BRITISH COLUMBIA

CATTLEGUARD STANDARDS AND SPECIFICATIONS

(Revised September 2005)

Ministry of Agriculture & Lands

Ministry of Forests and Range

Ministry of Transportation

DESCRIPTION

A cattleguard is a short-span bridge designed to allow the safe passage of motor vehicles, while safely restricting the passage of range cattle. Typically, a cattleguard consists of a series of steel bars or pipes supported on a steel framework and installed flush with the road surface.

All cattleguards supplied to the Ministry of Agriculture & Lands (MOAL), the Ministry of Forests and Range (MOFR), and the Ministry of Transportation (MOT) must conform to these requirements and specifications.

Fabrication of cattleguards cannot commence without written confirmation of approval from the MOFR in accordance with the specifications contained herein.

INVITATION TO QUOTE (ITQ) PROCESS

It is highly recommended that all new suppliers obtain design drawing approval prior to responding to any ITQ, as approval may take some time, particularly if the first submission requires a revision. Purchasing Services will not issue a purchase order to any supplier who has not had their design drawings pre-approved by the Ministry of Forests and Range.

The Province from time to time will conduct in-plant inspections of the cattleguards.

APPROVAL PROCESS

Cattleguard suppliers must provide the following information:

- Cattleguard design drawings
- Statement of Design Conformance
- Design calculations, if requested
- Proof of Canadian Welding Bureau (CWB) certification

All of the above should be sent directly to:

Ministry of Forests and Range
Resource Tenures and Engineering Branch
Attn: Mike Penner, Bridge Engineer
7th fl, 727 Fisgard St
Victoria BC V8W 1R8

DESIGN REQUIREMENTS & SPECIFICATIONS

General

Cattleguard designs shall be supported by a complete set of drawings, showing:

- design live load
- material specifications
- all dimensions
- connection details
- material list shall accompany each design submitted for approval
- cattleguard weight
- reference design codes and standards
- requirement for identification of trademark, model type, design axle load, and date of manufacture permanently marked on each cattleguard.

The design drawings shall be signed and sealed by a Professional Engineer registered to practice in British Columbia. Suppliers must submit a complete set of drawings for each size and type of cattleguard they wish to supply. Once a supplier's drawings have been MOFR approved, no further drawings need be submitted unless the specification changes or the supplier wishes to modify his design. Designers are cautioned that since there is no separate set of shop drawings, these drawings must be sufficiently detailed to ensure that the fabricator has all the information necessary to construct the item. Design drawings will be retained by MOF, MOT, and MAFF but are considered proprietary and will not be issued to other designers or fabricators. Additionally, suppliers are requested to submit the attached Statement of Cattleguard Design Conformance completed and signed by their design engineer.

Cattleguard designs undertaken after June 1, 2001, shall be in accordance with CAN/CSA-S6-00 Canadian Highway Bridge Design Code.

Cattleguards shall be designed for 100,000 cycles of design loading.

An impact load shall be applied concurrently with the design live load. The impact load shall be:

a) a vertical load equal to 40% of the live load, or
b) a vertical load equal to 20% of the live load, combined with a horizontal load equal to 20% of the live load.

The live load plus the impact loads shall be distributed 60% to one side of the vehicle and 40% to the other.

In each of the above applications, the live load shall be placed on the cattleguard in the location(s) causing maximum stress in the member in question.

All material used in the fabrication of cattleguards shall be new.

All steel used in the fabrication of cattleguards shall conform to CSA-G40.21-Grade 300 W (or equivalent) with the exception of round steel pipe, which shall have a minimum yield strength of 240 MPa. Welded and seamless steel pipe conforming to ASTM Standard A53 Grade B (minimum yield 35 ksi) meets this specification

All steel used in the fabrication of cattleguards shall have a minimum specified thickness of 6 mm with the exception of:

a) fence post sleeves and ballast wall (end fill) plates, which shall have a minimum specified thickness of 3 mm,
b) W-beam webs and flanges, which shall have a minimum specified thickness of 5 mm, and
c) running strips, which shall have a minimum specified thickness of 12 mm.

