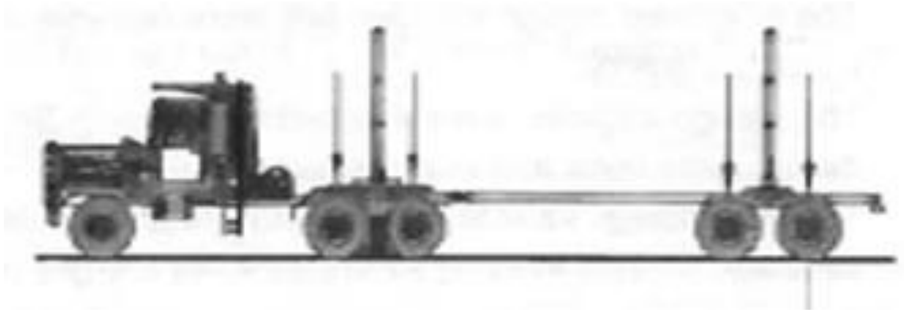

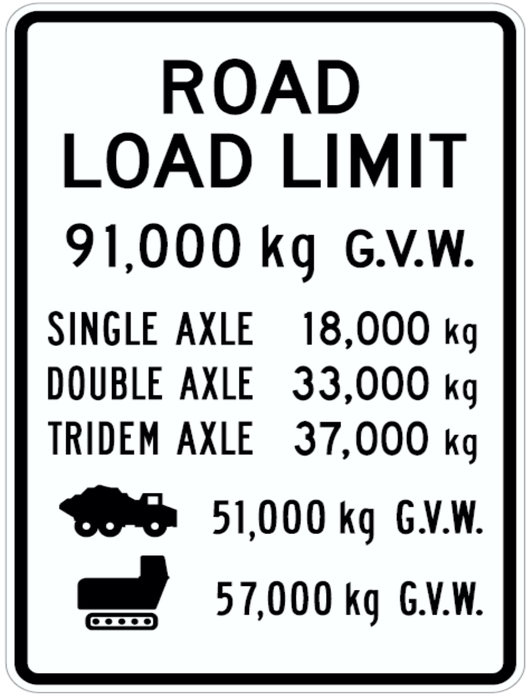

LOAD LIMITS FOR B.C. FORESTRY BRIDGES

18 November 2020

Allan Bradley and Brian Chow

FPInnovations

BRITISH COLUMBIA

Ministry of Forests, Lands, Natural Resource Operations and Rural Development

OUTLINE

- Why this project?
- Development of approach for B.C. forestry bridge and road load limits
- Load Limits:
  - BCFS designs
  - CL-625 & BCL-625 designs
  - LOH & HOH designs
  - Concentrated load vehicles
- Discussion

BRIDGE CAPACITY LOAD LIMITS FOR RESOURCE ROAD BRIDGES ARE NOT WELL UNDERSTOOD

- Bridge capacity signage is inadequate.
- Focus is on GVW – but not design vehicle.
- Implications of concentrated load vehicles not well understood.
- Non-forest industry traffic using forestry bridges.
- Real concern for overloading of bridges.
- A new methodology for posting of bridges is required.

NEW TRUCK CONFIGURATIONS

CONCENTRATED LOADING

VOLVO A30D (15 t + 36 t = 51 t)

Madill 120 (48 t on 3.8 m-long contact strips)

