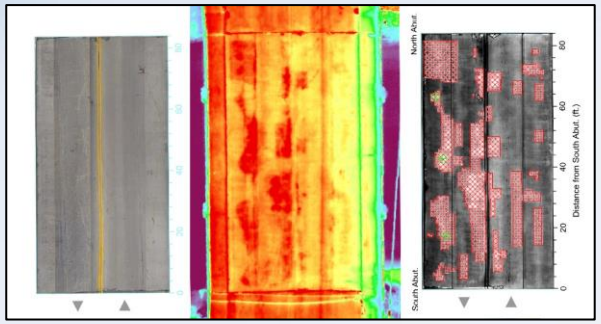
Bridge Deck NDE Program

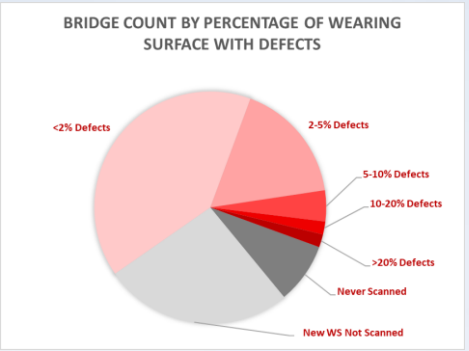
Philip Meinel, PE

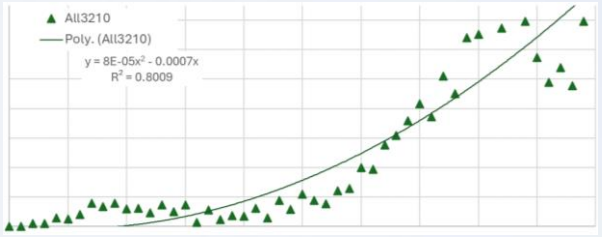
Structures Asset Management Engineer

Presentation Overview

- See the
  - Program
  - Unseen
  - Trend
  - Impact

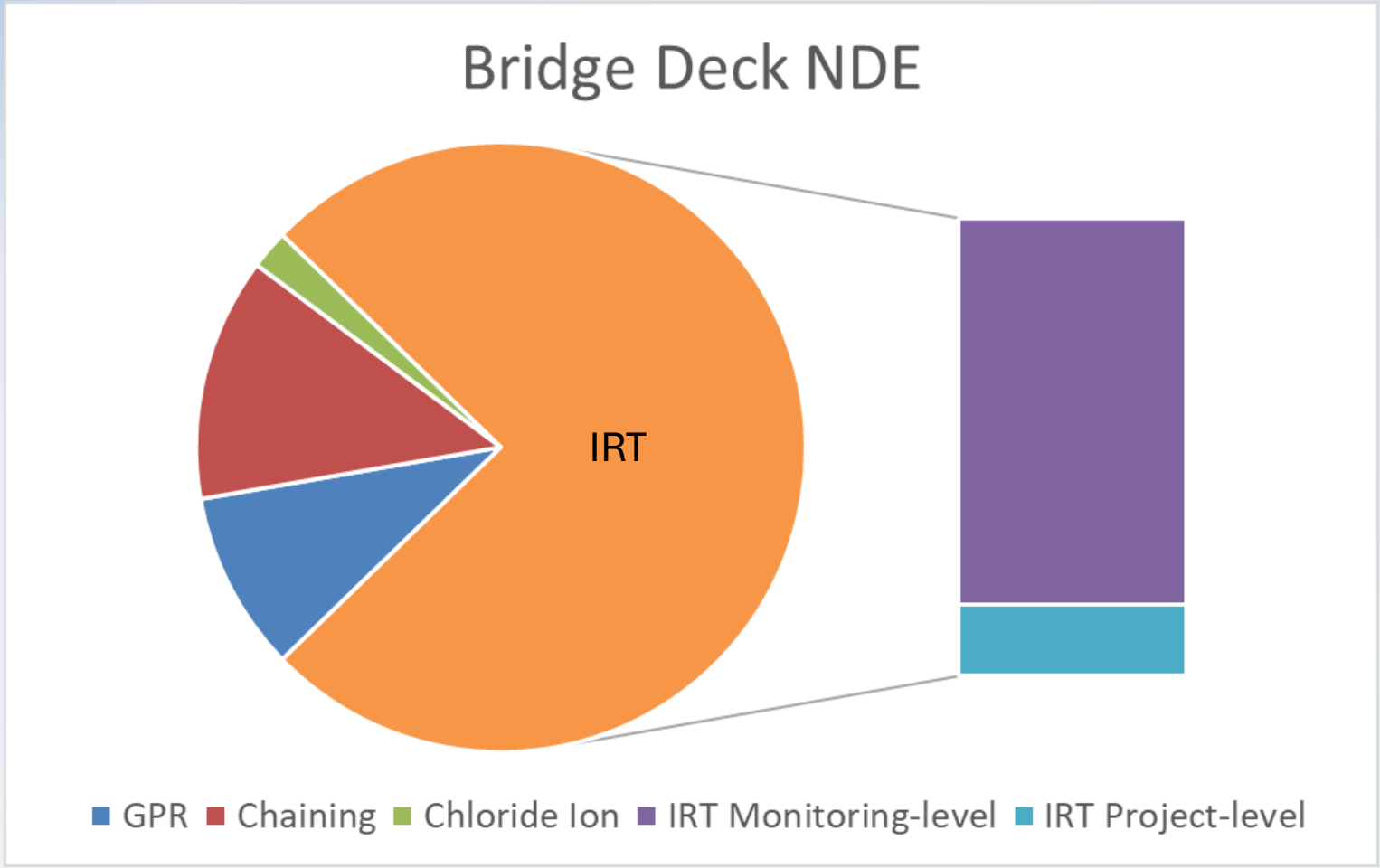




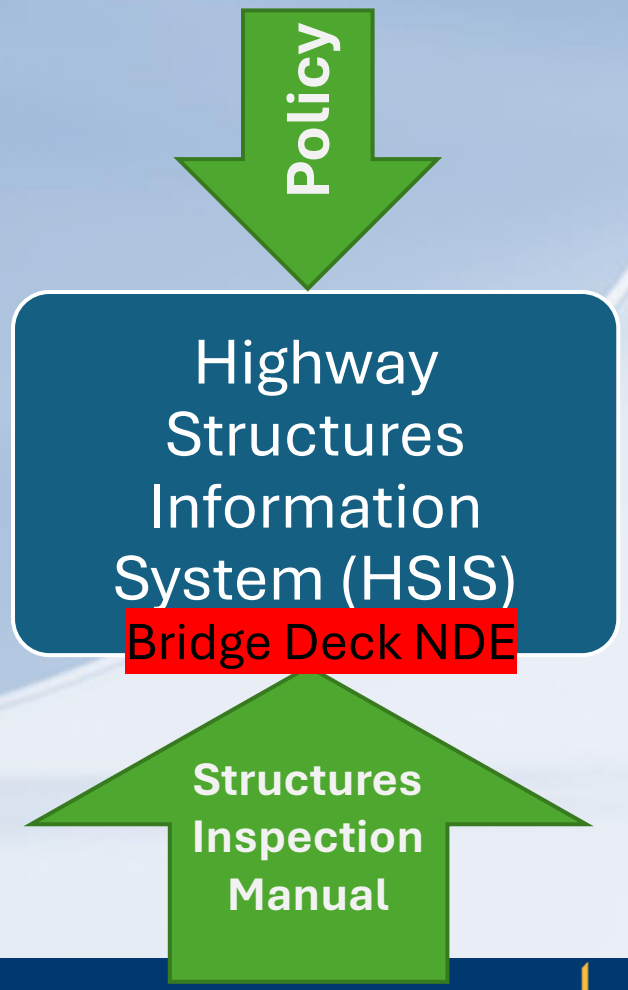


See the Program

- Bridge Deck NDE
  - IRT
  - GPR
  - Manual Chaining
  - Chloride Ion Testing
  - Automated Sounding



See the Program



- 2014 – Implemented AASHTO Elements statewide
  - WI uses ADEs to track deterioration of individual wearing surfaces

Chapter 6.D – Wearing Surfaces

D. Wearing Surfaces

Wearing Surface Elements

Wearing Surfaces (Other) (Element 510) - This element is for all decks/slabs that have overlays other than those listed below, such as timber running planks.

Wearing Surface (Bare) (Element 8000) - This element defines decks/slabs that do not have a wearing surface and will be coded to capture the top of a deck/slab without a wearing surface.

AC Overlay (Element 8511) – Defines flexible asphaltic overlay.

AC Overlay & Membrane (Element 8512) - Defines flexible asphalt overlays with membranes or PMA systems.

Thin Polymer Overlay (Element 8513) - Defines thin polymer overlays.

Concrete Overlay (Element 8514) - Defines rigid concrete overlays.

Polyester Concrete Overlay (Element 8515) - Defines polyester concrete overlay systems.

