MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

ASSESSMENT OF POTENTIAL SAFETY BENEFITS OF A WEIGHT ALLOWANCE REDUCTION FOR QUAD AXLE TRAILERS IN BRITISH COLUMBIA

FINAL REPORT (REVISED JANUARY 2014)

JANUARY 2014
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January 22, 2014

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EBA File: V31201696
ISSUED FOR USE
Via Email: Perry.Dennis@gov.bc.ca

ATTENTION: Perry Dennis
Deputy Director

Dear Mr. Dennis:

SUBJECT: Assessment of Potential Safety Benefits of a Weight Allowance Reduction for Quad Axle Trailers

As requested, EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company has now finalized our report on the Potential Safety Benefits of a Weight Allowance Reduction for Quad Axle Trailers registered in British Columbia. The attached report incorporates comments on the "Issued for Review" report distributed earlier this year.

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
EBA Engineering Consultants Ltd.

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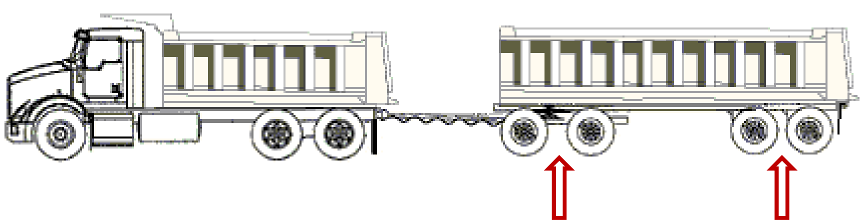
BACKGROUND

In 1991, the Provinces of Canada signed a Memorandum of Understanding (MoU) to adopt a *uniform national standard for dimensions and weight limits of interprovincial heavy commercial vehicles*. Under the MOU, the maximum allowable weight for a quad-axle trailer would be reduced from 34,000 kg to 31,000 kg. The rationale for the reduction was to reduce the impact of heavy vehicles on the structure of the roadway. In BC, the weight reduction would affect the transport of gravel aggregates, logs, and bulk liquids. These categories of vehicle operate almost exclusively within the province. Before implementing this regulation, the Ministry of Transportation wished to understand the implications of the weight reduction, in particular the potential safety benefits and cost implications and impact on the trucking industry.

Generic Combination with Quad-Axle Trailer Weight Limits (Existing)



EXPERIENCE ELSEWHERE

BC has yet to amend its vehicle regulation to incorporate the MoU. In several provinces and territories the "Quad Axle trailer" is not specifically recognized. In others the total weight of the truck/trailer combination governs the maximum load. In most provinces and territories the maximum permitted load for this type of trailer is 31,000 kg. In Ontario, the vehicle regulations have recently been updated so that the maximum load that can be carried by a commercial vehicle is defined by the vehicle design, primarily axle spacing. There have been no formal studies to determine whether there has been a measured safety benefit from the implementation of the weight reduction.

APPROACH

The study covers two distinct phases:

Phase A: Available data from Commercial Vehicle Safety Enforcement (CVSE), the Insurance Corporation of British Columbia (ICBC) and Ministry of Transportation and Infrastructure (MoTI) was reviewed to determine its suitability for the study. We assessed the growth of claims and actively insured vehicles, trends in collisions involving different types of commercial vehicle and estimated the potential costs associated with reducing the maximum allowable weight.

Phase B: Representatives from the trucking industry were interviewed to obtain information on their typical use of these trailers and to provide feedback on the potential implications of the weight reduction on their business.

DATA ANALYSIS

Information on the weight and status of a trailer at the time of a crash is not routinely recorded, so there is limited data to directly assess the safety implications of the proposed weight reduction. Analysis of claim and registration data for the affected truck-trailer combination concluded that between 2002 and 2011 the claim rate for vehicles that would be affected by the weight reduction has been stable. While the number of claims increased, the increase in claims was slower than the number of registered vehicles.