FPInnovations®

VERY HEAVY LOADS FROM NON-FORESTRY USERS

82 t GCW. Tandem-axle jeep left at side of highway

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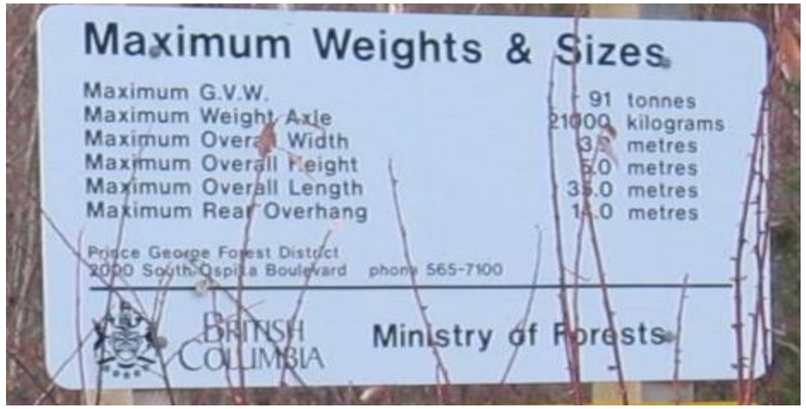
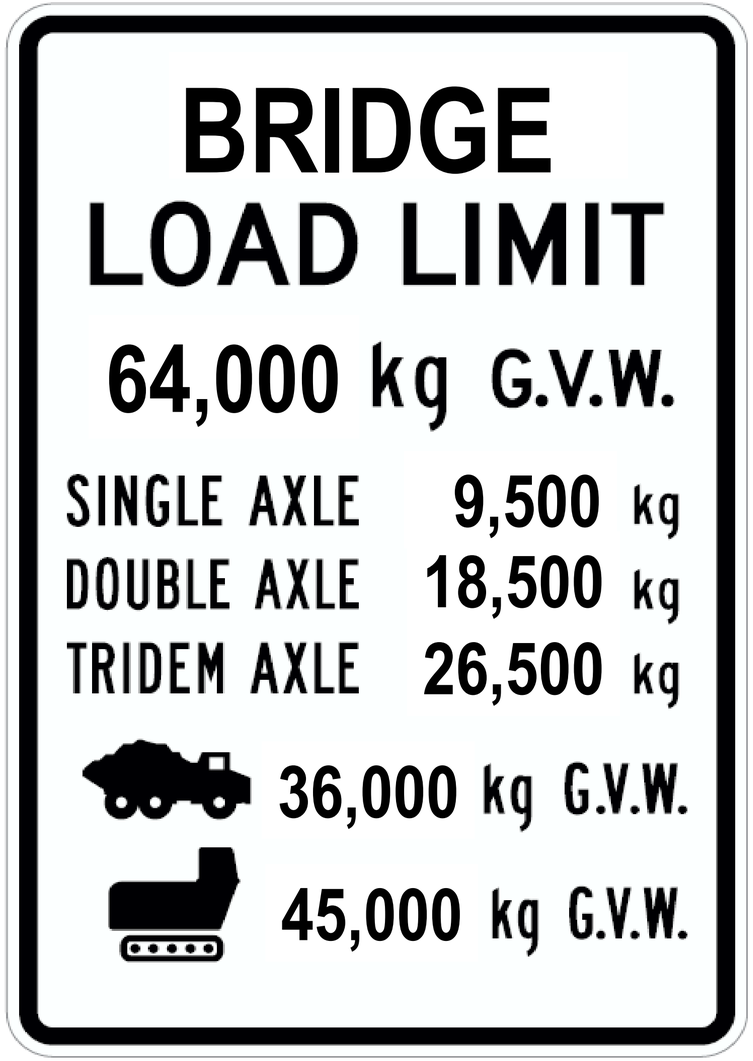
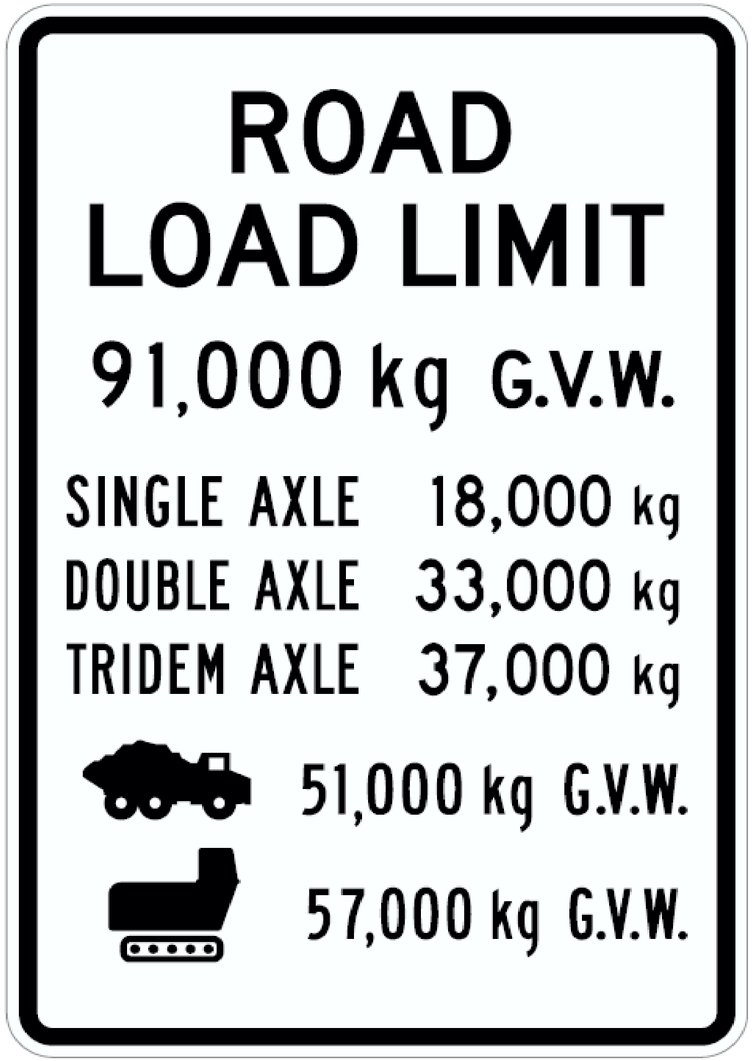
INADEQUATE SIGNAGE