See the Program

Policy

Highway Structures Information System (HSIS)

Bridge Deck NDE

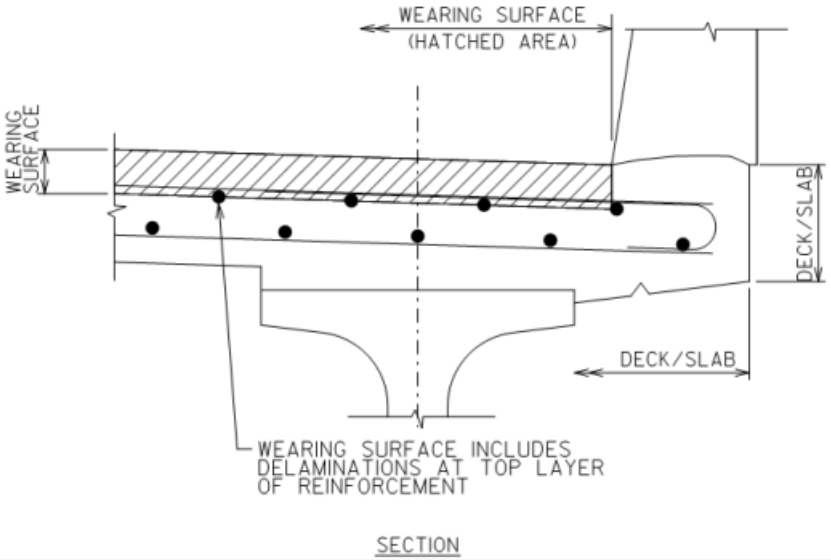
Structures Inspection Manual

- 2016 – Clarified Wearing Surface extent
  - Ensure results are recorded under each wearing surface element defect

Chapter 3.J – Wearing Surfaces

J. Wearing Surfaces

Wearing Surfaces	
510 – Wearing Surfaces (Other)	SF
8000 – Wearing Surface (Bare)	SF
8511 – AC Overlay	SF
8512 – AC Overlay & Membrane	SF
8513 – Thin Polymer Overlay	SF
8514 – Concrete Overlay	SF
8515 – Polyester Concrete Overlay	SF