Crash data collected between 2002 and 2011 shows that for the category of truck-trailer combination of interest, there was a considerable reduction in the number of reported collisions on numbered Provincial Highways. Human error and road conditions were identified as the primary cause of crashes for the category of truck-trailer affected by the weight reduction. Given the complexity of factors involved it truck crashes it is difficult to isolate crashes that may be eliminated, or where the severity would be reduced, if the weight limit were reduced.

ASSESSMENT OF IMPACT

A main consequence of the weight reduction will be to increase the number of truck-trailer trips required to deliver the same payload. Truck operators could see an increase in operating costs and ICBC an increase in claims resulting from the increased travel. Additional operational costs are primarily driver time and fuel costs. Other impacts include additional emissions and deterioration of pavement due to more trucks on the roadway. For there to be a net safety benefit, the collision/claim rate would need to be reduced to offset the increase in collision and operating costs. This leaves open the question whether the required reduction in collisions necessary to offset the cost is realistic.

Recovering the additional costs is related to two variables - the number of claims and the cost of each claim. At an assumed cost of $100,000 per claim, we would need to achieve a 30% reduction in the claim rate to offset the additional costs of higher collision and operating costs. The reduction needed is dependent on the actual claim costs. Given the already low rate of crashes, and with 90% of claims for truck-trailer collisions being injury and property damage only, the required reduction in claims would be difficult to attain.

INDUSTRY CONSULTATION

Representatives from the trucking industry were consulted to obtain their feedback on experience related to the safety and operational performance of the heavy vehicles in question. The industry consultation also gathered input on the anticipated effects of the proposed changes in axle weights, and how stakeholders felt the change would affect them. Finally, the consultation exercise tries to provide an independent opinion on the possible value of the impacts of the weight reduction.

The consultation demonstrated that the potential impacts resulting from a possible weight reduction vary across industry sectors depending on commodities transported. Achieving the reduction in weight is not as simple as loading less cargo on the trailer. The industry generally perceives an economic cost to reducing the trailer weight by 3,000 kg that would adversely impact both owners and drivers.

Given the small number of reported crashes from the participants, the safety benefits of a weight reduction, based on the sample data, would be marginal.

CONCLUSIONS AND RECOMMENDATION

From the analysis conducted using available data, it was concluded that there does not appear to be a trend of increased claims from quad axle trailers. The additional costs associated with reducing the allowable weight limit for these trailers are considerable and unlikely to be recovered through reduced collisions. It is recommended that the trailer weight reduction should not be implemented at this time.

To better understand the role of trailer weight in collisions involving trucks in BC requires data to be collected that allows different types of trailer to be more readily identified and the status of the load at the time of collision. A number of changes to the registration and claims recording systems used by ICBC and the RCMP are recommended

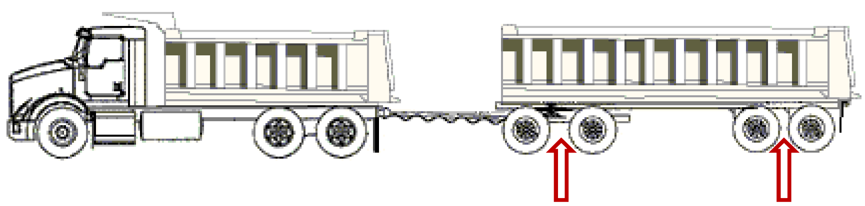
.

1 INTRODUCTION

1.1 Context of this Study

In 1991 British Columbia signed a Memorandum of Understanding (MoU) with the Federal Government, and all other provinces and territories, to adopt a *uniform national standard for dimensions and weight limits of interprovincial heavy commercial vehicles.* Although BC has complied with most of the MoU recommendations, it has not yet addressed the issue of *maximum weight allowance for quad-axle trailers*. Currently in BC, the maximum allowable weight for a quad-axle trailer in a truck-trailer combination is 34,000 kg, i.e. 17,000 kg per axle pair as the following graph illustrates.

Figure 1. Generic Combination with Quad-Axle Trailer Weight Limits



Under the MoU, and the provincial Commercial Transport Regulations (CTR), this allowance would be reduced to 31,000 kg. For BC, the scheduled weight reduction would primarily affect the transportation of gravel aggregates, logs, and bulk liquids. It would also primarily affect trailers connected to tandem axle power units as these units have less ability to accommodate additional weight transferred from the trailer to the power unit.