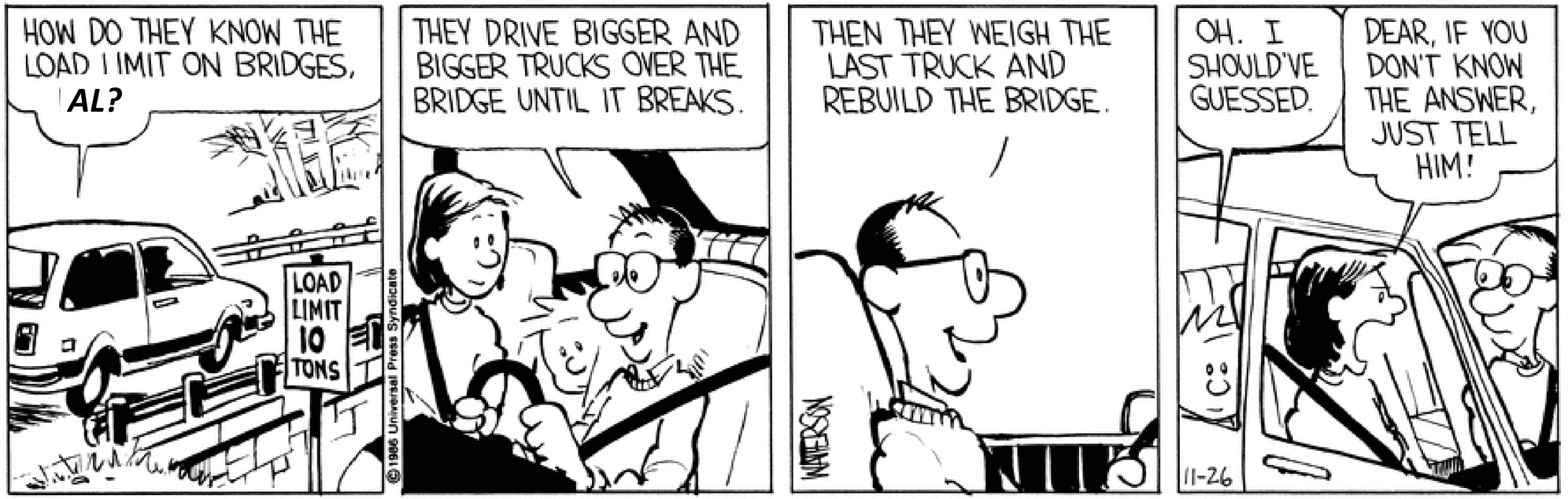


NEW FSR LOAD LIMIT SIGN





HOW DO *THEY KNOW* THE SAFE LOAD LIMIT OF BRIDGES?



CALVIN AND HOBBS

DEVELOPMENT OF APPROACH – KEY REFERENCE

Gagnon, Darrel. January 2003. *Design Vehicle Configuration Analysis and CSA-S6-00-Implication Evaluation*. Buckland & Taylor Ltd. Prepared for BC MOF.

Objective: determine if BCFS design vehicles are representative of current log truck traffic, and are appropriate for use with load factors from CHBDC S6-00.

Data: FERIC collected GVW, axle loads, axle spacing data. Dataset only sufficient to statistically analyse L-75 and highway legal trucks.

Conclusions:

- L-75 represents on-highway trucks well; L-100 represents overloaded on-highway trucks.
- Live load factors were found to vary by bridge component, bridge length, and design vehicle. A modified L-75 design vehicle was calculated that would allow a single live load factor to be used for all bridge lengths and components.
- LLF of 1.47 (rounded to 1.5) could be used for L-75 design because load control by mills makes trucks conform to PA traffic definition (trucks with tridem axle groups conform to PS traffic).

DEVELOPMENT OF APPROACH – KEY REFERENCE

Gagnon, Darrel. June 2003. *Design Vehicle Configuration Analysis and CSA-S6-00- Implication Evaluation. **Phase II***. Buckland & Taylor Ltd. Prepared for BC MoF.

Objective: to determine whether BCFS design vehicles were reasonably representative of the L-100 and L-165, and also good for logging equipment transport trucks.

Data: GVW only. Phase I stats used for axle loads. Theoretical lowbed loadings.

Conclusions:

- As in Phase I, live load factors were found to vary by bridge component, bridge length, and design vehicle.
- As in Phase I, modified BCFS design vehicles were calculated that would allow a single live load factor to be used for all bridge lengths and components.
- As in Phase I, CL-W design vehicles also were evaluated as an alternative to the BCFS design vehicles but these needed customizing and, therefore, offered no advantage.