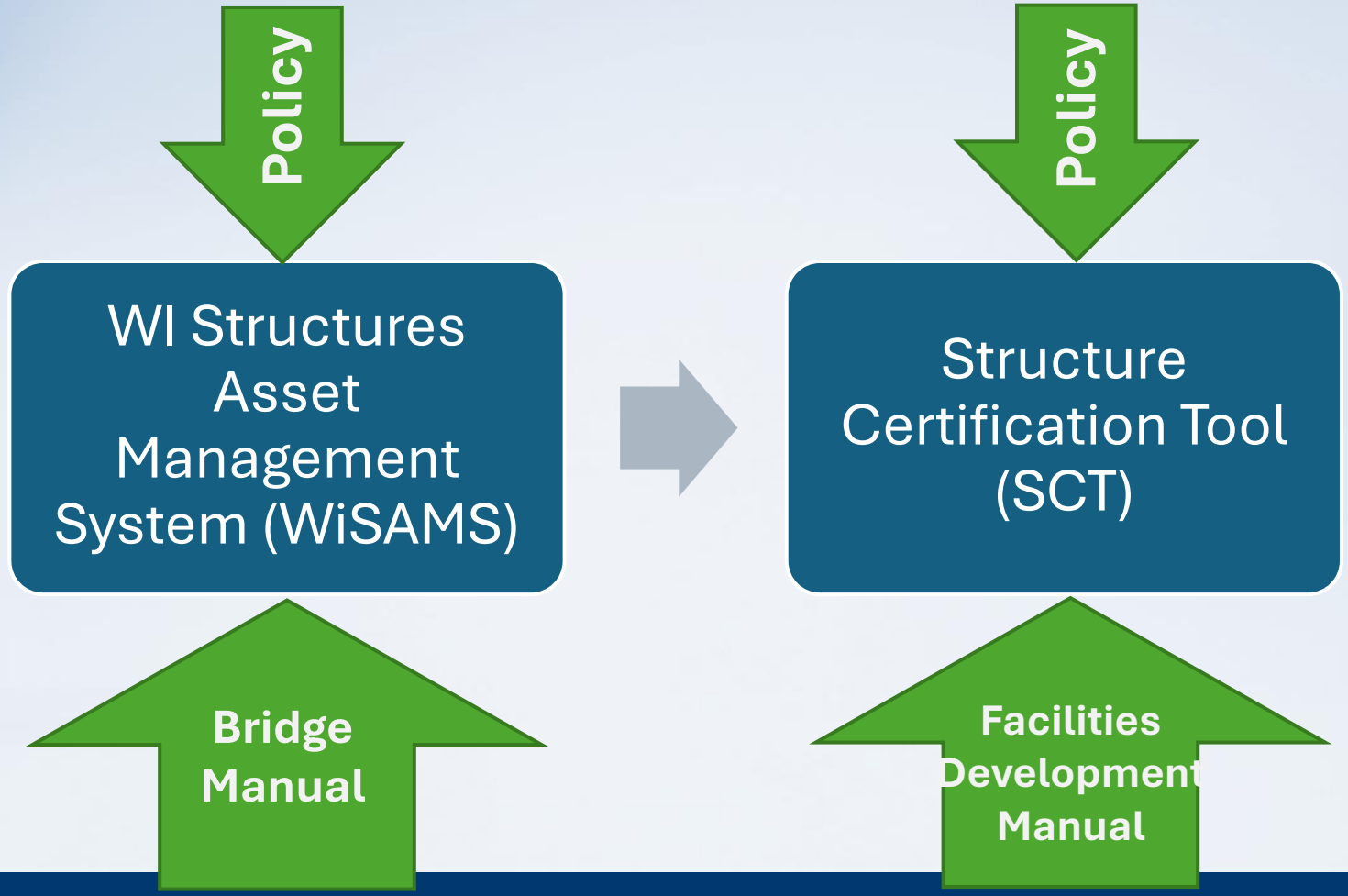


SECTION

Defect 3210- IR/Thermography or GPR Results for delaminations down to the top layer of reinforcement should be quantified under Defect 3210 under the applicable wearing surface element.

See the Program

- 2017 – WiSAMS first official report
  - BMS Optimizer
    - Projected work recommendations
- 2019 – Structures Certification process
  - Central office approval of all structure work



See the Unseen

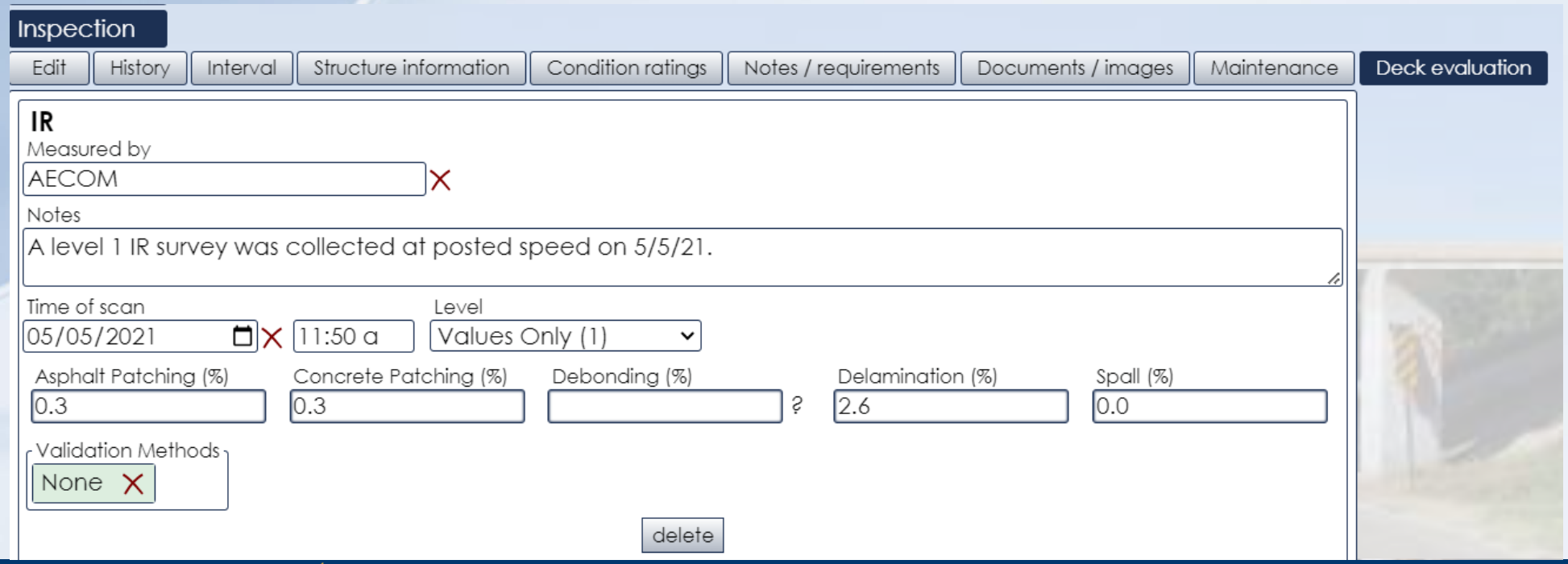
- 2020 - 36 year old deck, inspector only recorded 16 SF spalling found by visual inspection