In British Columbia, the affected categories of vehicles operate almost exclusively within the province. Therefore, before implementing this regulation, the Ministry of Transportation, through the CVSE branch, needs to better understand the implications of the weight reduction, concentrating on the following aspects:

1. The assessment the potential safety benefits of a reduced trailer weight allowance.
2. The evaluation of the consequent economic costs associated with the reduction.
3. The consultation with the trucking industry about the potential effects on the sector.

1.2 Scope and Objectives

The main objective of this study is *to assess the potential safety benefits of reducing the maximum allowable trailer weight for selected categories of truck and trailer combinations*.

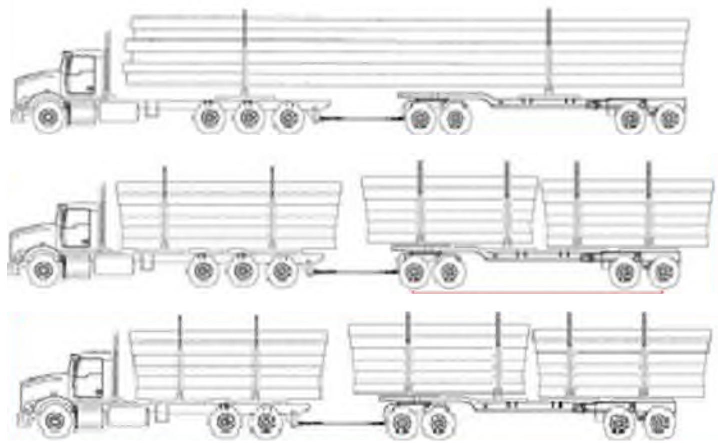
This study also intends to:

- Determine historical trends in the collision and claim rate for specific truck and trailer combinations.
- Assess the other potential advantages or disadvantages of the weight reduction.
- Understand the implication of the weight reduction from the point of view of fleet operators.

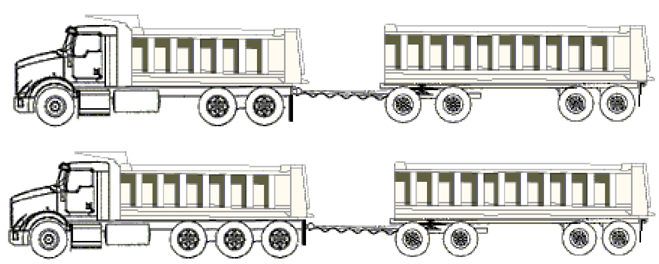
The scope of this project includes only trucks and trailers registered in British Columbia. Furthermore, crash and claim data analysis for this study accounts only for collisions on BC public roads. The review excludes analysis of operations on private roads such as logging and gravel extraction sites.

The Commercial Transport Regulations (CTR) specifies all the categories of truck and trailer combinations allowed on BC roads. The specific *categories of interest to this study* for quad-axle trailers are illustrated below.

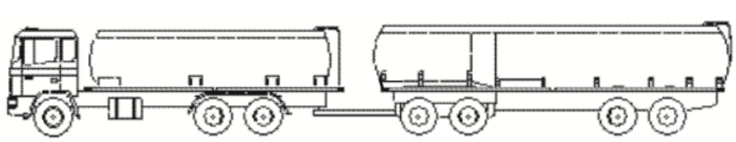
Figure 2. Selected Commercial Vehicle Configuration for this Study



(a) Common quad-axle trailer for a **logging truck** & trailer combinations



(b) Common quad-axle trailer for **dump truck** & trailer combinations



(c) Common quad-axle trailer for **tank truck** & trailer combinations

1.3 Experience Elsewhere

Earlier this year, CVSE staff contacted representatives in all Canadian provinces and territories to obtain their feedback on the maximum permitted loads for quad-axle trailers and their experience in implementing the MOU. The following table summarizes the response from eight provinces and two territories.

