

# Slope Indicator Installation and Monitoring



46th BCGWA Convention, Trade Show & AGM  
Kamloops, BC  
March, 2017





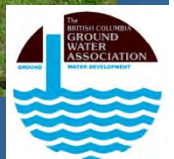








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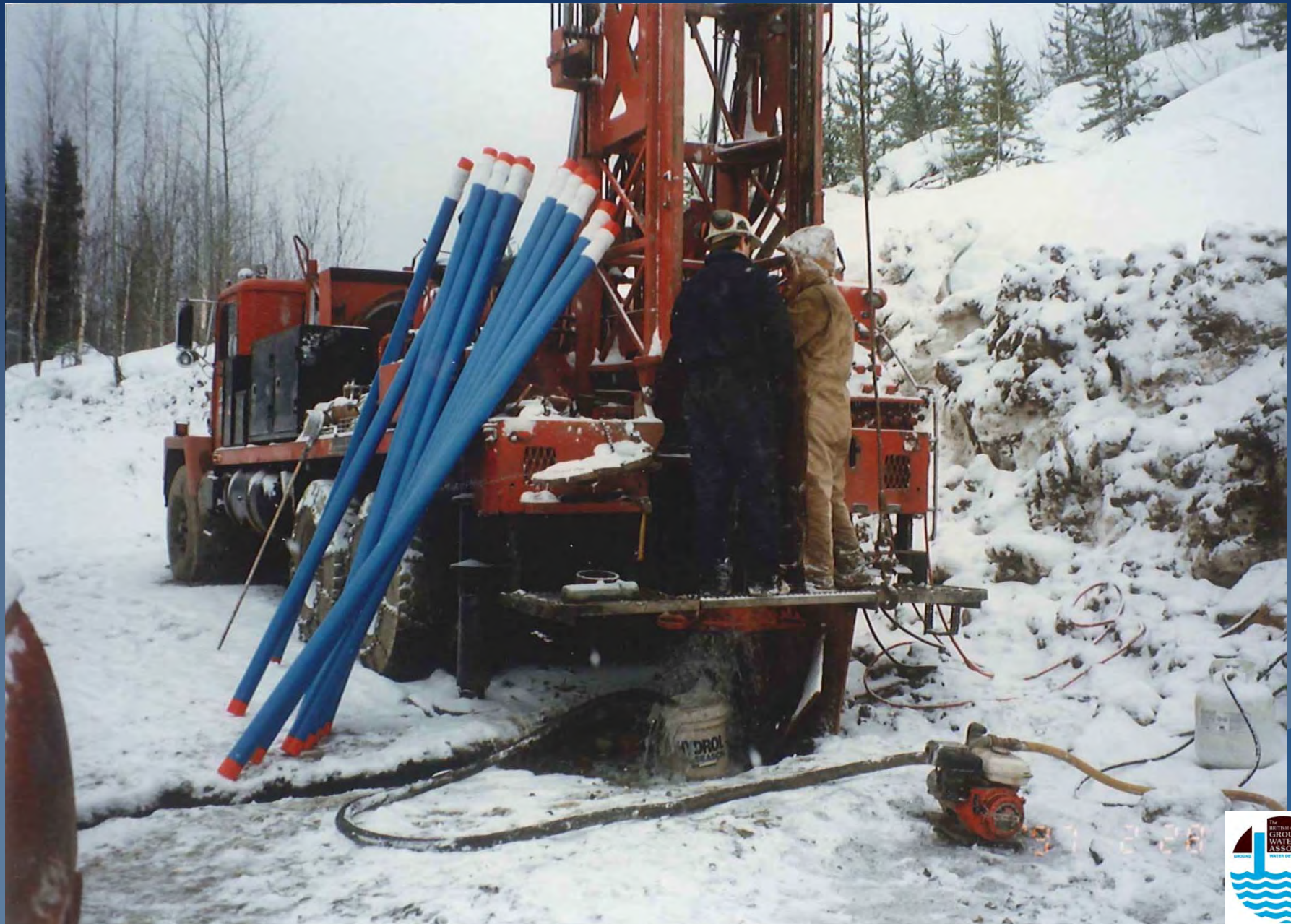
# Slope Indicators

- ◆ Installed in boreholes within the slide extents.
- ◆ Typically consists of ABS pipe with four machined internal longitudinal grooves at 90° offsets.