DEVELOPMENT OF APPROACH – KEY REFERENCE

Gagnon, Darrel. October 2004. *Design Vehicle Configuration Analysis and CSA-S6-00-Implication Evaluation. **Phase III**.* Buckland & Taylor Ltd. Prepared for BC MoF

Objective: to develop three design vehicles to replace BCFS design vehicles and conform to CHBDC S6-00:

-CL-625 for on-highway log trucks (63,500 kg GVCW per CHBDC)
-Light off-highway **LOH** truck (73,400 kg GVW)
-Heavy off-highway **HOH** truck (114,200 kg GVW)

Conclusions:

LOH could replace the L-100 (and L-75) design vehicles.

HOH could replace the L-165 (and L-150) design vehicles.

Lane loadings for LOH and HOH design vehicles better account for multi-vehicle bridge loads.

DEVELOPMENTS 2004 - 2009

- CSA releases 2006 CHBDC S6-06.
- BC MoTI and BC MoF adopt BCL-625 for design of all bridges for on-highway trucks.
- BC MoF adopted S6-06 truck eccentricity (600 mm from curb) for BCL-625 (and dropped use of CL-625).
- BC MoF retained load imbalances (60% / 40% and 55%/ 45%) for BCFS designs. The BCL-625 has a 50% / 50% load imbalance.

DEVELOPMENT OF APPROACH – KEY REFERENCE

Associated Engineering. June 2009. *Review of Development and Implementation of the New Design Vehicles for the Design of Bridges*. Prepared for BC MoFR.

Objective: Review the development of the LOH and HOH design vehicles, consider adoption of the BCL-625 design vehicle, and recommend how to adopt within CHBDC S6-06

Conclusions:

- BCL-625 is suitable for on-highway log truck traffic, and for L-45 and L-60 traffic.
- Adopted 50% / 50% load imbalance and 600 mm-to-curb eccentricity. Changing the load imbalance was offset with some dimensional and axle loading changes – developed by Darrel Gagnon of Buckland & Taylor.
- Revised LOH design vehicle (72,375 kg GVW); HOH design vehicle (114,200 kg GVW).
- Recommended that BC MoFR develop a screening tool for bridges.

DEVELOPMENT OF APPROACH – KEY REFERENCE

Gagnon, Darrel. April 2012. *Logging Truck Target Vehicles*. Buckland & Taylor Ltd. Prepared for BC FLNRO.

Objective: Develop guidelines for posting load limits based on GVW and axle load limits of BCFS, LOH & HOH design vehicles.

Conclusions:

- To achieve same design load factor, tandem axle loads for BCFS designs = 37% of GVW and LOH & HOH designs = 46% of GVW.
- Allowing for improved load distribution of tridem axles, tridem group load limit = 110% of tandem load limit.
- Single axle load limit = 53% of tandem axle load limit.

DEVELOPMENT OF APPROACH – KEY REFERENCE

McClelland, Gary. May 2013. *Road Load Rating Project*. SNT Engineering Ltd. Prepared for BC FLNRO.

Objective: Review and recommend improvements to previously developed bridge load limits.

Conclusions:

- Gagnon (2012) GVW and axle load limits should be adopted, as proposed.
- Extended load limits to include concentrated loadings, such as from 3-axle articulated dump trucks and 4-axle gravel trucks (“short trucks”), and tracked forestry equipment that might be walked across a forest bridge.

DEVELOPMENT OF APPROACH – KEY REFERENCE

Bradley, Allan. September 2020 (revised). *Forest Bridge Capacity Signage*. Technical report 202016. FPInnovations. Prepared for BC FLNRORD.

Objectives: Review previously developed bridge load limits, recommend format for road & bridge signage, gather industry feedback about new signage and road load rating concept.

Conclusions:

- Reject Gagnon (2012) GVW increase -- non-forestry road users may not conform to PA traffic.
- McClelland (2013) short truck and tracked equipment GVW revised using different live load factors and short truck method.
- Concentrated load limits estimated for concrete slab & gravel-over-log stringer forest bridges.
- Added Load Limits for CL-625, L-90, and L-120, using same methodology.
- Comprehensive signage format
- Proposed concept for posting load limits for road networks.
- Forest industry generally accepting of road load limit concept.

DETERMINING THE SAFE LOAD LIMIT

Analysis based on broad scale screening rather than load rating individual bridges.

Maximum design vehicle force effects (design capacity) was determined for range of 5m to 36m simple spans.

Safe load limits for GVW and axle loads, and concentrated loads were determined for each bridge design.