Table 1. Provinces Response to MoU

Province	Status	Limit	Exception	Compliance
Alberta	MOU Implemented	Maximum 31,000 KG		Y
Saskatchewan	MOU implemented	Maximum 31,000 KG		Y
Manitoba	MOU implemented	Up to 31,000 KG for a 4- axle trailer		Y
Ontario	Implemented through SPIF (Safe Productive Infrastructure Friendly) SPIF does not separate truck and trailers for weight limit Maximum GVW depends on wheelbase Implemented in 2010	54,000 KG maximum permitted for combined tridem truck/quad trailer	Can be increased up to 63,500 KG with increased wheelbase (SPIF Type L (p38)	N
Quebec	Limit based on total load for truck and trailer	GVCW 55,000 KG for 7 axle tridem/quad combination	Permit required for 34,000 KG (Axle group B45)	N
PEI, Nova Scotia, New Brunswick, Newfoundland	Atlantic provinces adopted MOU in 2001	31,000 KG maximum for trailer		Y
Northwest Territories	Quad axle trailer not recognized	31,000 KG maximum for trailer		Y
Yukon		Up to 32,000 KG permitted on a 4-axle trailer		N

Overall, the response to the MOU has varied. Following are the key observations:

- The quad axle trailer is not formally recognized in several provinces.
- In many cases the maximum permitted weight is defined by the combined truck-trailer combination as opposed to just the trailer.
- With the exception of Ontario and Quebec, and Yukon the maximum permitted weight of a quad axle trailer is 31,000 kg or less.
- In the case of Quebec, weights up to 34,000 kg are allowed by permit. Extracts from Quebec's "Road Vehicle Load and Size Limits Guide (2013) are included in Appendix C.
- In the case of Ontario, legislation has recently been implemented that bases the maximum permitted gross vehicle weights on the design of the vehicle. Under the Safe, Performance and Infrastructure Friendly specifications (SPIF), the maximum permitted weight for a seven axle combination (tridem truck plus quad axle trailer) can be as high as 63,500 kg but this requires a specific axle spacing (see Appendix D).

There appears to have been no analysis of the impact of reductions in maximum vehicle weights on collision rates.

1.4 Study Approach

In this case, the first task was to get familiarised with the data available to better understand the quality, depth and variety of information (and information sources) at our disposal. The Insurance Corporation of British Columbia (ICBC) provided data on vehicle registration, claims and collision records to analyse specific crash types involving the vehicle categories of interest.

The study contains two complementary but distinct phases:

Phase A: *Data collection and analysis*

Phase B: *Industry consultation*

The approach for this study follows four main steps:

1. Data Review: a review of the available data from CVSE and ICBC and MoTI.
2. Trend Analysis: an analysis of the growth of *claims and actively insured vehicles* (for the subject vehicle types) and collision frequency.
3. Industry Consultation: consultation with representatives of the trucking sector to obtain information on typical use of the subject trailers and feedback on the potential implications of the weight change on their operations.
4. Cost Estimation: establishing the potential costs associated with a decrease in the maximum allowable weight (increased travel and exposure required to haul the same payloads).

1.5 Report Structure

The structure of this report reflects the steps outlined previously:

- **Section 2** provides an inventory of the data available for the review.
- **Section 3** presents the results and findings from the data analysis including estimation of the costs and potential benefits of the proposed weight reduction.
- **Section 4** summarises the results from the stakeholder interviews and discusses the findings and comments from the industry consultation.
- Finally, **Section 5** offers conclusions and recommendations for further development of this work.

2 DATA INVENTORY

This section provides a summary of the available data for this study. There are four potential sources of information that could be used to assess the safety benefits of the proposed weight reduction;

1. Data collected by CVSE.
2. Registration and claim data obtained from ICBC.
3. Collision data assembled by Ministry of Transportation and Infrastructure.
4. Information obtained from the industry consultation.

As the following sections explain, the study evaluates each of these sources to determine their validity.

2.1 Data from Commercial Vehicle Safety & Enforcement (CVSE)

CVSE maintains two types of data:

a. Overweight / oversize permit applications; and
b. Weight scale records.