Finished cattleguards shall be identified with a trademark, model type, design axle load in kilonewtons and date of manufacture stamped or welded in an area of the guard that will be easily read after installation.

Welding

Welding shall only be undertaken by a company certified by the Canadian Welding Bureau to the requirements of CSA Standard W47.1 — Certification of Companies for Fusion Welding of Steel Structures, Division 3, or better, with work performed to CSA Standard W59. Certification must be in place at the time of tender and shall remain in place for the duration of the fabrication. All bidders must be able to provide proof of appropriate Canadian Welding Bureau (CWB) certification upon request.

Painting

All cattleguards shall be painted. Surface preparation shall be to SSPC SP10 – near white metal abrasive blast with a sharp 50 to 75 micron profile. Paint shall be a single coat of inorganic, zinc-rich primer at a dry film thickness (DFT) of 50 – 75 microns over the profile.

Only approved inorganic zinc-rich primers listed in the British Columbia Ministry of Transportation *Recognized Products Book* under Coating Systems — Structural Steel — Severe Conditions — SS1 shall be used. Currently approved products are listed at:

http://www.th.gov.bc.ca/bchighways/operations/hwyeng/geotech/geotech.htm

Inspection

All cattleguards are subject to possible in-plant inspections by a government representative prior to delivery. Successful bidders must provide the government's quality assurance representative with copies of their construction drawings, together with their fabrication and coating schedule upon request. Completed cattleguards must not be shipped without approval of the government, or their quality assurance representative.

Size

All cattleguards shall be 2438 mm long (direction of traffic), edge to edge, on the deck surface. Single-lane, light-duty Range-type cattleguards shall be 3600, or 4800 mm wide, as specified. Widths for Standard Highway, and Off-Highway cattleguards shall be either 4800 mm (one lane), or 7300 mm (two lane), as specified.

ATV cattleguards shall be 2438 mm long (direction of traffic) and 1524 mm wide.

Deck Construction

The deck shall be constructed of pipes (maximum diameter 115 mm) or beams (maximum flange width 50 mm) arranged perpendicular to traffic flow, with a 125 – 150 mm space in between. Gussets or reinforcement between members shall not permit the build up of gravel or snow that might enhance the ability of cattle to cross.

Running strips shall be between 38 and 50 mm wide and the spacing between each strip shall be between 75 and 100 mm. Running strips shall be minimum 12mm thick. Strips shall allow smooth passage of cars and trucks, while restricting the crossing of cattle.

The ends of the running strips shall be bent down a minimum of 50 mm (measured vertically from top of deck) if beams are used for the deck, or where pipes are used, wrapped a minimum of 60 degrees (measured from the vertical at the top of the pipe). The end region of the running strips shall be welded along the complete leading and side edges that are in contact with the pipe or beam. Running strips shall not be spliced.

Where specified, running strips shall be placed in the wheel path to accommodate an average passenger car as well as logging traffic and highway accessible construction vehicles. Running strip thickness shall be adequate for the design loading. For 3600 and 4800 mm widths, running strips shall be installed on a single-lane basis; for the 7300 mm width, the strips shall be installed on a two-lane basis.

A maximum of four splices per cattleguard are permitted on deck pipes or beams. All splices shall be reinforced with sleeves or plates (factory splices included).

Fencepost sleeves shall pass through the deck and be attached to the frame. They shall be designed to accept a 75 mm steel or timber fence post, at an angle of 115° from horizontal. The top of the sleeve shall not protrude above the deck.

Frame Construction

The frame shall be designed to evenly distribute the vehicle loading from the deck to the sills. The ends of frame that contact the ground shall be effectively blocked to prevent road material from falling underneath the cattleguard.

