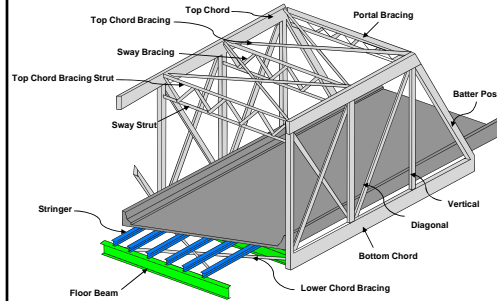


# Inspection of Trusses

## Truss Members & Elements



## Level II Truss Inspection

### Trusses for Alberta Highways

- Bridge system has about 340 sites with 460 truss spans
- Majority of these trusses were fabricated between 1920 & 1930
- Most of the spans are on secondary highways and local roads
- Level II Truss inspection started in the early 1970's
- Second round of U/T inspection in 1983 revealed numerous cracked members

## Level II Truss Inspection

### Frequency of Inspection

- Provincial highways 4 – 5 years
- Local roads 6 years
- Special monitoring – varies depending on truss condition, age, and traffic volumes.

## Level II Truss Inspection

### Preparation for Inspection

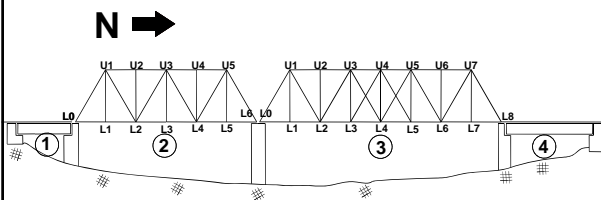
- Check previous reports
- Obtain inspection forms
- Hire ND inspection company
- Equipment for U/T
  - Ultrasonic testing machine with 60° and 70° probes
  - Coupling fluid
  - Spare batteries and charging unit
  - Extra probe and leads

## Level II Truss Inspection

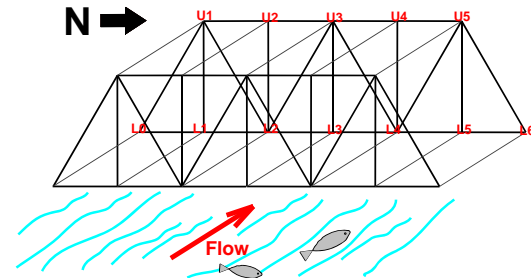
### Preparation for Inspection

- Submit traffic safety and fall protection plans and obtain approval
- Access equipment:
  - Lift truck
  - Snooper truck
- Inspection tools
- Personal safety attire

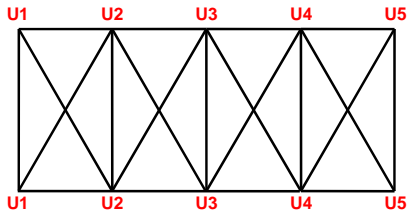
## Truss Inspection



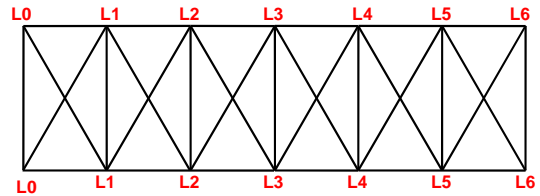
## Truss Member Notation



### Top Chord Bracing



### Lower Chord Bracing



### Level II Truss Inspection

#### Visual Inspection

- Check all members and connections for:
  - Cracks
  - Missing or loose bolts
  - Welds
  - Scabs, delamination, gouges and elongated holes
  - Note any strain indication
  - Note any collision damage
  - High water damage on bottom chord and bottom laterals

### Level II Truss Inspection

#### Visual Inspection

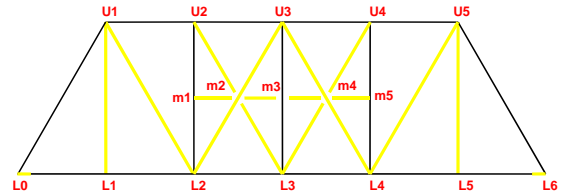
- Check all members and connections for:
  - Sags and buckling characteristics
  - Measure and report distortion
  - Floor beam copes
  - Report on extent of corrosion, pitting and section loss
  - Measure and report any top chord sweep for pony trusses
- Member/s requiring replacement shall be identified

## Level II Truss Inspection

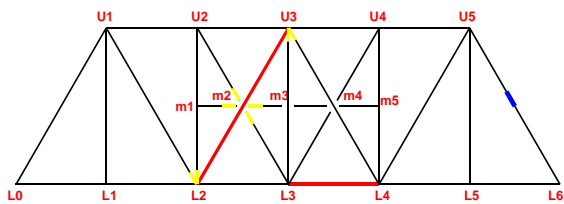
### Visual Inspection

- Check posted and actual vertical clearance for through trusses
- Report condition of deck elements
- Check bearings
- Check railing

