

SIGN STRUCTURE INSPECTION & RATING



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Introduction

- Definition – sign or multiple signs with area >4 m2
- Signing for Interchanges – normally have associated BF #
- Naming Convention
 - Site file number 75760
 - Visual identifiers
 - Z = sign structure
 - W, E, N, or S = direction of approach
 - Structure number 2 = 2nd structure (travelling north)
 - Example 75760-ZN-2
 - Numbering convention – 1st sign come to (farthest away) is #1
 - If another sign is added all signs in that direction get re-numbered

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Introduction

- Refer to Chapter 15 in BIM Manual
- Other sections on form are rated consistent with other structures (e.g. Approach Road and Approach Guardrail)
- Rating and Recording requirements same as for other structures
- Measure and record vertical clearance if possible
- Minimum acceptable VC on provincial highways is 6m**. If VC on form is <6m – or if inspector suspects VS is not accurate recommend L2 VC

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Inventory Data

- Verify and update
- Chapter 4 BIM Manual

Site Inspection		Site Inspection	
Project Number	0440-2013-010	Form Type	0001
Year/Revision	2013/001	Location	10
Region	Alberta	Inspector Name	Carol Murray
Region or Team Name	CROWTHER INTERCHANGE	Inspector Date	2013.03.01
Location ID	001 001 0 001	Alternate Name	
Legal and Location	100 001 0 001 001 001 001	Alternate Date	
Length, Leftside	100 001 0 001 001	Inspector Date	21 Jan 2012
Road Name	STP	Issue Type	10
Control Sign Area	001 001 0 001 001	Sign Type	10
ASCT/Type	001 001 0 001 001	Class Code	10
Road Condition	001 001 0 001 001	Class Entry Date	10 Jan 2012
Inspector Name	001 001 0 001 001	Inspector Name	Carol Murray
Inspector Date	001 001 0 001 001	Inspector Date	10 Jan 2012
Class	001 001 0 001 001	Class Revision Number	10
Class Revision Date	001 001 0 001 001	Class Revision Date	10 Jan 2012
Class Revision	001 001 0 001 001	Class Revision	10

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Utilities

- Note and record location within 200 m
- Many structures have lights
- Others have hi-vis sign resolution
- Report hazards with utilities immediately (LRN 12/48 hrs)



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Approach Road / Safety Features

- Horizontal and vertical alignment
 - Rate same as Chapter 6 of BIM
- Traffic Safety Features
 - Advance warning light, flashing lights, barriers, signs, impact attenuators
 - Rate function and condition – refer to 15.5.2
- Guardrail (rate barriers as TSF)
 - Inspect and rate according to 15.5.3 – 20 m each direction from sign
 - Record length and termination Type
 - Meets standard Yes / No (if “No” explain why)
 - Current preferred system is flexible HTCB
 - Refer to 15.5.3.1 for other system types

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Substructure

Substructure			
Bridge Component	Last	Now	Explanation of Condition
Pedestal	8	8	Double Leg A1629
(Total No. 2)			8.5m at East.
(Type: CONCRETE)			
(Offset from Skousbergs) 6)			
Column	8	8	
(Type: GALVANIZED STEEL HOLLOW STRUCTURAL SECTION)			
Connections	8	8	
Coating	7	7	
Substructure General Rating	8	8	

- Substructure accommodates
 - Dead Load of sign structure
 - Live Loads such as wind, collision

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Substructure (Cont'd)

- Pedestal
 - Provides base for column attachment
 - Record number and type (usually concrete, maybe steel)
 - Measure and record offset from EOP to c/l of pedestal
 - record min. if more than one present and record offset in comment area if other
 - Comment if top of pedestal <850 mm above ground
 - Defects affecting load carrying capacity rate 3 or less
 - Check for scaling, spalling or corrosion (light scaling not serious)

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Substructure (Cont'd)

- Column
 - Carries bridge loads to pedestal
 - Confirm Steel Ident Tag on column matches form
 - Generally steel (HSS); susceptible to deicing salts and vehicle damage
 - Check vertical alignment
 - Check weld stiffeners at bottom of columns (if present)
 - Check for collision damage
 - Check surface condition, welds, connections, etc.
 - Heavy corrosion or pitting rate 4 or less
 - Cracks rate 3 or less