TABLE 5: LOAD LIMITS FOR B.C. FORESTRY BRIDGES (2019 DRAFT)

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel- over log bridge
L-45	44	8.5	16.0	17.5	26	39	33
L-60	58	11.5	21.5	23.5	35	43	36
CL-625	62	9.5	18.5	25.5	35	49	41
BCL-625	64	9.5	18.5	25.5	35	54	45
L-75	73	14.5	27.0	29.5	42	54	45
LOH	82	20.0	37.5	41.5	57	72	57
L-90	87	17	32	35	49	66	55
L-100	97	19	36	40	55	69	57
L-120	116	23	43	48	66	87	71
HOH	129	32	60	66	89	97	95
L-150	145	29	54	59	83	110	88
L-165	160	32	59	65	91	136	113

CHANGES TO 2019 DRAFT LOAD LIMITS

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel- over log bridge
L-45	41	8.5	16.0	17.5	26	39	33
L-60	55	11.5	21.5	23.5	35	43	36
CL-625	64	9.5	18.5	25.5	35	49	41
BCL-625	64	9.5	18.5	25.5	35	54	45
L-75	68	14.5	27.0	29.5	42	54	45
LOH	72	20.0	37.5	41.5	57	72	57
L-90	82	17	32	35	49	66	55
L-100	91	19	36	40	55	69	57
L-120	109	23	43	48	66	87	71
HOH	114	32	60	66	89	97	95
L-150	136	29	54	59	83	110	88
L-165	150	32	59	65	91	136	113

CHANGES TO 2019 DRAFT LOAD LIMITS

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel- over log bridge
L-45	41	8.0	15.0	16.5	26	39	33
L-60	55	10.5	20.0	22.0	35	43	36
CL-625	64	9.5	18.5	26.5	35	49	41
BCL-625	64	9.5	18.5	26.5	35	54	45
L-75	68	13.0	25.0	27.5	42	54	45
LOH	72	18	34	37	57	72	57
L-90	82	16	30	33	49	66	55
L-100	91	18	33	37	55	69	57
L-120	109	21	40	44	66	87	71
HOH	114	28	53	58	89	97	95
L-150	136	27	50	55	83	110	88
L-165	150	29	55	61	91	136	113

CHANGES TO 2019 DRAFT LOAD LIMITS

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel- over log bridge
L-45	41	8.0	15.0	16.5	25	39	33
L-60	55	10.5	20.0	22.0	33	43	36
CL-625	64	9.5	18.5	26.5	36	49	41
BCL-625	64	9.5	18.5	26.5	36	54	45
L-75	68	13.0	25.0	27.5	41	54	45
LOH	72	18	34	37	51	72	57
L-90	82	16	30	33	46	66	55
L-100	91	18	33	37	51	69	57
L-120	109	21	40	44	61	87	71
HOH	114	28	53	58	80	97	95
L-150	136	27	50	55	77	110	88
L-165	150	29	55	61	84	136	113

CHANGES TO 2019 DRAFT LOAD LIMITS

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel- over log bridge
L-45	41	8.0	15.0	16.5	25	39	33
L-60	55	10.5	20.0	22.0	33	43	36
CL-625	64	9.5	18.5	26.5	36	49	41
BCL-625	64	9.5	18.5	26.5	36	54	45
L-75	68	13.0	25.0	27.5	41	54	45
LOH	72	18	34	37	51	72	57
L-90	82	16	30	33	46	66	55
L-100	91	18	33	37	51	69	57
L-120	109	21	40	44	61	87	71
HOH	114	28	53	58	80	97	95
L-150	136	27	50	55	77	110	88
L-165	150	29	55	61	84	136	113

CHANGES TO 2019 DRAFT LOAD LIMITS

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel- over log bridge
L-45	-3	-.5	-1	-1	-1	0	0
L-60	-3	-1	-1.5	-1.5	-2	0	0
CL-625	+2	0	0	1	1	1	0
BCL-625	0	0	0	1	1	1	0
L-75	-5	-1.5	-2	-2	-1	0	0
LOH	-10	-2	-3.5	-4.5	-6	1	4
L-90	-5	-1	-2	-2	-3	0	0
L-100	-6	-1	-3	-3	-4	0	0
L-120	-5	-2	-3	-4	-5	-4	-2
HOH	-15	-4	-7	-8	-9	13	1
L-150	-9	-2	-4	-4	-6	-6	0
L-165	-10	-3	-4	-4	-7	-6	1

TABLE 7: LOAD LIMITS FOR B.C. FORESTRY BRIDGES (2020)

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridges	*Concrete slab or gravel-over-log bridges*
L-45	41	8.0	15.0	16.5	25	39	33
L-60	55	10.5	20.0	22.0	33	43	36
CL-625	64	9.5	18.5	26.5	36	50	41
BCL-625	64	9.5	18.5	26.5	36	55	45
L-75	68	13.0	25.0	27.5	41	54	45
LOH	72	18	34	37	51	73	61
L-90	82	16	30	33	46	66	55
L-100	91	18	33	37	51	69	57
L-120	109	21	40	44	61	83	69
HOH	114	28	53	58	80	110	96
L-150	136	27	50	55	77	104	88
L-165	150	29	55	61	84	130	114

