

DESIGN BULLETIN #45/2007

Use of Retaining Wall Structures for Bridges and Roadways In Active Watercourse Environments

Summary: The use of retaining walls adjacent to or crossing active watercourses is considered at the time of planning, design and construction of roadways and bridges in Alberta. In recent years retaining walls have been used within the influence of active watercourses for both roadways and bridge crossings resulting in technical, safety and economic concerns.

Key Points:

- Retaining walls can be susceptible to undermining and/or outflanking with potentially catastrophic consequences.
- Failure of retaining walls caused by the erosive and destabilizing actions of flowing water on the wall foundation is such that collapse can occur rapidly without significant warning or visible signs of distress.
- The cost of repairing or reconstructing retaining walls bounding or traversing active watercourses can be prohibitive both economically and environmentally. Conventional fill and structural protection systems generally allow better opportunity to respond quickly to restoring or protecting highway infrastructure.
- Retaining walls will also likely require systematic, specialized inspection throughout their life-cycle.
- Retaining walls generally result in less flexibility (increased throw-away cost) with respect to future infrastructure upgrading.
- Retaining walls paralleling the roadway may require the use of extensive barrier systems resulting in potential operational and safety problems on high volume, high speed roadways.
- Relocation of waterway or roadway and/or conventional fill and protection systems generally result in better economics when overall life-cycle costing is considered as compared to retaining walls.

Recommendations:

- Retaining walls adjacent to or crossing active watercourses are not recommended.
- In cases where there are no other viable alternatives the walls shall be designed to withstand both lateral attack from mobile channels and undermining due to scour. This may result in extensive river protection works as well as appropriate sheet piling, foundation lowering and structural protection works.
- During the planning and design phase of all Alberta Infrastructure and Transportation roadways all viable options avoiding the use of retaining walls for roadways and bridges subject to potential impact from watercourses shall be evaluated. As a minimum this shall include alternatives involving relocation of the roadway or bridge, relocation of the active waterway, modification of roadway cross-section and conventional fill and river protection works.

Implementation of Bulletin

This Bulletin is effective immediately February 26, 2007.

Contacts

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