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Substructure (Cont'd)

- Connection / Bearings
 - refers to column-to-pedestal connection
 - corrosion resulting in loss of section rate 4 or less
 - missing or loose nuts, rate 4 or less (suggest missing nuts =3 unless lock nut)
 - check all welds for cracks – if present rate 3 or less
- Coating
 - refers to coating on column (typically galv) and pedestal (typically none)
 - top coat deteriorated, primer intact – or no corrosion but touch up req rate 5
 - pitting and / or loss of section (5%) rate 4 or less
 - pitting and / or loss of section (>10%) rate 3 or less

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Superstructure

Bridge Component	Superstructure	
Dist. Type	Low	High
Explanation of Condition		
Dist. Type: TUBE STRUCTURE, A (Item Number: A1629-91)		
Special Features	X	X
Special Features (Type 1)		
Special Features (Type 2)	X	X
Member		
Chord	B	B
Diagonal	X	X
Vertical	B	X
Connections	B	B
Access Platform	X	X
Coating		
(Type: GALVANIZED)	F	F
Touch Up (Y/N)	No	
Sign Alignment Problems		
Vertical (Y/N)	No	
Horizontal (Y/N)	No	
Superstructure General Rating	B	B

- Refers to portion attached to columns and spanning the road

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Superstructure (Cont'd)

- Special Features
 - Refers to temporary or permanent
 - Not items identified as Traffic Safety Features
 - Typical examples
 - high load indicators,
 - special lighting,
 - hazard signing or flashers,
 - column brace,
 - wind deflectors

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Superstructure (Cont'd)

- Truss Members
 - rating details Chapter 7.16 of BIM Manual
 - bottom chord
 - diagonals
 - verticals
 - connections
 - check lower members for collision damage
 - tension members look for fatigue cracks
 - defects affecting load carrying capacity rate 4 or less
 - corrosion or pitting resulting in section loss rate 4 or less
 - cracks rate 3 or less

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Superstructure (Cont'd)

- Access platform (present on older signs)
 - platform and rail used for maintenance (signs and lights) – laid flat when not used
 - not for use during routine Level I from ground with binoculars
 - Check connections
 - high load damage
- Coating
 - rating same as 15.6.5 Substructure
- Span alignment problems
 - check for bows, sags, bow, buckling, twists, other signs of distress
 - alignment between columns is level

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Signs

Sign			
Bridge Component	Last	Now	Explanation of Condition
Sign Board	8	8	
(Type: METAL)			
Connections	8	8	
Coating	8	8	
Readable (Y/N)	Yes		
Illumination	X	X	
Sign General Rating	8	8	

- Refers to signs on the superstructure
- Includes variable message boards
- Should be clear, clean and readable

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Signs (Cont'd)

- Record type of sign (wood or metal)
- Digital variable message boards
- Sign Board
 - Over traffic so defects can be serious
 - damage from wind, high load, etc.
 - fasteners, and connections
 - coating damage or deterioration
 - lighting
- Coating
 - Usually hi-vis reflective with lighting
 - Diamond grade without lighting
 - Damage/difficult to read rate 4 or less
 - Broken lights, loose cords 4 or less
- Connections
 - loose or missing bolts
 - rate 4 or less

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General Ratings

- Approach Road / Safety Features
 - Horizontal and Vertical alignment
 - Safety concerns
- Substructure
 - Pedestal, Column and Connection ratings
- Superstructure
 - Load carrying elements
 - Safety concerns
- Sign
 - Sign board, Connections, Coating, Illumination

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Sign Structure Maintenance

Maintenance Recommendations					
Completed Work					
Planned Work					
Work Type	Status	Rec. Year	Target Year	Inspector Comments	Department Comments
REPAIR SUPERSTRUCTURE					
STRAIGHTEN/REPLACE MEMBERS					
REPAIR/REPLACE SOILING					
PATCH/REPAIR ACCESS PLATFORM AREA					
ADJUST/PAIN PEDestal BEARING AREA					
Structural Condition Rating (Last/Now)	/			(Est. Repl. Yr)	(Maint. Repl. YR)