Elements

Chk	Element	Defect	Description	UOM	Total	Quantity in Condition State 1	2	3	4
X	**12**		**Reinforced Concrete Deck-Coated Reinforcing**	SF	4,190	3,716	472	2	0
		1080	Delamination - Spall - Patched Area Under side of deck at SW and NE corners 2' CS3 **(PIC)**	SF		0	0	2	0
		1130	Cracking (RC) Leaching transverse cracks in all 3 spans.	SF		0	472	0	0
	8000		Wearing Surface (Bare)	SF	3,842	**3,673**	**100**	**69**	0
		3210	Debonding/Spall/Patched Area/Pothole Spall**s** in SB lane. **(PICS)**	SF		0	0	**16**	0
		3220	Crack (Wearing Surface) Both end blocks need repair. Transverse and longitudinal cracks at ends.	SF		0	**100**	**53**	0

See the Unseen

- 2020 - 36 year old deck, inspector only recorded 16 SF spalling
- 2021 – IRT/HRI recommends adding 111 SF CS2 delamination and concrete patching and 12 SF CS3 asphalt patching



See the Unseen

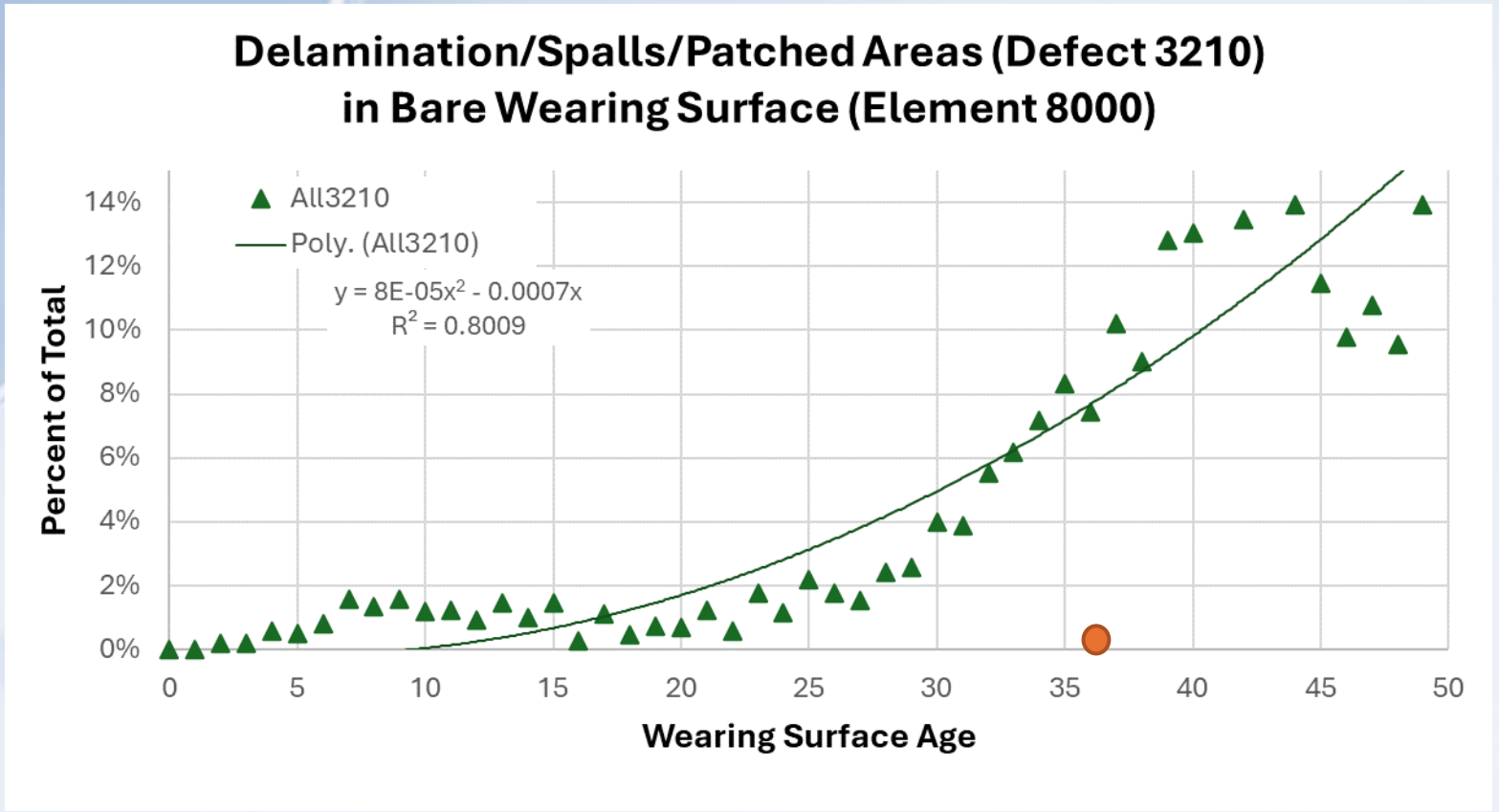
- 2020 - 36 year old deck, inspector only recorded 16 SF spalling
- 2021 – IRT recommends adding
- 2022 – Inspector added 111 SF of CS2 delamination