## Level II Truss Inspection



## Level II Truss Inspection



## Level II Truss Inspection

### Ultrasonic Inspection

- Report any rough holes
- Mark any member which has a crack
- Report all the findings on the U/T forms
- Try to determine the cause of cracking

## Level II Truss Inspection

### Photographs

- Take overall photograph of the entire bridge
- Take photographs to show condition of:
  - Deck, curbs, wheel guards
  - Bridgerail, bearings
  - Overall condition of paint
  - Typical underside
  - General condition of substructure
  - Specific problems

## Level II Truss Inspection



## Level II Truss Inspection



## Level II Truss Inspection



### Level II Truss Inspection



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20



### Level II Truss Inspection



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21



### Level II Truss Inspection



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22



### Level II Truss Inspection



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23



### Level II Truss Inspection



### Level II Truss Inspection



### Level II Truss Inspection



### Level II Truss Inspection



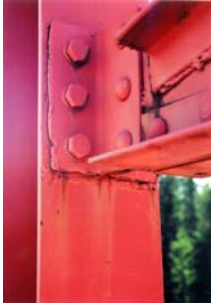
### Level II Truss Inspection



### Level II Truss Inspection



### Level II Truss Inspection



### Level II Truss Inspection





### Level II Truss Inspection



### Level II Truss Inspection



### Level II Truss Inspection



### Level II Truss Inspection



Steel Truss Bridges

## Level II Truss Inspection





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36

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## Level II Truss Inspection






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37


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## Level II Truss Inspection





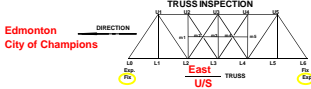
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38


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Edmonton  
City of Champions




MEMBER	ULTRASONIC INS.			OTHER ITEMS	MEMBER
	A END	B END	C END		
TOP CHORD					
L1-U1					✓
U1-U2					✓
U2-U3					✓
U3-U4					✓
U4-U5					✓
U5-U6				Welded, U/T done - no crack	✓
VERTICALS					
U1-L1	✓	✓		Inward dent - 20 x 200mm at L2	✓
U2-L2	✓	✓			✓
U3-L3	✓	✓			✓
U4-L4	✓	✓			✓
U5-L5	✓	✓			✓

BRIDGE NAME: Whitemud Cr. SPAN NO. 2 OF 4 DATE: Y2-mth-d4 FILE: xxxxx  
 TRUSS IDENT: A-75-3 - 4 PANEL TRUSS 90 FT. IN. SPAN. INSPECTOR: J. Doe PAGE: 1



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39

Steel Truss Bridges

TRUSS INSPECTION  
East  
U/S TRUSS

MEMBER	ULTRASONIC INS.						OTHER ITEMS	MEMBER	
	A END	B END	A END		B END				
A END	B END	No Crack	Crack Width ≤ 0.1mm	Crack Width 0.1-0.2mm	Crack Width 0.2-0.3mm	Crack Width 0.3-0.5mm	Crack Width 0.5-1.0mm	Accrains Number	Notes Number
DIAGONALS									
U1 - L2	✓								
U2 - m2	✓								
m2 - L3	✓								
U3 - L2	✓						75mm dent and 12mm crack at L2	X	
U3 - L4	✓								
U4 - m4	✓								
m4 - L3	✓								
U5 - L4	✓						bullet hole near middle at inside flange		
m3 - m2	✓								
m3 - m4	✓								
m4 - m5	✓								

BRIDGE NAME: Whitemud Ck SPAN NO. 2 OF 4 DATE: Yy-mm-dd FILE: xxxxx  
 TRUSS IDENT: A 75-3 6 PANEL TRUSS 90 FT./M. SPAN. INSPECTOR: J. Doe PAGE: 2

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 40

Steel Truss Bridges

TRUSS INSPECTION  
East  
U/S TRUSS

MEMBER	ULTRASONIC INS.						OTHER ITEMS	MEMBER	
	A END	B END	A END		B END				
A END	B END	No Crack	Crack Width ≤ 0.1mm	Crack Width 0.1-0.2mm	Crack Width 0.2-0.3mm	Crack Width 0.3-0.5mm	Crack Width 0.5-1.0mm	Accrains Number	Notes Number
BOTTOM CHORD									
L0 - L1	✓								
L1 - L2	✓								
L2 - L3	✓								
L3 - L4	✓						75 x 200mm dent near L4		
L4 - L5	✓								
L5 - L6	✓								
TOP CHORD BRACING (Note Truss Direction)									
U2E - U2 W	✓								
U2E - U3 W	✓								
U4E - U4 W	✓								
U1E - U2 W	✓								
U1E - U2 E	✓								
U2E - U3 W	✓								
U2E - U3 E	✓								