For various reasons, this study does not use any of the CVSE database directly.

In the first case, commercial vehicles require a permit to carry loads which exceed the gross vehicle weight (GVW) associated with the vehicle registration. As this study focuses on normal operations, and oversize vehicles would presumably still be permitted, it does not use the records in this overweight / oversize database.

In the case of weight scales, all commercial vehicles are required to go through them when they are open (CVSE operates over 20 facilities throughout the province). Vehicles that exceed the per axle load weight for their vehicle class are detained at the station. Unless the vehicle is over the weight limit, the stations do not record specific data (i.e. time, date, license number, vehicle combination or weight) of each truck. Given this limitation, this study could not use any of the data from the weight scales.

Finally, CVSE has access to Police Incident Reports for crashes involving commercial vehicles. However, after the change in the BC Legislation in 2008, the police can attend such crashes at their discretion. Consequently, police attending crash sites dropped significantly from 40,000 to 33,000 incidents per year. Moreover, a police incident report usually includes only limited crash data. But most importantly, it does not record information on the type and load status of trailers.

2.2 Data from Insurance Corporation of British Columbia (ICBC)

ICBC provided historical records of vehicle registration and crashes from their Data Warehouse. The study used records from 2002 to 2011 in order to analyze the change over the most recent 10 year period for which data was available.

Vehicle Registrations

ICBC classifies vehicle data by attributes such as body style, make, model and year, following the ADC Reference Guide for Body Styles (see Appendix A). This study considers two specific body types that were considered relevant for the analysis: Type 2 Commercial Trucks, referred to as “Power Units” in this report and Type 6 Commercial Trailers. The system does not currently capture the number of axles in the vehicle combination or on the trailer. As illustrated in Appendix A, trailers classed as Type 6 are extensive and captures trailers licensed to carry over 1,400 kg. While it is possible to isolate Dump, Logging and Tank trailers from the ICBC registration data, it is not possible to isolate quad-axle trailers licensed to carry up to 34,000 kg. However, given the available data, it is not unreasonable to assume that analysis of Type 6 Dump, Logging and Tank Trailers as a whole represents well the conditions of the quad-axel subset. For the purpose of this study, we refer to the truck component of the tractor-trailer combination as the "power unit" and the trailer as the trailer.

Claim Records Database

This database provides a record of the financial transactions and steps ICBC takes to process a claim. For commercial vehicle claims that involve a tractor-trailer combination, the following conditions apply:

1. The claim record includes *only the component of the truck-trailer combination involved in the incident.* Where an incident involved only a trailer, there are no records for the power unit and vice-versa.
2. If the incident involves both the truck/power unit and the trailer, the system records separate claims for each component. In such cases the claim for the power unit is not cross referenced with the claim for the trailer. This can result in some double counting as a single incident involving damage to the power unit and the trailer would be represented by two claims.

ICBC Database Extract

To expedite the search process, CVSE provided ICBC with examples of known crashes that involved the vehicle configurations of interest in this study. ICBC used this filter to customize a search methodology in its database.

From an analysis of the ICBC data the following was determined:

1. If there is no claim for the truck/power unit, and there are no injuries, no data is recorded for the power unit.
2. If a claim is filed for a power unit, it does not specify whether a trailer was attached.
3. If a claim is filed for a trailer, there is no record of its status at the time of the incident, i.e. loaded, not loaded or overloaded.
4. Finally, if a trailer is damaged, the record shows limited data and no status of the load.

2.3 MoTI Collision Data

The Ministry of Transportation and Infrastructure provided a summary of reported crashes on numbered provincial highways between 2002 and 2011, consistent with the ICBC data. The summary is based on collision reports documented in the form MV6020. This form does not specifically record the type of trailer involved in a collision; however, Ministry staff advised that the class of vehicle that represents the trailers affected by the proposed weight reduction are referred to as "Combination Unit Truck/Heavy". This covers vehicles with a rated Gross Vehicle Weight (GVW) of 10,500 kg or higher. In addition to the number of collisions by severity, MoTI also provided a breakdown of the primary factor for truck collisions between 2007 and 2011.