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Sign Structure Maintenance Table 11.1

LEVELT INSPECTION	CORE TIMBER CAPS/CORBELS
CONCRETE DECK INSPECTION	REPAIR/REPLACE TIMBER CAPS
CONCRETE CURB INSPECTION	REPAIR ADJUTMENT SCOUR/EROSION
VERTICAL CLEARANCE MEASUREMENT	PLACE ADDITIONAL RIP RAP
CHLORIDE TESTING	REMOVE DRIFT ACCUMULATION
COPPER SULPHATE ELECTRODE TESTING	INSTALL CATHODIC PROTECTION
PAINT INSPECTION	INSTALL CONCRETE/STEEL LINING
STEEL CULVERT BARREL MEASUREMENT	INSTALL STRUTS
SPECIAL STRUCTURE MONITOR	INSTALL CONCRETE COLLAR/CUTOFF
ULTRASONIC PRESS INSPECTION	REPAIR SEAMS
SCOUR SURVEY INSPECTION	OBTAIN CORROSION ANALYSIS DATA
REPAIR/REPLACE BRIDGERAIL	REPAIR/REPLACE SOILING
GALVANIZE/PAINT BRIDGERAIL	PATCH/REPAIR ACCESS PLATFORM
RETROFIT BRIDGERAIL	ADJUST/PAIN PEDestal BEARING AREA
SEAL CURBS	OTHER ACTION
PATCH DECK	REPAIR/REPLACE TIMBER CORBELS
SEAL DECK	REPAIR/REPLACE TIMBER PILES
OVERLAY DECK	LOAD POST BRIDGE
REPAIR/REPLACE DECK JOINTS	REPLACE MEMBERS
REPLACE STRIP DECK	STRAIGHTEN MEMBERS
REPLACE SUB DECK	REPAIR MEMBERS
RESET PAINT BEARINGS	INSTALL BOLTS
REPAIR SUPERSTRUCTURE	REPAIR JOISTS
STRAIGHTEN/REPLACE MEMBERS	CRACK REPAIR/TREATMENT
WASHERS	PATCH CURBS/STRUTS
FILL BOLT HOLES	REPAIR STRUTS
SHOTCRETE REPAIRS	REPLACE CULVERT

Table 11.1 – Maintenance work types

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SIGN STRUCTURE TYPES 15.7.2



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COR10



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Tube - Double Leg



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Tube - Cantilever



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Space Truss - Double Leg



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Space Truss - Cantilever



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Truss – Double Leg



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Truss – Cantilever



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Variable Message Board – Truss Cantilever



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Variable Message Board – Tube Cantilever



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Variable Message Board – Vermac Lollipop



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SIGN STRUCTURE SPECIAL FEATURES

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Wind Deflectors on COR10



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Wind Deflectors <https://www.youtube.com/watch?v=GmEgH6jAV2k>



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Column Support Arm



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SIGN STRUCTURE TYPICAL DEFECTS

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Crack in Top Chord



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Crack in Top Chord



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Crack in Access Platform Support



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Crack in Vertical at Bolt Hole



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Crack in Diagonal



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Crack in Column of COR10



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Cracks in Column Joint Welds of COR10



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Crack in Column Plate Weld



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Crack in Column Plate Weld



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Alberta

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Crack in Bottom Chord



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Alberta

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Crack in Bottom Chord – Stop Drilled



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Alberta

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Crack in Bottom Chord – Weld Repair



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Alberta

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Crack in Bottom Chord – Metallized



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Alberta

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Crack in Bottom Chord – Steel Sleeve



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Alberta

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Buried Pedestal



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Alberta

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Loose Anchor Bolt Nuts



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Alberta

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Missing Anchor Bolt Nuts



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Alberta

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Loose Bolt



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Alberta

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Loose/Displaced Sign Clip



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Alberta

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Loose Top Chord Connection Bolts



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Alberta

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Column Perforations



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Alberta

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Collision Damage



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Alberta

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Collision Damage



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Collision Damage



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Questions?



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