# Slope Indicator Installation



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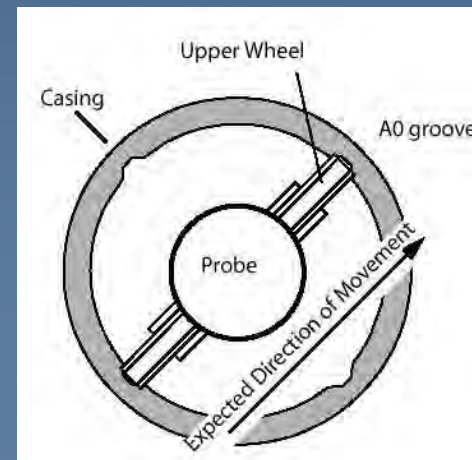
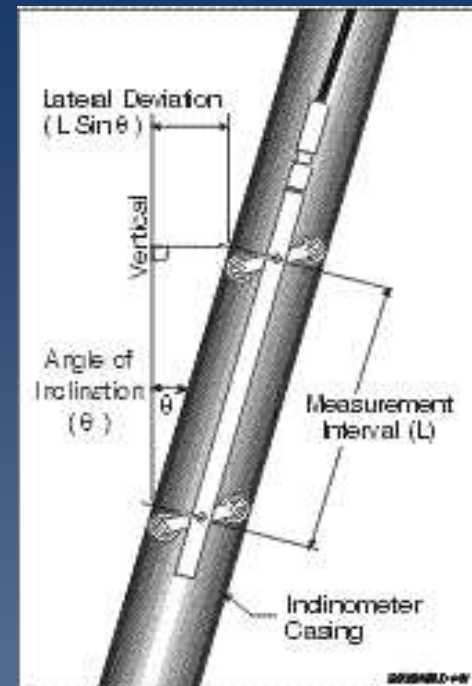


# Slope Indicator Monitoring

- ◆ Originally read with inclinometer probe containing two servo-accelerometers that measure the inclination of the probe travelling in the machined grooves.
- ◆ A baseline reading is taken and all subsequent readings are compared to it.

Monitoring results:

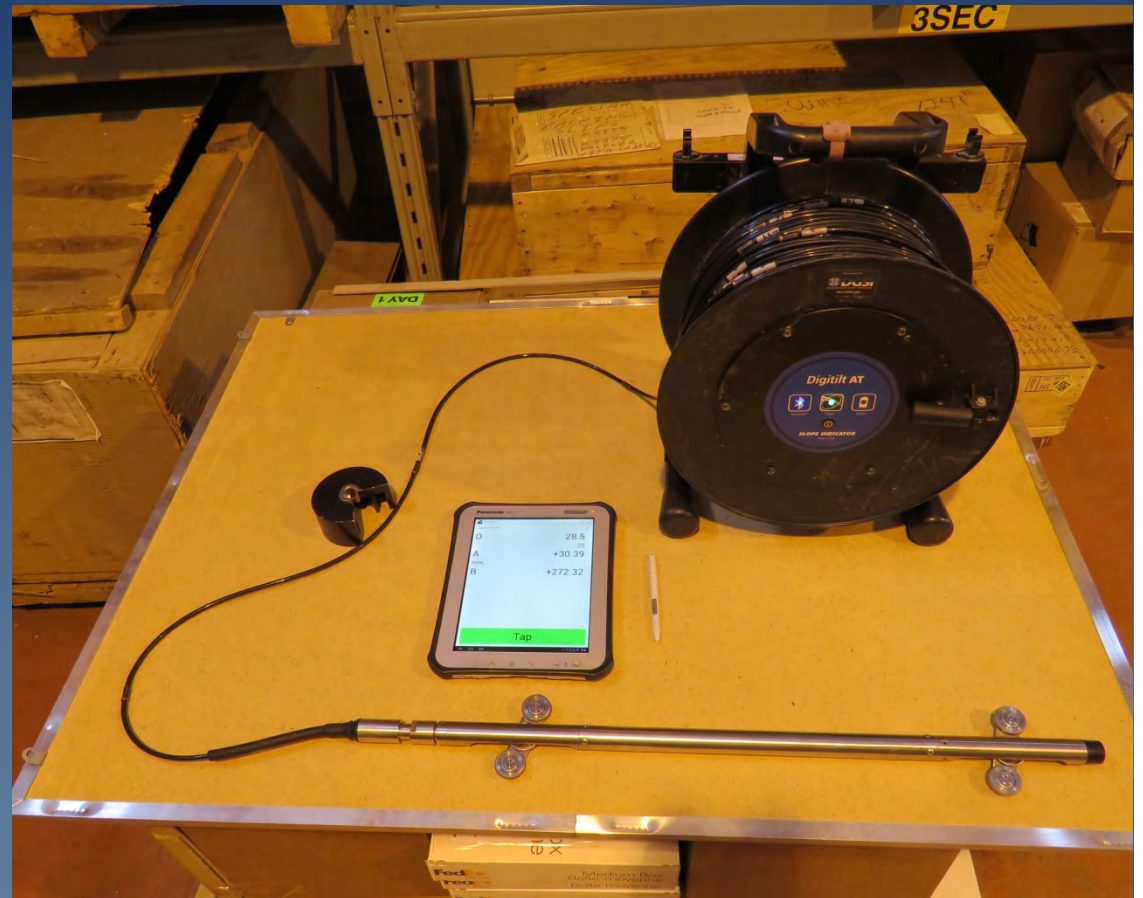
- ◆ depth of slide surfaces.
- ◆ direction of movement.
- ◆ Magnitude and rate of movement.