The MoTI collision data was used in conjunction with the ICBC data to determine trends in collision rates.

2.4 Inputs from Industry Representatives

Phase B of the study consisted of interviews with selected industry representatives.

The purpose of the survey was to record general industry experience on safety and operational performance of the relevant truck-trailer combinations and documents their typical use, loading and transportation routes. In addition, the survey provides information on the fleet size and composition, equipment use, level of exposure and adoption of new technology in the industry.

3 PHASE A – DATA ANALYSIS

This section provides a summary of the assessment of the data, the findings from the trend analysis, and the analysis of the claim data.

3.1 Data Assessment

Data Collected from ICBC

The first step was to filter the database to account only for the selected vehicle types, body styles and licensed Gross Vehicle Weights (GVW) that are *likely to capture* quad-axle trailers. The objective was to identify trends in claim frequency and severity of collisions, and the relationship between registered vehicles and vehicle claim records.

Operators commonly insure some vehicles and trailers for only a part of the year. The ICBC database, reports 'actively insured vehicles' insured as of the end of the year. This could potentially understate the number of active vehicles in spring/summer but is the most accurate figure available.

The registration and claim data from ICBC included:

- Actively insured vehicles between 2002 and 2011.
- Body styles: dump, logging and tank trucks because the power units and trailers fall into these categories
- Type 2 commercial trucks, i.e. power units with a licensed gross vehicle weight (GVW) of 60,100 – 63,500 kg
- Type 6 commercial trailers. While Type 6 trailers are rated with a licensed GVW of 1,400 kg or higher, the study focussed on Dump trailers, Logging trailers and tanker trailers.

Assessment of Vehicle Registration

The analysis of the actively insured vehicles in the ICBC dataset is summarized in Table 2 and illustrated graphically in Figure 3. In order to isolate changes to the growth in registrations over the 10 years, we have separated the data into two parts - 2002 to 2006 (4 years) and 2006 to 2011 (5 years). The following is observed:

- In 2011, the number of Type 6 insured trailers was almost eight times more than the number of Type 2 power units (all types). This may in part be due to the definition used for trailers but still represents a decrease from almost 12 times more than in 2002. This reduction hints at a higher productivity of the fleet given the growth in economic activity. The overall annual rate of growth is 5% for trailers and over 11% for trucks. The growth in trailers is primarily due to increased registrations for dump trailers. For logging trailers the number of registrations decreased between 2002 to 2011.
- The growth in both trailers and trucks was higher between 2002 and 2006 than between 2006 and 2011
- The increase for both the power units and trailers was highest for dump trucks.

Table 2. Growth of Actively Insured Power Units & Trailers

Insured	Power Units (Type 2)				Trailers (Type 6)				Ratio of Trailers to Power Units			
	Dump	Log	Tank	Total	Dump	Log	Tank	Total	Dump	Log	Tank	Total
Actively Insured Units												
2002	235	374	78	687	2,346	5,042	1,325	8,713	10.0	13.5	17.0	12.7
2006	485	738	121	1,344	4,027	5,205	1,532	10,764	8.3	7.1	12.7	8.0
2007	563	734	156	1,453	4,885	4,823	1,624	11,332	8.7	6.6	10.4	7.8
2011	738	820	219	1,777	7,414	4,251	1,797	13,462	10.0	5.2	8.2	7.6
Annual Growth Rate												
2002-2011	13.6%	9.1%	12.2%	11.1%	13.6%	-1.9%	3.4%	5.0%	0.1%	-10.1%	-7.8%	-5.6%
2002-2006	19.9%	18.5%	11.6%	18.3%	14.5%	0.8%	3.7%	5.4%	-4.5%	-15.0%	-7.1%	-10.9%
2006-2011	8.8%	2.1%	12.6%	5.7%	13.0%	-4.0%	3.2%	4.6%	3.9%	-6.0%	-8.3%	-1.1%

The trend in growth for each category of truck is shown in Figure 3. In order to illustrate the relative growth in each type of power unit and trailers, the values at year 2002 are normalised to a base of 100.