BRIDGE NAME: Whitemud Ck SPAN NO. 2 OF 4 DATE: Yy-mm-dd FILE: xxxxx  
 TRUSS IDENT: A 75-3 6 PANEL TRUSS 90 FT./M. SPAN. INSPECTOR: J. Doe PAGE: 3

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 41

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TRUSS INSPECTION  
East  
U/S TRUSS

MEMBER	ULTRASONIC INS.						OTHER ITEMS	MEMBER	
	A END	B END	A END		B END				
A END	B END	No Crack	Crack Width ≤ 0.1mm	Crack Width 0.1-0.2mm	Crack Width 0.2-0.3mm	Crack Width 0.3-0.5mm	Crack Width 0.5-1.0mm	Accrains Number	Notes Number
TOP CHORD BRACING (Cont'd) (Note Truss Direction)									
U3 E - U4 W	✓						20mm notch at C/L. Overall bow of 15mm.		
U3 W - U4 E	✓								
U4 E - U5 W	✓								
U4 W - U5 E	✓								
PORTALS									
U1E - U1 W	✓								
U5E - U5 W	✓								

BRIDGE NAME: Whitemud Ck SPAN NO. 2 OF 4 DATE: Yy-mm-dd FILE: xxxxx  
 TRUSS IDENT: A 75-3 6 PANEL TRUSS 90 FT./M. SPAN. INSPECTOR: J. Doe PAGE: 4

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 42

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TRUSS INSPECTION  
East  
U/S TRUSS

MEMBER	ULTRASONIC INS.						OTHER ITEMS	MEMBER	
	A END	B END	A END		B END				
A END	B END	No Crack	Crack Width ≤ 0.1mm	Crack Width 0.1-0.2mm	Crack Width 0.2-0.3mm	Crack Width 0.3-0.5mm	Crack Width 0.5-1.0mm	Accrains Number	Notes Number
LOWER CHORD BRACING (Note Truss Direction)									
L0 E - L1 W	✓								
L0 W - L1 E	✓								
L1E - L2 W	✓						3mm section loss at horiz. gusset		
L1W - L2 E	✓								
L2E - L3 W	✓								
L2W - L3 E	✓								
L3E - L4 W	✓								
L3W - L4 E	✓								
L4E - L5 W	✓								
L4W - L5 E	✓								
L5E - L6 W	✓								
L5W - L6 E	✓								

BRIDGE NAME: Whitemud Ck SPAN NO. 2 OF 4 DATE: Yy-mm-dd FILE: xxxxx  
 TRUSS IDENT: A 75-3 6 PANEL TRUSS 90 FT./M. SPAN. INSPECTOR: J. Doe PAGE: 5

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 43

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**TRUSS INSPECTION**  
**East - TRUSS**


MEMBER	ULTRASONIC INS.						OTHER ITEMS	MEMBER
	A END	B END		B END		A END		
A END	Backscat	Direct	Direct	Backscat	Direct	Direct	Access	
B END	Direct	Backscat	Direct	Backscat	Direct	Direct	Number	
<b>FLOOR BEAMS</b>								
L0 - L0						overall bow of 30mm		✓
L1 - L1								✓
L2 - L2								✓
L3 - L3								✓
L4 - L4								✓
L5 - L5								✓
L6 - L6								✓

NOTE ANY STRINGERS, GUSSET PLATES, TOP CHORD BRACING STRUTS, HANDRAIL PANELS ETC. USE THIS SYSTEM OF NOTATION IF POSSIBLE AND MARK ON THE LINE DIAGRAM. BE SURE TO NOTE IF SPLICE PLATE IS INSIDE, OUTSIDE, UPPER OR LOWER ETC.

BRIDGE NAME: Whitemud Ck SPAN NO. 2 OF 4 DATE: Yy-mm-dd FILE: xxxxx  
 TRUSS IDENT: A- 75-3 S PANEL TRUSS 90 P.P.M. SPAN INSPECTOR: J.Doe PAGE: 6



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## Where to Find Cracks in Trusses?

- Damaged members.
- Tension members
- Rough holes
- Welds.
- Members with stress reversal



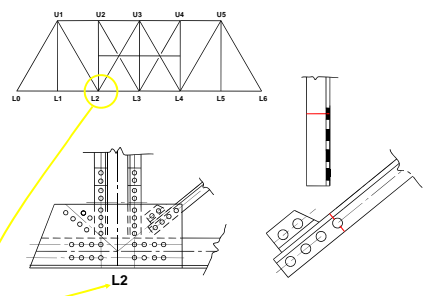
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45




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## Truss Member Fatigue Crack






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46



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## Questions??



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47