# Slope Indicator Monitoring



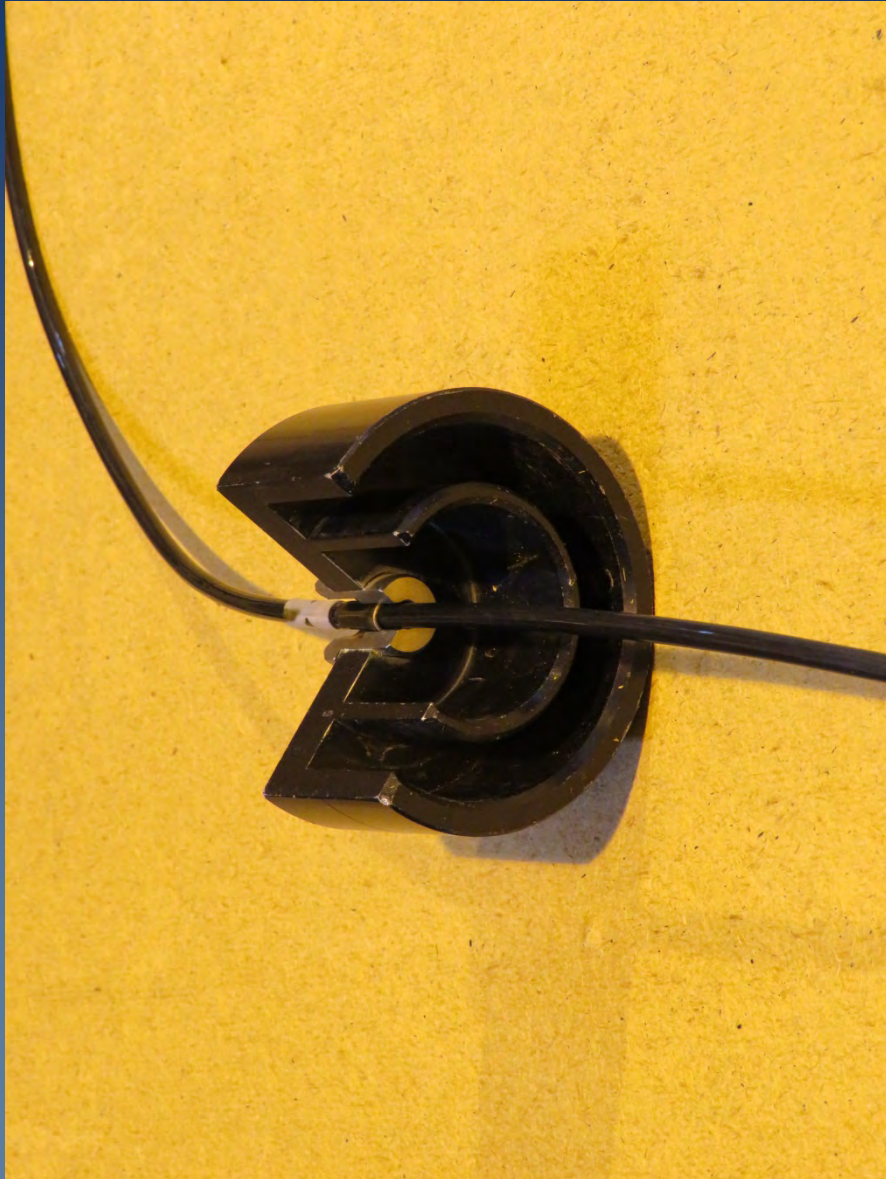
# Slope Indicator Monitoring



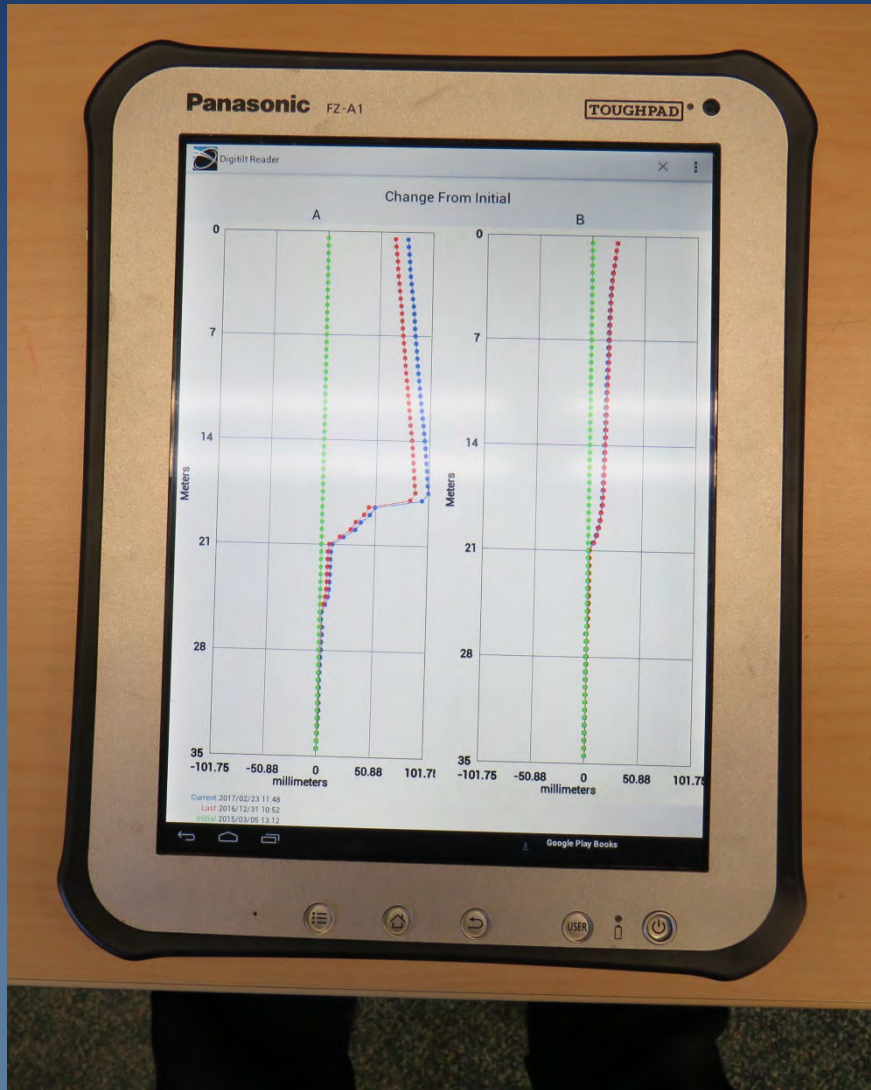
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