Elements

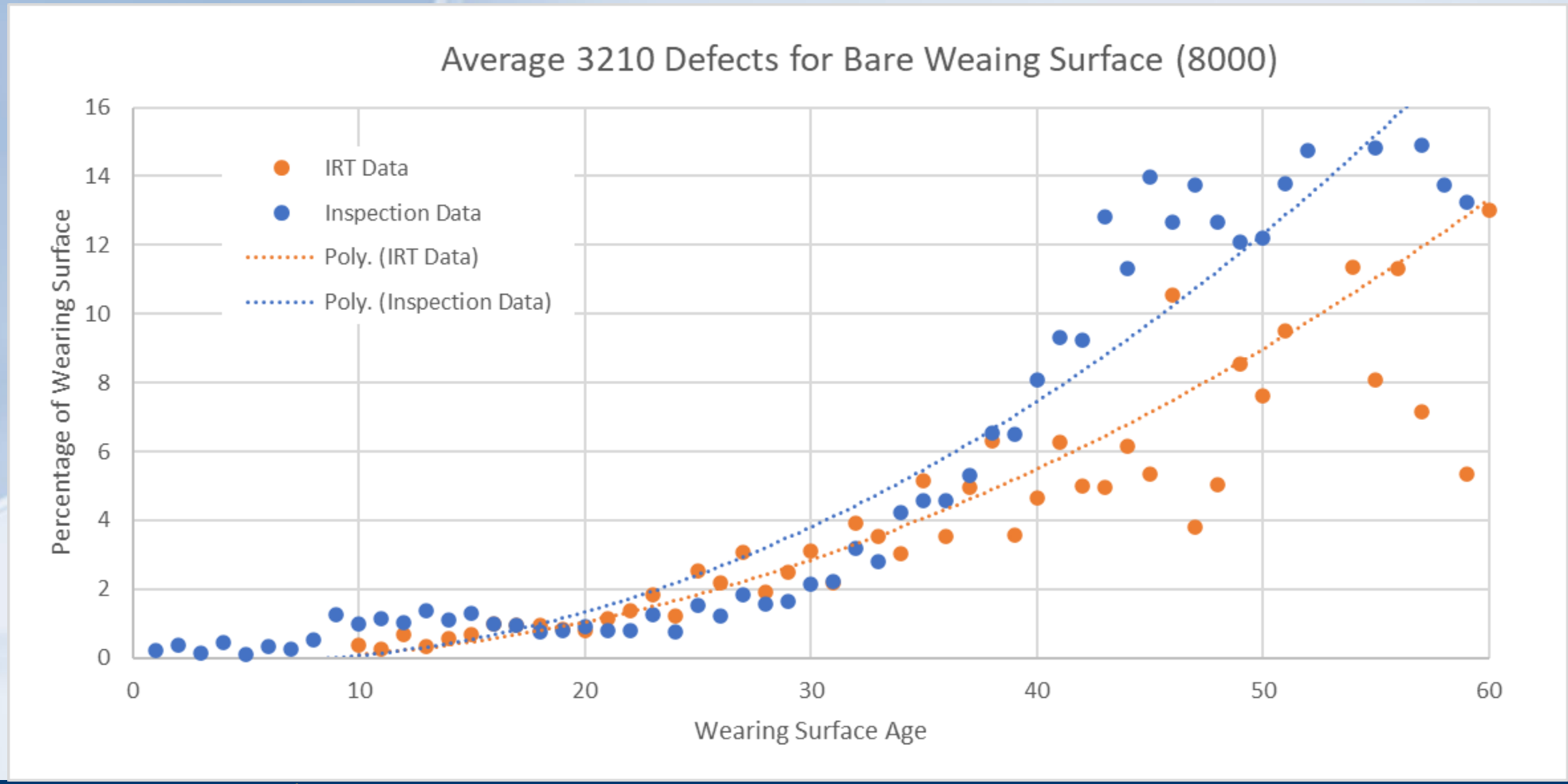
Chk	Element	Defect	Description	UOM	Total	Quantity in Condition State 1	2	3	4
X	**12**		**Reinforced Concrete Deck-Coated Reinforcing**	SF	4,190	**3,715**	472	**3**	0
		1080	Delamination - Spall - Patched Area Under side of deck at SW and NE corners 2' CS3.	SF		0	0	2	0
		1130	Cracking (RC) Leaching transverse cracks in all 3 spans. **Heavy efflorescence under SE corner of deck.**	SF		0	472	**1**	0
	8000		Wearing Surface (Bare)	SF	3,842	**3,562**	**211**	69	0
		3210	Debonding/Spall/Patched Area/Pothole Spalls in SB lane. **May 2021 Level 1 IR deck survey indicates 0.3% asphalt patching, 0.3% concrete patching, 2.6% delamination and no spalling.**	SF		0	**111**	16	0
		3220	Crack (Wearing Surface) Both end blocks need repair. Transverse and longitudinal cracks at ends.	SF		0	100	53	0

