APPENDIX V

Appendix/Attachment Title

Steel Section Remaining Tool

Appendix/Attachment Revision and Year:

Version 1.0, 2024

Appendix/Attachment Introduction and Discussion

Inspectors can use this appendix as a tool to document the amount of steel section remaining on certain elements. The use of this appendix or a similar means of documenting steel section remaining on certain elements shall be required as detailed below. This appendix does not require the tool to be included in the inspection report, however, SCDOT requires detailed notes for the elements and this tool can produce the required level of detail for the elements. Detailed notes shall be included as detailed below.

- Where a load rating is being requested due to corrosion for the subject structural steel element. At least one (1) pile or one (1) linear foot or more of the structural steel element is in CS4 for Corrosion (Defect 1000) requires a load rating per Section 5.5.2, or
- When deemed necessary by a BITL.

Reference the applicable section included in this appendix for guidance.

Note that diaphragms on curved bridges may be acting a primary member. If a diaphragm is acting as a primary member and it has the condition warrants a structural review to determine the effect on strength or serviceability of the element or bridge, the provisions of Appendix V shall be followed for the member.

Appendix/Attachment Description

Section 1 is for steel beam reporting. Steel beam reporting shall be followed for girders, stringers, diaphragms that act as primary members, and truss members. Section 2 is for steel pile reporting.

1.0 STEEL BEAM MEASUREMENTS

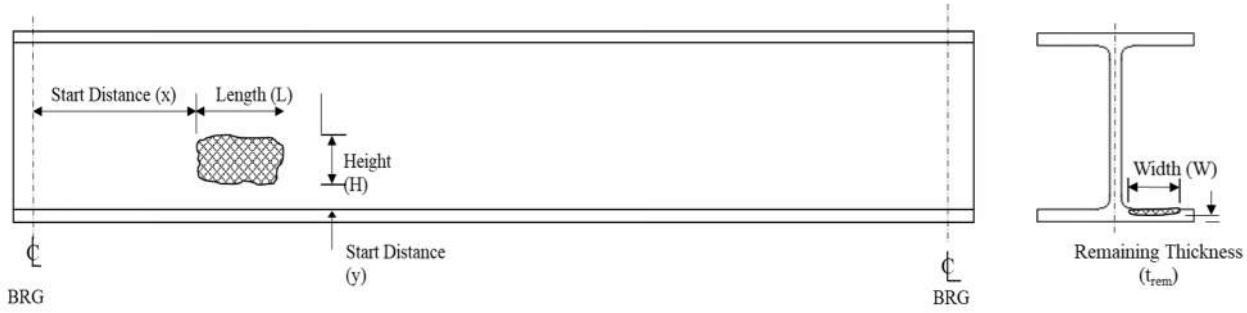
Reminder: Always report section remaining. For steel beam corrosion defect notes, each note must contain the following information:

- Girder Number in Span-Beam Number format (Girder #-#)
- Location of defect along Beam Length (measuring from the closest edge of defect area to centerline of bearing)
- Corrosion type/category (corrosion, pitting, knife edging, corrosion hole, etc.)
- Defect dimensions (Length x Width or Height x percent section remaining)

Example:

Girder 6-4: 5.5 ft from Bent 6, LEFT Web Face has (corrosion) 26'' L x 9'' H x 0.25'' of material thickness remaining starting 4'' from the bottom of web. (CS4, 3LF, Photo XX).

Girder section loss notes must be listed individually, with separate lines for different locations, and Beam parts (Top Flange, Web, Bottom Flange) and the left or right side of the beam where the measurement was performed.



Girder Number (Span-Beam Number format (Girder #-#)) shall be taken from the labeling diagram. Consultants shall correct labeling diagrams, if needed. District inspectors shall contact the BMO to correct a labeling diagram, if needed.

Web measurements are typically measured as "thickness remaining" with a D-meter, flange measurements are typically measured as "thickness remaining" with electronic calipers.

