



Guidelines for Professional Services in the Forest Sector – Crossings

These guidelines set out general standards of professional practice that the Professional Engineer and the Forest Professional must ... meet when providing professional services related to a crossing project. They have been prepared by the Joint Practice Board of the Association of British Columbia Forest Professionals (ABCFP) and the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) and have been adopted by the Council of each Association.

Why Were Guidelines Required?

- Forest development requires the planning, design, construction, inspection and maintenance of forest road bridges and major culverts (“crossings”).
- Government has granted specific professional associations the legislative authority to regulate resource professionals working in the forest sector.

***Why Were Guidelines Required?
Cont'd***

- The regulatory authority includes determining which professional activities should be carried out by members of which professional association and addressing matters related to areas of overlap.
- The planning and design of bridges and major culverts is within an area of practice overlap between the two Associations.

***Why Were Guidelines Required?
Cont'd***

- The *Foresters Act* includes, within the definition of the practice of professional forestry, "planning, locating and approving forest transportation systems including forest roads."
- The *Engineers and Geoscientists Act* includes, within the definition of the practice of professional engineering, "design or directing the construction of public utilities, industrial works, railways, bridges..."

Definitions

Crossing: A forest road bridge or major culvert.

Culvert: A pipe, arch, box or log structure 6 metres or less centre-to-centre of bearing, covered with soil and lying below the road surface used to carry ephemeral or perennial stream flow in a stream channel from one side of a road to the other.

Definitions Cont'd

Bridge: (Not Defined)

However, a bridge is by default any log structure greater than 6 meters center-to-center of bearing or any other composite or non-composite structure of any span.

Coordinating Registered Professional (CRP)

Every crossing project must have a Coordinating Registered Professional (CRP).

The CRP is responsible for the coordination of all of the services required for the crossing project including:

- coordination
- planning/design
- field reviews, as built drawings and crossing assurance

Coordinating Registered Professional (CRP) Cont'd

The CRP must appreciate that while they may, in their professional discretion, delegate tasks to others, the responsibility for the crossing remains with the CRP.

Professional Accountability!

Coordinating Registered Professional (CRP) Cont'd

Coordinating Registered Professional: The CRP is a Registered Professional Forester or a Professional Engineer.

For simple crossings the CRP is either a RPF or a P.Eng.

For all other crossings the CRP must be a P.Eng.

General Requirements of a Simple Crossing

Plans must be prepared using structural details provided in drawings, tables, charts and other design aids that have been prepared by a P. Eng. All design aids must be referenced on the plans and supporting documents.

Factored dead loads and live loads, must impose less than 200 kPa design bearing pressure on the foundation soils or bedrock unless a higher design bearing pressure is authorized by a design aid prepared by a Professional Engineer.

Hydrology and Hydraulics (simple crossings)

- channel must be historically stable with erosion resistant banks; or
- the channel may be historically unstable where the CRP has determined that it is acceptable for the crossing and/or the approaches to be damaged or destroyed during design flow events and this has been shown on the plans.

Approaches, Alignment and Gradient (simple crossings)

- must be stable based on field reviews
- excluding log structures, the road approach shall be aligned to assure that the design vehicle tracks straight on to and off of the crossing with no side tracking, and
- the maximum crossing grade shall be 4% or less excluding log structures with gravel decks.

Foundation Soils or Rock (simple crossings)

Can safely support a design bearing pressure of 200 kPa or more if it is composed of unweathered bedrock free of adverse jointing and discontinuities, dense glacial till, or dense sandy gravel. These ground conditions should be adequate ... provided that the following conditions are met:

- the normal groundwater table is a minimum of 1m below the base of the footings if on soil;

Foundation Soils or Rock (simple crossings) Cont'd

- the bearing surface has a < 5% slope in any direction;
- there is no evidence of instability in the vicinity of the crossing that could impact the proposed structure;
- the footing bears on undisturbed soil, bedrock or a modest thickness of granular fill;
- minimum footing or sill width (subject to a design aid);
- minimum setback requirement

***Foundation Soils or Rock
(simple crossings) Cont'd***

BUT...

It is recognized that soil and bedrock types and conditions vary from place to place in BC.

In these cases it may be possible to develop geotechnical design aids for local or temporary use in order for the crossing to qualify as a simple crossing.

Substructures (simple crossings)

- If constructed of log sills or log cribs, substructures must be 4 metres or less in height, or if constructed of interlocking concrete blocks... must be 2 metres or less in height...
- Plans for substructures must be prepared using design aids prepared by a Professional Engineer.

Superstructures (simple crossings)

must

- be non-composite;
- be single span simply supported;
- incorporate structural designs that have been prepared by a P. Eng. for the loading configuration required;
- have plans developed with the aid of tables prepared by a P. Eng. if consisting of log stringers;

Design Aids

- developed by a P.Eng
- define the design and construction circumstances to which the design aid can be applied
- delineate the geographical area
- explain any limitations in the application
- indicate basis of design aid

Examples:

Log stringer tables, substructure design, foundations

“Other Crossings”

All other structures that do not fall within the simple crossing criteria. Some examples would be composite structures, longer span portable bridges and major culverts.

RPF = simple crossings

PEng = simple crossings, all other crossings including major culverts.

Specialists

- responsible for one or more services (define scope of work)
- is responsible for obtaining relevant project information from the CRP
- overseeing and taking professional responsibility for all work carried out under the specialist’s direct supervision

Examples

Hydrologist, Geotechnical Engineer, Biologists

Planning, Design and Field Review Considerations

The CRP will be responsible for all facets of planning, design and field reviews of the crossing including and not limited to:

- Hydrology and Hydraulics
- Foundations and Substructures
- Approaches and Alignment
- Superstructures
- Construction and Field Reviews
- Plans and Documents

Planning and Design Considerations

- Design and fabrication to be done to CAN/CSA S6 and Canadian Foundation Engineering Manual.
- General arrangement drawings must be signed and sealed by the CRP.
- A complete set of plans will include the general arrangement, detail superstructure and substructure drawings and other fabrication drawings required.

Planning and Design Considerations Cont'd

- Design aids utilized must be referenced on the drawings.
- The CRP may refer to the Forest Engineering Guidebook, Forest Service Bridge Design and Construction Manual and other documents.

***Planning and Design
Considerations Cont'd***

- no template
- a set of drawing should provide enough detail on the location, composition, arrangement, design parameters and fabrication, materials and construction specifications
- must be defensible, and may be subject to a peer review

***Planning and Design
Considerations - Construction
and Field Reviews***

The CRP will be responsible for all field reviews to meet the Bylaws of each association. These may include

- Layout
- Foundations
- Component assembly
- Erosion control measures
- Approaches

Final Field Reviews

- The CRP will be responsible for a final field review after which time the crossing assurance statement will need to be signed and sealed by the CRP.
- The CRP is to identify the frequency of routine maintenance inspections with a maximum of no more than 3 years.
- Special monitoring or inspections are to be identified by the CRP.

Maintenance Inspections

- Maintenance inspections are beyond the scope of the guidelines but at a minimum routine maintenance inspection reports need to be signed and sealed by a Professional Engineer or Forest Professional.

Questions?