Sill Construction

The sill distributes the total loads from the cattleguard to the ground. The sill shall be constructed from round or rectangular steel sections or flat plate and shall run the full width of the cattleguard. If rectangular sections or flat plate are used, the width of the sill shall be such to provide a minimum horizontal soil contact width of 200 mm.

If round pipe sections are used, the minimum pipe diameter shall be 115 mm. A minimum of 2 pipes per sill shall be used and they shall be spaced over a minimum width of 350 mm, measured center to center of the outer pipes.

If channel sections are used in cattleguard construction, measures must be taken to avoid water, snow, and dirt accumulation.

CATTLEGUARD CLASSIFICATIONS

(B1) Range Type

Single-lane range type cattleguards are supplied to the Ministry of Agriculture & Lands for installation on those lightly used roads where the anticipated traffic is limited to standard farm, ranch, or silviculture vehicles.

Design Live Load:	truck with tandem axles (1.2 m axle spacing): Max 90 kN per axle.
Width:	3600 mm and 4800 mm – required width must be specified on order.
Running strips:	Optional, requirement to be specified on order.

(B2) Standard Highway Type

All cattleguards supplied to the Ministry of Transportation shall be this type. Standard highway type cattleguards are used throughout the province on both paved and unpaved roads.

Design Live Load: truck with tandem axles: 120 kN per axle
(1.2 m axle spacing).

Width: 4800 mm – one lane
7300 mm – two lanes

Running strips are mandatory

(B3) Off Highway Type

Off-highway cattleguards are supplied to the Ministry of Forests and Range to be used on logging access roads where the loaded vehicle weight exceeds the legal highway limit (traffic described for B1 and B2 is also present).

Design Live Load (must be specified on order):

a) L-75: tandem axle – 154 kN per axle (1.2 m axle spacing)

OR

b) L-100: tandem axle – 205 kN per axle (1.68 m axle spacing)

Width: 4800 mm – one lane
7300 mm – two lanes

Running strips: Optional, requirement to be specified on order.

(A1) ATV Type

ATV type cattleguards are supplied to the Ministry of Forests and Range for use on recreational access trails where car and truck access is restricted. Where car or truck access is possible, alternate cattleguards must be used.

Design Live Load: Two axle – 4 wheel All-Terrain Vehicle
Transverse c/c wheel spacing = 1000 mm
Longitudinal c/c axle spacing = 1200 mm
Axle Weight = 9 kN

Width: 1524 mm Running strips – not required.

SAMPLE REQUISITION/TENDER NOTES

Sample 1 Description Range Type Cattleguard (B1)
Width: 3600 mm
Running strips required.

Sample 2 Description Standard Highway Type Cattleguard (B2)
Width 7300 mm

Sample 3 Description Off-Highway Type Cattleguard (B3)
Live Load: L-100
Width: 4800 mm
No running strips

Sample 4 Description ATV Type Cattleguard (A1)
Width: 1524 mm
Live Load: Two axle – 4 wheel All-Terrain Vehicle
Transverse c/c wheel spacing – 1000 mm
Longitudinal c/c axle spacing – 1200 mm
Axle Weight – 9 kN
Running strips not required

Statement of Cattleguard Design Conformance

I am a Professional Engineer, licensed to practice in the Province of BC, and I have undertaken professional responsibility for the design of Cattleguards for the firm:

____.

The design drawings which have been prepared by me or under my direct supervision are:

Drawing No.(s)	**Drawing Date**

I confirm that the designs are in conformance with the Ministry of Agriculture, Food and Fisheries, Ministry of Forests and Range, and Ministry of Transportation, Cattleguard Standards and Specifications, dated September 2005.

Signature of Professional Engineer			(please affix professional seal here)
Name of Professional Engineer *(please print)*		DATE SIGNED YYYY MM DD	
EMPLOYER'S NAME AND ADDRESS (*please print)*			
PHONE NO.	FAX NO.		E-MAIL ADDRESS