TRUCK-SPECIFIC ANALYSIS USED TO SET BRIDGE LIMITS

9-axle tridem-drive B-train (72.3 t)

Bridge design vehicle configuration	Max. length of simple single-span bridges able to support tridem-drive 9-axle B-trains
L-45	6.5 m [8.5 to 12 m spans OK also]
L-60	24 m
CL-625	31 m
BCL-625	37 m
L-75	80 m
L-100	80 m

SHORT TRUCKS AND TRACKED VEHICLES

FPInnovations®

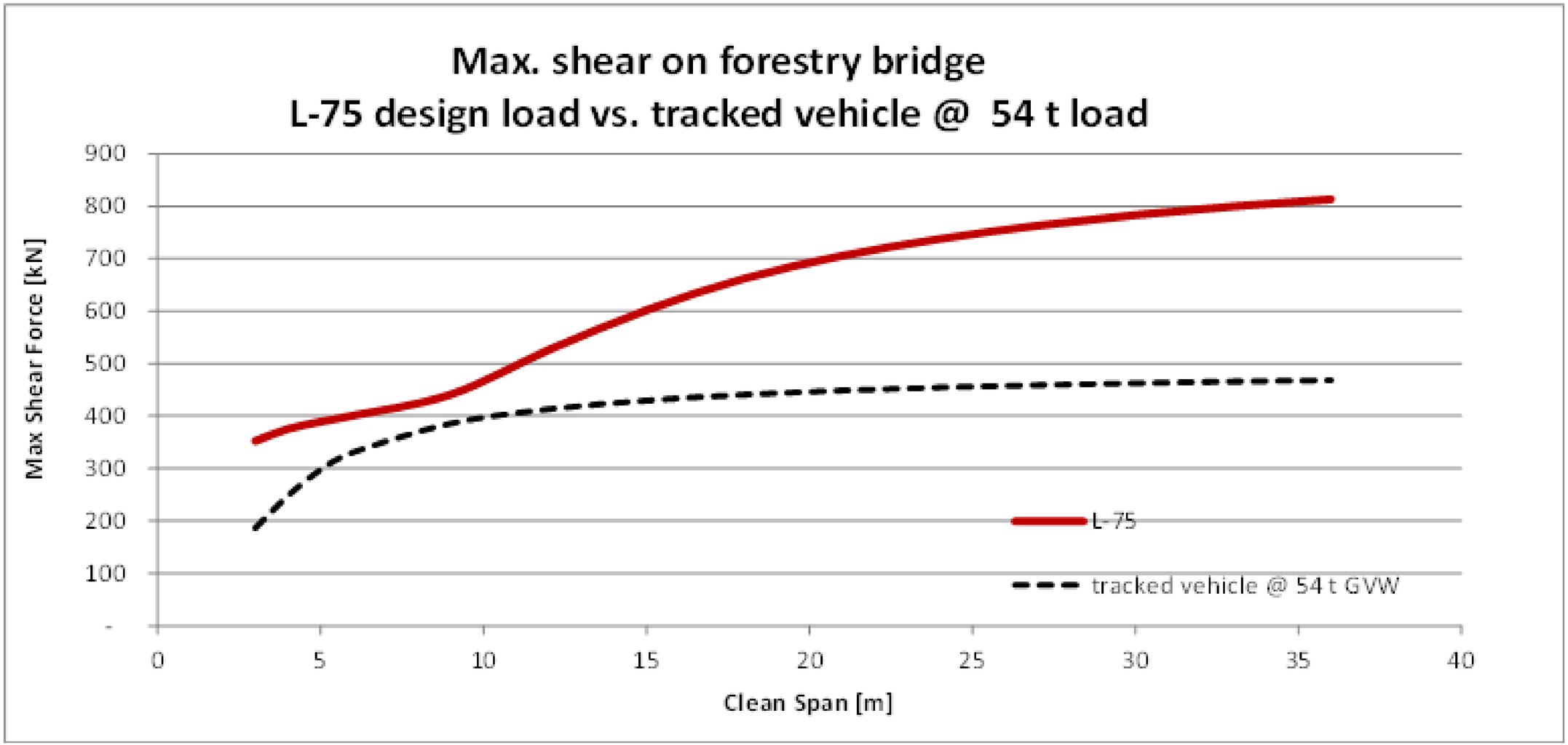
PROPOSED SHORT TRUCK & TRACKED EQUIPMENT LOAD LIMITS FOR DESIGN

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel-over-log bridge
L-45	41	8.0	15.0	16.5	25	39	33
L-60	55	10.5	20.0	22.0	33	43	36
CL-625	64	9.5	18.5	26.5	36	50	41
BCL-625	64	9.5	18.5	26.5	36	55	45
L-75	68	13.0	25.0	27.5	41	54	45
LOH	72	18	34	37	51	73	61
L-90	82	16	30	33	46	66	55
L-100	91	18	33	37	51	69	57
L-120	109	21	40	44	61	83	69
HOH	114	28	53	58	80	110	96
L-150	136	27	50	55	77	104	88
L-165	150	29	55	61	84	130	114