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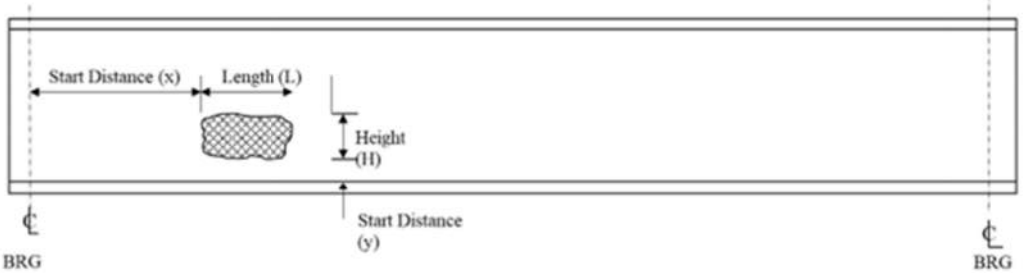
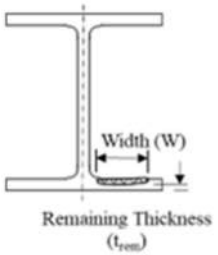
Directions:
1. Bridge element numbering orientation shall match the labeling diagram.
2. Web measurements are typically measured "thickness remaining" with a D-meter.
3. Flange measurements are typically measured as "thickness remaining" with calipers.

Beam	*Girder Number (in Span-Beam Number format - #-#)*
Element	*Web, Top Flange, Bottom Flange, etc.*
Side	*Left or Right Side*
X	**(decimal feet)** *Distance from Center Line of Bearing to defect start*
L	**(decimal inches)** *Length of Defect*
B	*Bent Number (where "X" is measured from)*
H	**(decimal inches)** *Height of Defect (for webs)*
W	**(decimal inches)** *Width of Defect (for flanges)*
Y	**(decimal inches)** *Start Distance Up Web for Defect (Webs), neglect if at the bottom*
T	**(decimal inches)** *Thickness Remaining*





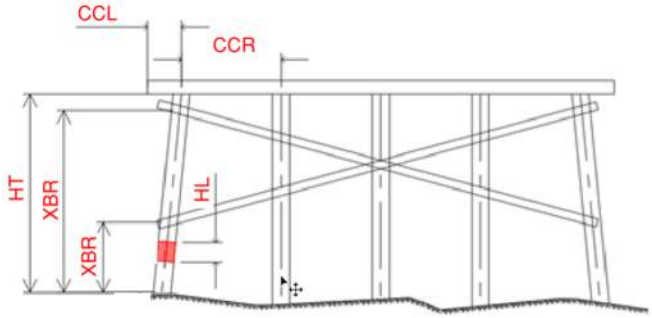
Inspection Date	Inspector Initials	Location of Defect			Field Measurements							Notes
		Beam	Element	Side (L/R)	X (ft)	B	L (in)	H (in)	W (in)	Y (in)	T (in)	

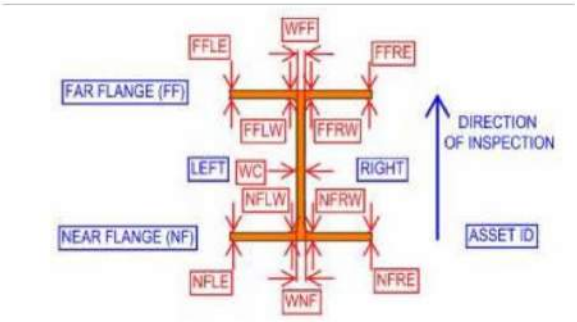
2.0 STEEL PILE MEASUREMENTS

Reminder: Always report section remaining. For steel pile corrosion defect notes, each note must contain the following information:

- Pile Number in Bent-Pile Number format (Pile #-#)
- Location, (both on pile, and vertical location from bottom of cap to start of defect)
- Corrosion type/category (corrosion, pitting, knife edging, corrosion hole, etc.)
- Defect dimensions (Length x Width x Percent section remaining)
- Example:

Pile 3-1 has corrosion 6" (L), 6 ft down from the cap, 59% section remaining (CS4, 1LF, Photo XX).