Figure 3. Relative Growth of Actively Insured Power Units and Trailers

Assessment of Claims

ICBC provided close to 20,000 claim records for Type 2 trucks and Type 6 trailers. The type of vehicle, body style and GVW for Type 2 trucks appropriate for the study constitutes a subset of this database. These are summarized in Tables 3 and Figure 4. Some of the main conclusions are:

- In 2011, the total of trailer-related claims was 20% less than of claims for power units.
- The ratio of claims of trailers over power units has dropped continuously since 2002 reflecting the lower growth rate for trailers.

- The claim rate for power units between dump, logging and tank trucks (Type 2) varied from 0.0% to 24.8% per year while the rate for trailers (Type 6) varied from -5.1% to 12.2%.
- The higher annual increase in claims for power units was primarily due to an increase between 2002 and 2006. Between 2006 and 2011 the overall increase for power units was much lower than from 2002 to 2006.

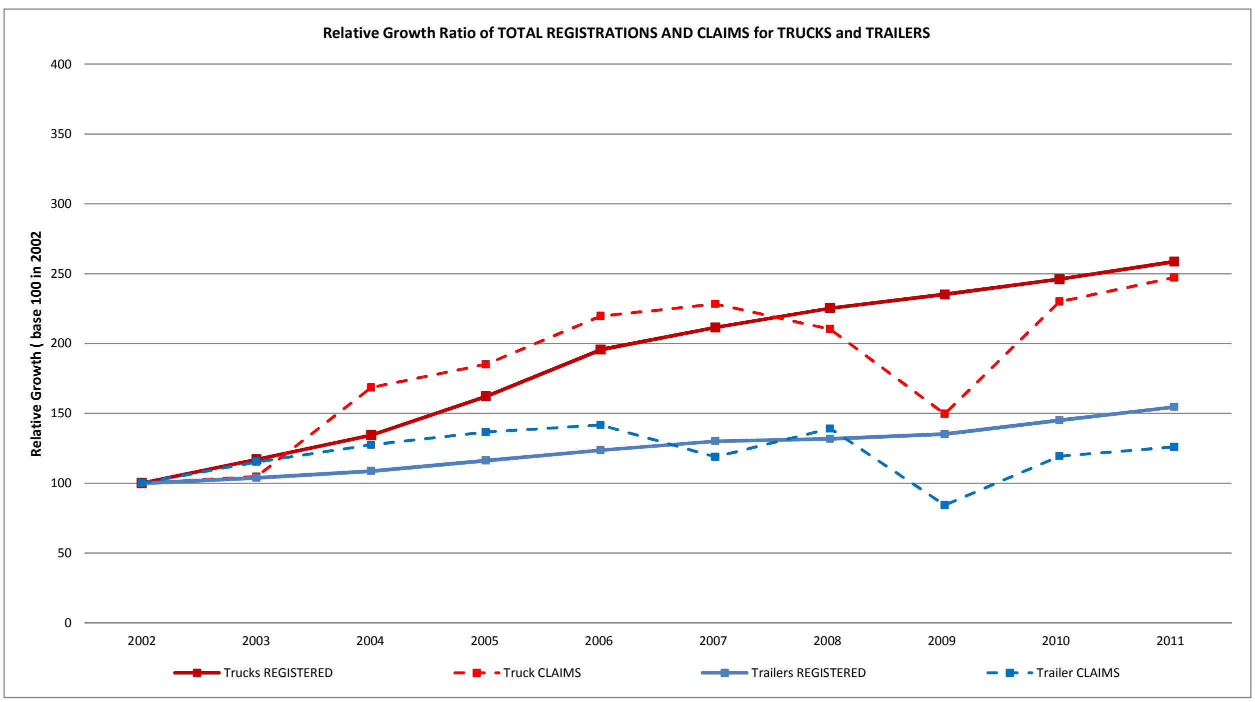
Table 3. Growth of Claims for Power Units & Trailers