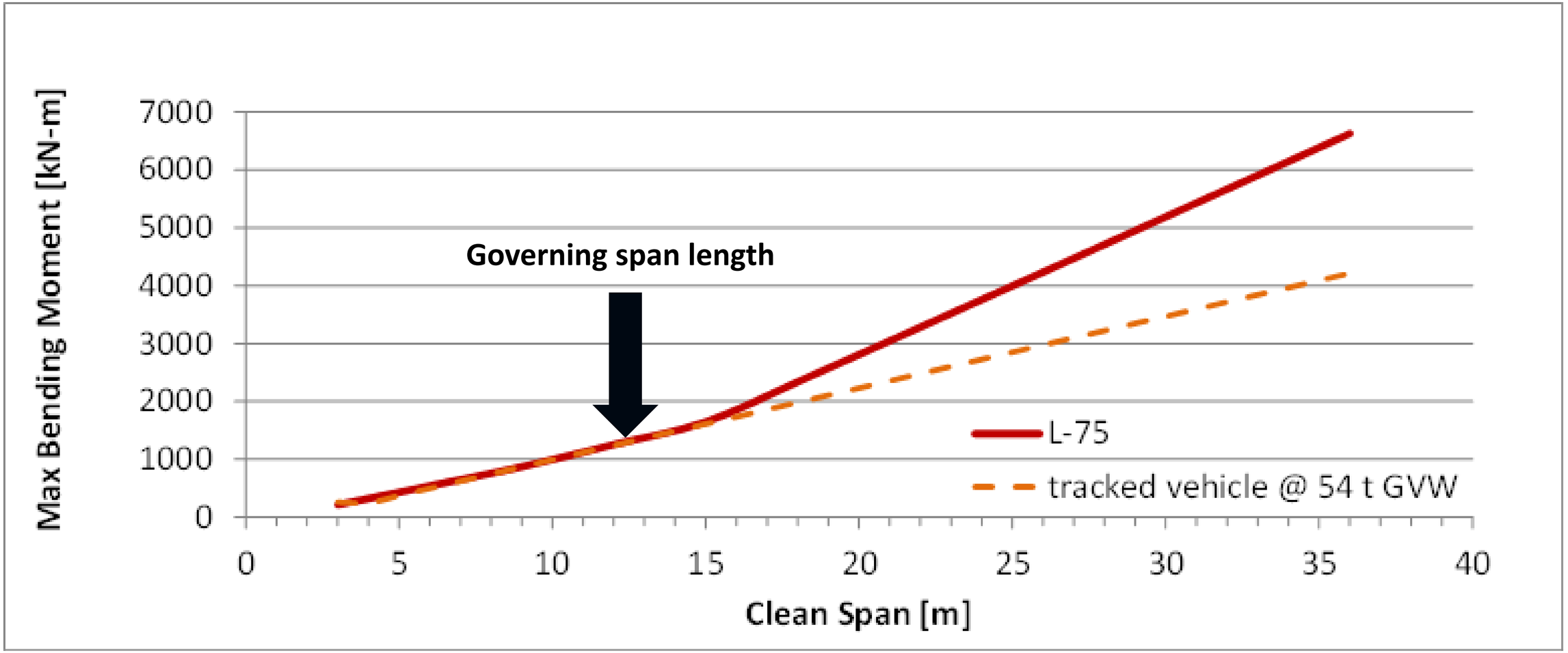
SHORT TRUCK GVW LOAD LIMITS

- Survey of 29 common Articulated Dump Trucks found all GVW > 43 tonnes. These truck GVWs exceeded the GVW load limit of many of the lighter bridge designs.
- GVW load limit for short trucks on L-45, L-60, CL-625, BCL-625 and L-75 bridges set for gravel trucks. Short truck **GVW** Limit = **single axle** limit + **tridem axle** limit.
- GVW load limit for short trucks for LOH and heavier designs bridges set for articulated dump trucks. Short truck **GVW** Limit = **single axle** limit + **tandem axle** limit.
- Check of GVW load limit based on force effects comparison and from factored axle loads gave good agreement (GO – NO GO table).

