

23 June 2013

What have we learned from the consultants that we didn't know already?

Ultimate strength:

Consultant 3 specifies 6 by 19 IWRC plastic valley filled wire rope of 1 and 5/8 inch diameter. That is just generic wire coated in plastic. The 6 by 19 means it is composed of 6 strands wound around an independent wire rope core (IWRC). It has 133 strands. A better rope would be 6 by 41 EFSSWR. It is 1.6 times the strength and has 287 strands making it more flexible and longer lived. EFSSWR is extra flexible special steel wire rope. That is what a tug's tow wire is usually composed of.

This 1 and 5/8<sup>th</sup> wire breaks at 211,800 pounds when new.

The statement of requirements states one end is wound around a tensioning drum of 30 inch diameter. That is 18 times the wire diameter and from page 17 of memo 2 that costs 9 percent of the wires strength. I'm going to round that to 10% and now we have 192,600 pounds available.

Consultant 3 calls for 20 metric tonnes of pretension. That drops our available force to 170,200 pounds. Same consultant says maximum excursion off centerline is 304 feet. That plots out to 5.1 degrees which from page 7 of memo 1 leaves us with 15.3 percent of strength due to the effect of taut span. We are now down to 29,467 pounds. Now we can solve for wind force required to break cables.

Page 14 of memo 1 has the wind formula  $q=0.00256(\text{wind velocity squared})$ . We reach yield at 43.5 knots of wind. This is down considerably from the 63.7 calculated previously due to the consultants recommendation to increase the pretension load. If all three cables are considered to share the load equally (something I have stated is unrealistic) yield is reached at 76 knots of wind. There is no place for this ferry to hide. There is no safe barn where you can put the horse away and close the door. The storm of December 11th 2006 would wipe this ferry off the dock and break all 3 cables with ease if you use Environment Canada's 83 knots. If you use Ferries 26 knots then everything is just fine. You decide.

PK 23 June 2013

\*