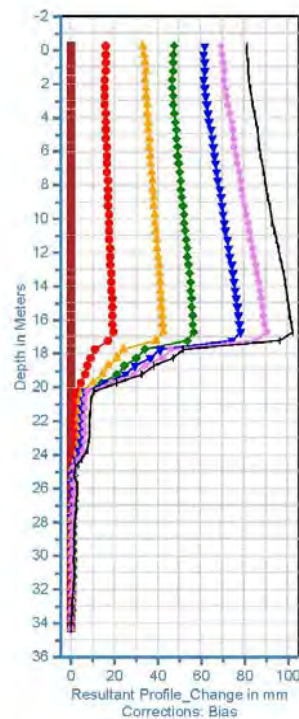
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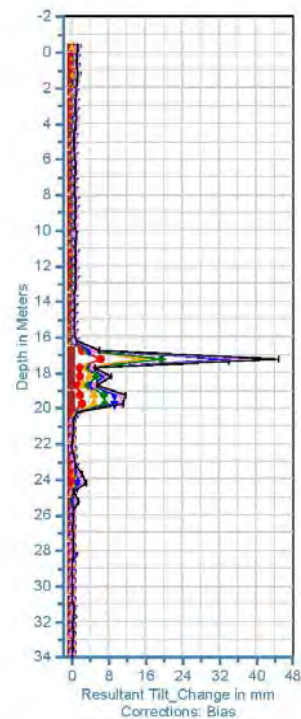
Sdbeatton 06-1R6 Magnitude