See the Trend

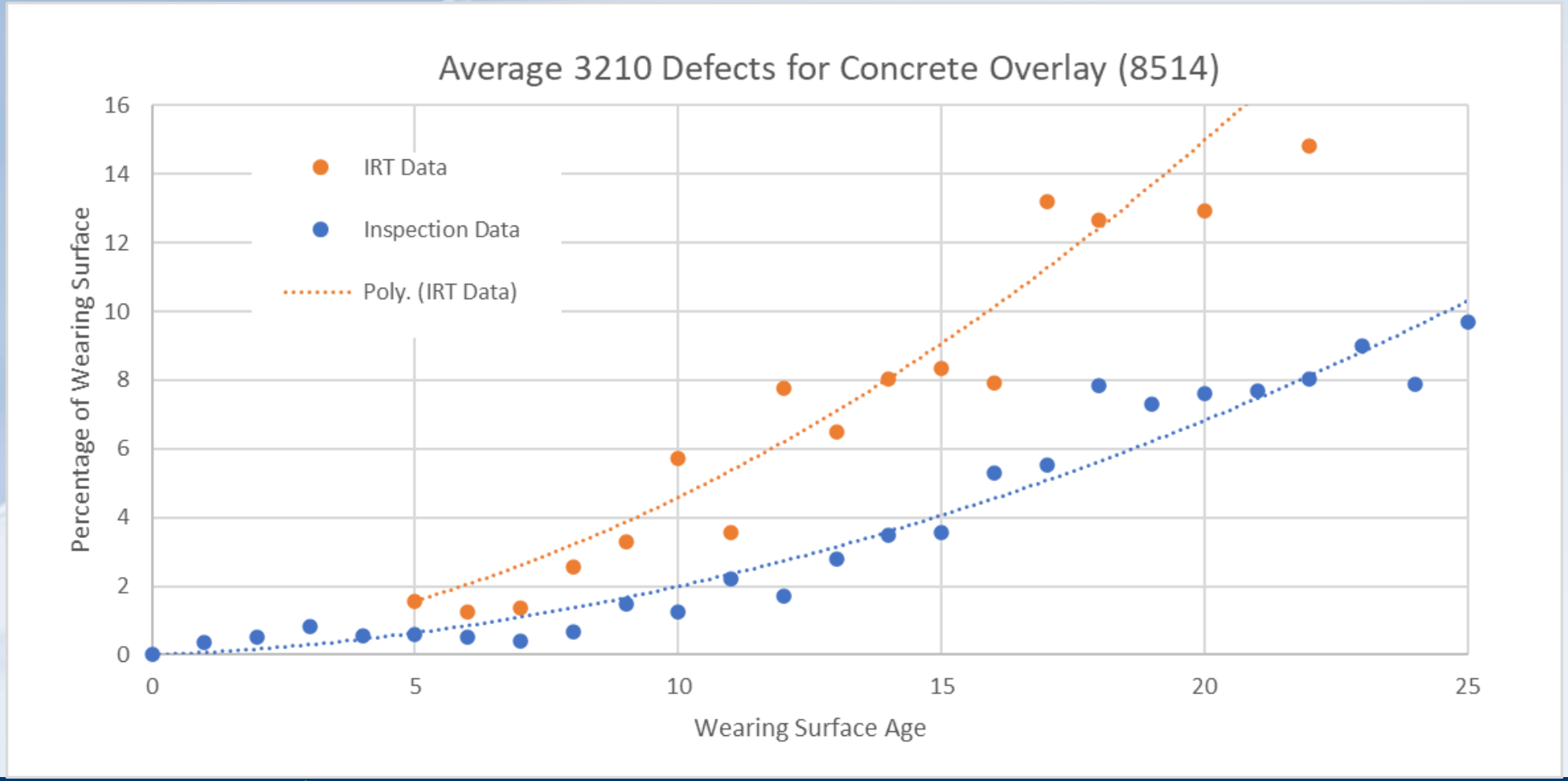
- Typical deterioration of Wearing Surface (Bare) ADE 8000