COMPARISON OF MAXIMUM SHEAR FORCE FROM L-75 TRUCK VS. 54-TONNE TRACKED VEHICLE FOR 5 – 36 M SPANS



COMPARISON OF MAXIMUM BENDING MOMENT FROM L-75 TRUCK VS. 54-TONNE TRACKED VEHICLE FOR 5 – 36 M SPANS



GO – NO GO TABLE FOR ARTICULATED ROCK TRUCKS

Articulated rock truck	GVW (tonnes)	The bridge design capacity is sufficient (GO) or the bridge design capacity is not sufficient (NO GO)											
		L-45 (40.9)	L-60 (54.5)	CL-625 (63.7)	BCL-625 (63.7)	L-75 (68.2)	LOH (72.4)	L-90 (81.8)	L-100 (90.9)	L-120 (109.1)	HOH (114.2)	L-150 (136.4)	L-165 (150.0)
Bell B25E	43.7	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO	GO	GO
John Deere 260E	46.7	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO	GO	GO
Cat 725 C2	47.0	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Volvo A25G	47.5	NO GO	NO GO	NO GO	GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Bell B30E	48.2	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Terex TA250	48.3	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
John Deere 310E	51.0	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Doosan DA 30	51.5	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Terex TA300	51.5	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Cat 730	51.9	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Volvo A30G	52.3	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Cat 730 EJ	53.3	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO	GO
Komatsu HM 300-5	53.5	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO	GO	GO	GO
Bell B40D	66.9	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Terex TA400	68.3	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Cat 740 GC	68.7	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Volvo A40G	68.9	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
John Deere 410E	69.1	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Doosan DA40-5	70.3	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Bell B40E	70.8	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Volvo A45G	71.1	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Bell B45E	72.9	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Cat 740 EJ	73.7	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
John Deere 460E	74.0	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Cat 745	74.4	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Komatsu HM 400-5	75.1	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Bell B50D	79.9	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Bell B50E	81.1	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	GO	GO	GO
Volvo A60H	98.4	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO	NO GO

TABLE 7: LOAD LIMITS FOR B.C. FORESTRY BRIDGES

Design Vehicle	GVW Load Limit (tonnes)	Single Axle Load Limit (tonnes)	Tandem Axle Load Limit (tonnes)	Tridem Axle Load Limit (tonnes)	Short Truck Load Limit (tonnes)	Tracked Equipment Load Limit (t)	
						2-girder forestry bridge	Slab or gravel-over-log bridge
L-45	41	8.0	15.0	16.5	25	39	33
L-60	55	10.5	20.0	22.0	33	43	36
CL-625	64	9.5	18.5	26.5	36	50	41
BCL-625	64	9.5	18.5	26.5	36	55	45
L-75	68	13.0	25.0	27.5	41	54	45
LOH	72	18	34	37	51	73	61
L-90	82	16	30	33	46	66	55
L-100	91	18	33	37	51	69	57
L-120	109	21	40	44	61	83	69
HOH	114	28	53	58	80	110	96
L-150	136	27	50	55	77	104	88
L-165	150	29	55	61	84	130	114

CAVEATS TO BRIDGE LOAD LIMITS

- The load limits table is intended for use by qualified professionals who are experienced with the design and evaluation of forest road bridges, who have reviewed these caveats, the source document (Bradley 2020), and understand the limitations of the analysis and information.
- Load limits assume that the bridge was appropriately designed, constructed, maintained, and has no structural issues.
- Load limits apply to conventional two-girder, single span, simply supported BC forestry bridges (**except concrete slabs or log stringers for tracked equipment GVW limits*).
- Load limits can be applied to all bridges 5 to 36 m-long with a given design vehicle; a more detailed evaluation (considering span length and structural elements) will likely yield higher allowable loads.
- Definition of design vehicles may change over time. These load limits are based upon the most recent definitions. Load limits apply to the original design vehicle and not to any subsequent uprating that wasn't justified by structural upgrades.

CAVEATS TO PROPOSED LOAD LIMITS

- Load limits apply to simple, single spans only – carrying one vehicle at a time.
- L-45 to L-120 Load Limits apply to conventional forestry bridges with decks 4.26 m wide (14’ wide) and supported by two stringers spaced 3 m apart. L-150 to L-165 Load Limits apply to conventional forestry bridges with decks 4.88 m wide (16’ wide) and supported by two stringers spaced 3.6 m apart. Different distribution factors (and load limits) would apply to different deck and (or) arrangements.
- Load limits for short trucks and tracked equipment are based on specific assumptions that are detailed in Bradley (2020). Expert judgement was used to select live load factors because no studies of DLA and LLF were available. A more detailed evaluation with the specific vehicle could yield higher allowable loads.

ACCESS TO REFERENCES

- Link to download Bradley (2020) and other referenced documents:

https://www2.gov.bc.ca/gov/content/industry/natural-resource-use/resource-roads/engineering-standards-guidelines/bridge-design-construction

- Copies of Bradley (2020) are also available from FPInnovations.

- Links to **this webinar presentation** will be posted on the EGBC website and on the above FLNR bridge engineering website.

QUESTIONS?

- Questions?
- What thoughts have you to share about implementation?

Need more information?

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