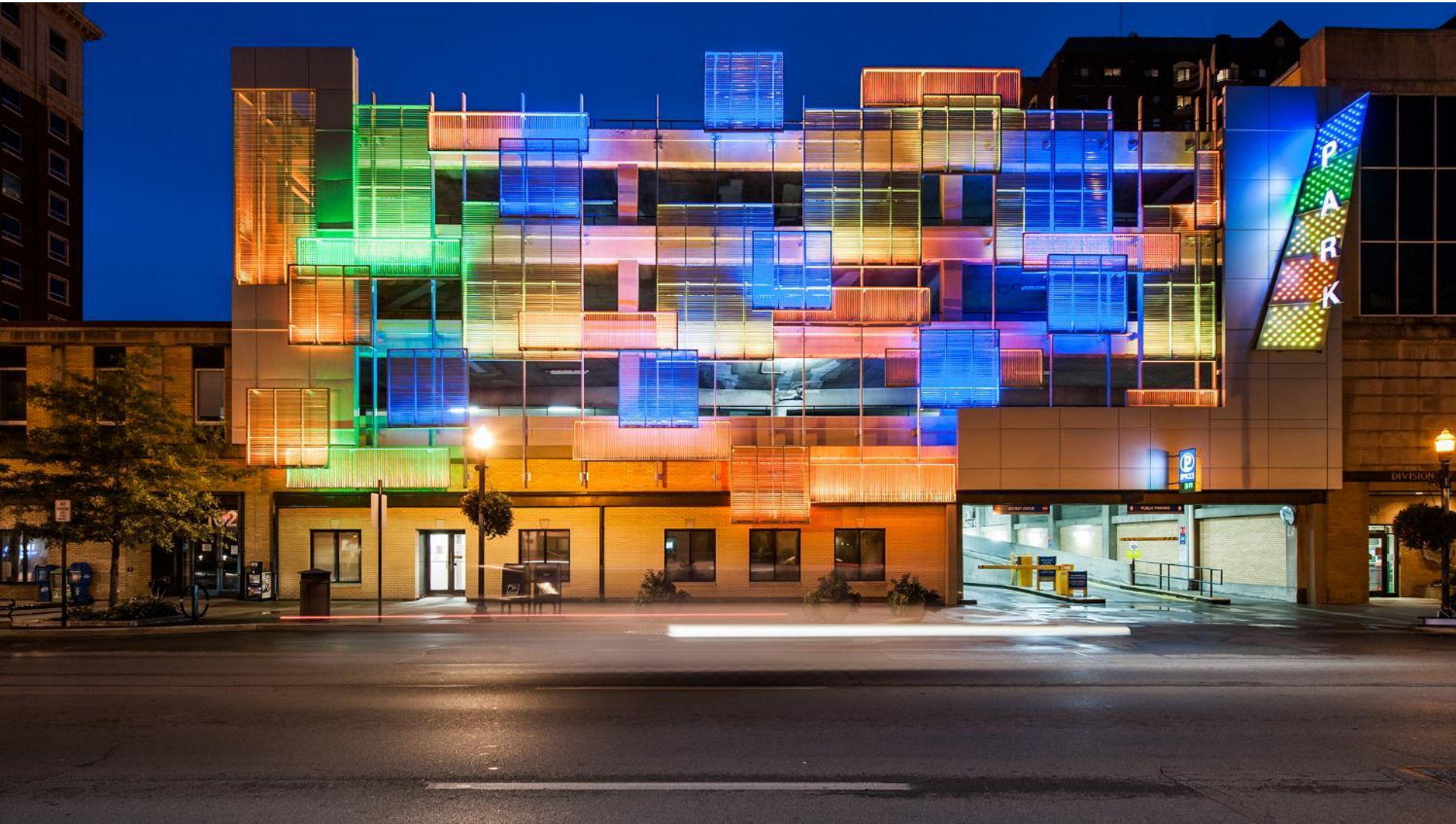
Repairs

Delivery

Impact

WALTER P MOORE

Thank You!



WALTER P MOORE