See the Trend

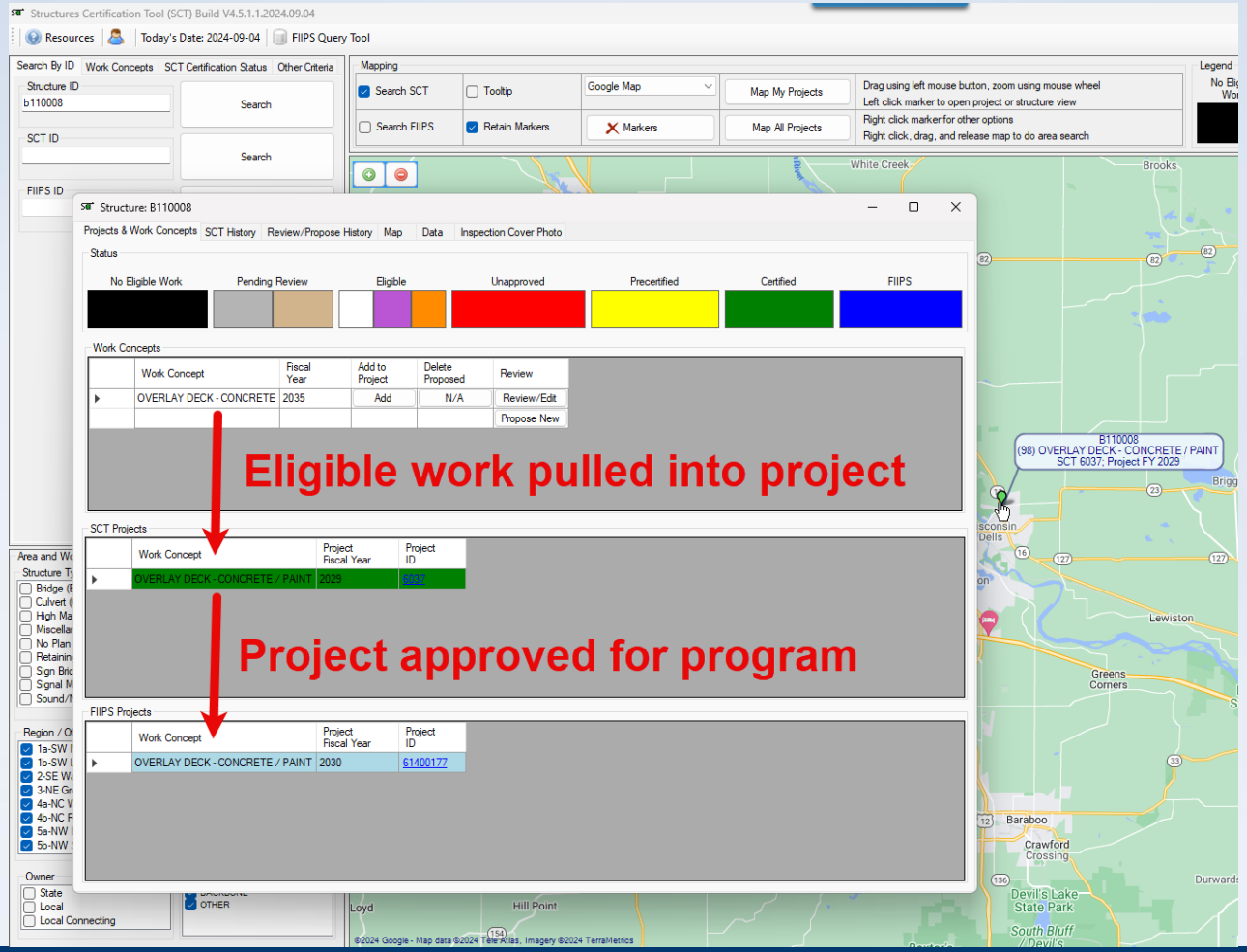


See the Trend



See the Impact

- Globally…not much, but for this individual structure…
  - Visual only inspection
    - No work action
  - Visual with IRT results
    - 2035 concrete overlay



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