Pile Number (in Bent-Pile Number format - Pile #-#) shall be taken from the labeling diagram. Consultants shall correct labeling diagrams, if needed. District inspectors shall contact the BMO to correct a labeling diagram, if needed.

Web measurements are typically measured as "thickness remaining" with a D-meter, flange measurements are typically measured as "thickness remaining" with electronic calipers.

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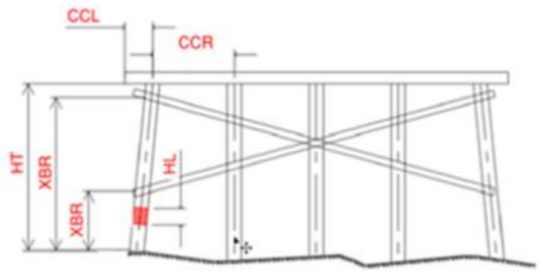
Cap Width
Cap Height

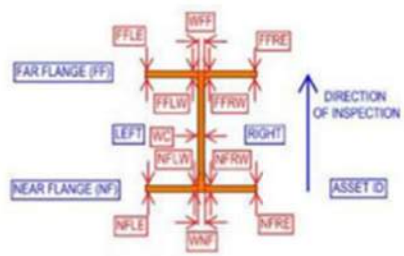
Directions:
1. Bridge element numbering orientation shall match the labeling diagram.
2. Web measurements are typically measured "thickness remaining" with a D-meter.
3. Flange measurements are typically measured as "thickness remaining" with calipers.
4. If exterior pile is to be analyzed, the exterior pile spacing (left or right) is measured to edge of cap.
5. If piles are battered, center to center spacing should be estimated <u>at cap level.</u>
6. If cross bracing has severe deterioration or is disconnected to the adjacent pile, consider it ineffective and discount it within the measurements.

Pile — *Pile Number (in Bent-Pile Number format - 6-8)*
I — (degrees) *Approx. Inclination of Pile*
Pile Size — *Size From Table*
Repaired? — *Has the pile been repaired, spliced, etc ?*

CCL — (decimal feet) *Center to Center Pile Spacing to Left of Pile*
CCR — (decimal feet) *Center to Center Pile Spacing to Right of Pile*
HT — (decimal feet) *Exposed Pile Height (Bottom of Cap to Groundline)*
XBR — (decimal feet) *Controlling Unbraced Length (consider cross-bracing)*

L — (decimal feet) *Length to Defect (from cap)*
HL — (decimal inches) *Height of Defect*





<u>Legend (Use Section Remaining)</u>

FFLE *Far Flange Left End*
WFF *Web at Far Flange*
FFRE *Far Flange Right End*
FFLW *Far Flange Left at Web*
FFRW *Far Flange Right at Web*
WC *Web at Center*
NFLE *Near Flange Left End*
WNF *Web at Near Flange*
NFRE *Near Flange Right End*
NFLW *Near Flange Left at Web*
NFRW *Near Flange Right at Web*

Standard Pile Sizes

Original Pile Size	HP10x42	HP10x57	HP12x53	HP12x63	HP12x74	HP12x84	HP14x73	HP14x89	HP14x102	HP14x117
Pile Depth, d(in)	9.7	9.99	11.8	11.9	12.1	12.3	13.6	13.8	14	14.2
Orig. Flange Thickness, tf (in)	0.42	0.565	0.435	0.515	0.61	0.685	0.505	0.615	0.705	0.805
Orig. Flange Width, bf(in)	10.1	10.2	12	12.1	12.2	12.3	14.6	14.7	14.8	14.9

Inspection Date	Inspector Initials	Basic Pile Information			Repaired?	Pile Layout/Geometry						Percent Rem	Field Measurements of Web and Flanges (see diagram)											Notes
		Pile	I	Pile Size		CCL	CCR	HT	XBR (min)	L	HL		FFLE	WFF	FFRE	FFLW	FFRW	WC	NFLE	WNF	NFRE	NFLW	NFRW	