05/03/2015 24/08/2015 23/02/2016  
23/09/2016 07/11/2016 31/12/2016  
23/02/2017



Sdbeatton 06-1R6 Magnitude

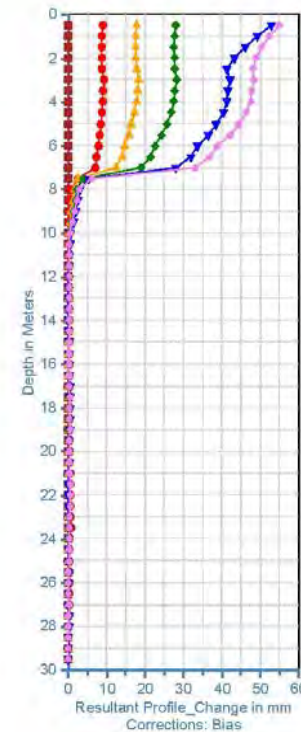
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23/02/2017



Spectra Energy Transmission - Pipeline Systems Integrity  
Fort St. John Raw Gas Transmission - 16" Silver Dahl Pipeline  
South Approach Slope to the Beatton River - km 30.529  
UTM 10 626744E 6319724N - Stickup = 0.76m

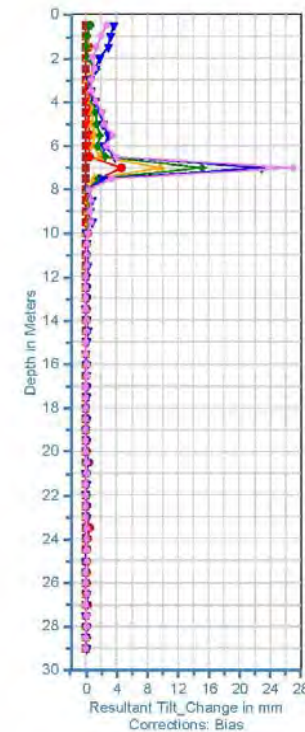
Laprise 03-1R7 Magnitude

19/03/2015 20/06/2015 22/08/2015  
24/10/2015 26/02/2016 24/07/2016



Laprise 03-1R7 Magnitude

19/03/2015 20/06/2015 22/08/2015  
24/10/2015 26/02/2016 24/07/2016



Spectra Energy Transmission - Pipeline Systems Integrity  
Fort St. John Raw Gas Transmission - 12" Laprise Pipeline  
North Approach Slope to the Beatton River - km 23.89  
UTM 10 573625E 6338410N - Stickup = 0.96m



# Challenges & Lessons Learned

CONSTRUCTION RISK MATRIX

SARA Species with Defined Critical Habitat												
SARA and Provincially Listed Species												
BCR Priority Species												
Migratory Birds (All Species)												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

**Migratory Bird Breeding Window**

Increasing Regulatory Risk ↑

# Challenges & Lessons Learned



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# Questions?

