

1.0 Site Visit

The Annual Inspection site visit was conducted on July 9, 2003. At the time of the visit, the weather was clear and blustery.

2.0 Significant Observations

The following observations, considered to be relevant to the stability of the slope were made:

- The large landslide complex in the valley wall continues to be active as described in the previous assessment reports. Additional retrogression since the October 2002 instrument readings of the landslide crest was noted – the crest had retrogressed to the fenceline adjacent to SI #8, as shown in Photos 4, 5 and 6.
- No signs of tension cracks between the fence line and the highway were observed.
- The new landslide block on the north flank of the slide area, north of SI #10, has shown visible displacement since the May 2002 inspection. Please refer to Photos 10 to 12 for an illustration. This slide block is similar to those in the main slide area, with fresh tension cracks developing in the field behind the previous crest.
- Creek erosion at the toe of the slope continues to be the primary trigger for the slide activity.

3.0 Changes from Previous Visits

Overall, no significant changes were noted in the landslide conditions at this site since the May 2002 inspection. Active movement of the landslide continues, with the most active areas as follows:

- Recent retrogression of the landslide crest to the fenceline adjacent to SI #8, as shown in Photos 4, 5 and 6.. The crest was approximately 1 m away from the fenceline when the October 2002 instrument readings were taken.
- Continued movement and further development of the new landslide block northeast of SI #10.

4.0 Discussion

Although active landslide movement was noted in the areas listed above, the overall position of the landslide crest relative to the northbound lanes of Highway 2 has not changed significantly since the May 2002 inspection. However, this does not indicate that the risk to the highway has changed. As noted in the previous assessment reports, ongoing landslide movement at this site will result in the crest of the valley slope retrogressing to the west, eventually directly undermining the current northbound lanes of Highway 2. It will likely take some time for this to occur, possibly in the order of decades.

Mitigation of this landslide complex would be a major undertaking. As a minimum, significant river training works would be required. Significant earthwork volumes would also be required to flatten the slopes, which would continue to retrogress towards a stable angle even after toe erosion is mitigated. Mitigative measures would require significant investigation and design studies prior to implementation, and depending on the scope of work in the creek channel itself may encounter significant environmental permitting issues.

It may be most practical to allow the landslide to run its course and allow for future realignment of the highway to the west as the slide crest retrogresses. There do not appear to be any topographical constraint to relocation of the highway and such works may be less costly and have fewer environmental impacts than attempting to mitigate this slide.

As noted in the previous assessment report, the current monitoring using slope inclinometers is not considered wholly adequate at this site. The failure mode is such that new slide blocks can develop and move rapidly for short periods of time, followed by long periods of relative inactivity. Therefore, the slope inclinometers would show little or no signs of movement prior to a rapid movement period where the crest could retrogress several metres, after which the slope inclinometer would be unreadable. AMEC has previously recommended additional monitoring via periodic surveys of the crest position, and the first such survey was taken in July 2003.

5.0 Assessment

This is a very large, active landslide complex, with active crest retrogression towards the highway in recent years. On this basis, the Probability Factor with respect to this slide is taken as 11 since the slide is active and crest retrogression near the highway will continue.

It is likely that, in the short term, continuing retrogression of the current slide will not impact the highway, but over the medium to long term the highway is at risk. On this basis a Consequence Factor of 2 is assigned for the **present location** of this slide. This value will increase with time as the slide retrogresses toward the highway.

Based on the above, the **present** Risk Level at this site is calculated as 22, which is unchanged from the 2001 assessment. This value will increase with time as the slide retrogresses toward the highway.

6.0 Recommendations

The existing SI's should be read annually.

The position of the slope crest should be surveyed periodically in order to estimate and monitor the rate of crest retrogression towards the highway.

Despite the limitations of slope inclinometers with respect to monitoring this type of landslide, it is worthwhile to continue reading them as planned. However, AMEC recommends switching to annual (spring) readings from semi-annual (spring/fall) readings and placing greater emphasis on periodic surveys of the crest position and general visual inspections of the slope condition.

Annual inspections should be continued as planned.

An historic airphoto review should be conducted. This review could help to estimate the historic rate of crest retrogression towards the highway. This type of work was included in AMEC's March 2001 proposal for additional work to determine the most feasible mitigative option for this site.