Claims	Power Units (Type 2)				Trailers (Type 6)				Ratio of Trailers to Power Units			
	Dump	Log	Tank	Total	Dump	Log	Tank	Total	Dump	Log	Tank	Total
Annual Claims from Power Units and Trailers												
2002	75	42	10	**127**	91	80	26	**197**	1.2	1.9	2.6	**1.6**
2006	167	102	10	**279**	124	127	28	**279**	0.7	1.2	2.8	**1.0**
2007	180	103	7	**290**	128	84	22	**234**	0.7	0.8	3.1	**0.8**
2011	188	106	20	**314**	116	98	34	**248**	0.6	0.9	1.7	**0.8**
Annual Growth Rate												
2002-2011	10.8%	10.8%	8.0%	**10.6%**	2.7%	2.3%	3.0%	**2.6%**	-7.2%	-7.7%	-4.6%	**-7.2%**
2002-2006	22.2%	24.8%	0.0%	**21.7%**	8.0%	12.2%	1.9%	**9.1%**	-11.6%	-10.1%	1.9%	**-10.4%**
2006-2011	2.4%	0.8%	14.9%	**2.4%**	-1.3%	-5.1%	4.0%	**-2.3%**	-3.6%	-5.8%	-9.5%	**-4.6%**

Since claims for the power unit and trailer are independent, there are likely instances where either there was no trailer attached to a power unit or the trailer was not damaged and, therefore, no claim was necessary.

As before, Figure 4 shows the growth for total *registrations* but this time comparing them to two new curves that illustrate the relative growth of total *claims*. Again, this rate is normalised to base 100 in 2002. From Figure 4, one can appreciate the drop in *claims between 2007 and 2009*. This decrease would reflect less exposure of an otherwise stable fleet as seen by the *registration* curves. In 2010 and 2011, claims grew at a similar rate to registrations for both power units and trailers.

Figure 4. Growth of Total Claims and Registrations for Power Units and Trailers



Characteristics of Claims

ICBC classifies claims as being either 1) *property damage only* or 2) *casualty*. The *"casualty"* class includes both injuries and fatalities, but does not distinguish between them. A review of Police Incident Reports was undertaken for claims for the period 2007 to 2011 inclusively. Over these five years, there were 30 fatality reports out of a total of 1,313 attended incidents (2.3% of the total collisions). This is similar to results from the collision data provided by MoTI. Based on the police incident reports, we can conclude that:

- The majority of the claims, i.e. 82% for power units and 90% of trailers were *"property damage"* only.
- In almost 50% of the cases there was a conflict between the report causes of the collision by different claimants (referred to as 'conflicted cause'). There is no detailed information by which to further classify these claims.

The analysis includes the severity of claims, location of crashes and their reported cause (see Table 4 and Figure 5).

Table 4. Distribution of Claim Records of Commercial Vehicles and Trailers (2007 to 2011)

Collision	Category	Power Unit	Trailers
Severity	Casualty	18%	10%
	Property Damage Only	82%	90%
Cause	Conflicted	47%	65%
	Side impact	15%	7%
	Single vehicle	9%	13%
	Rear end	15%	6%
	Other	14%	9%

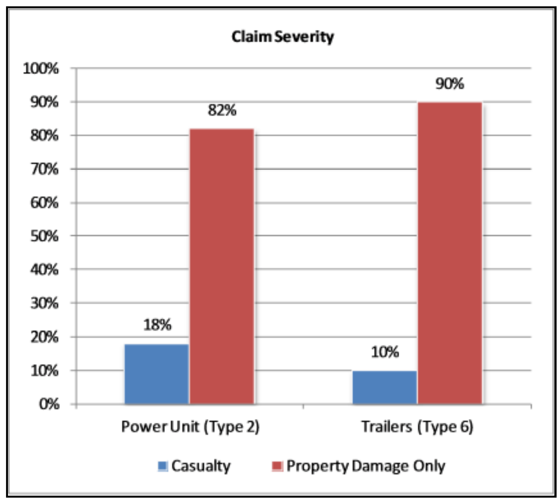
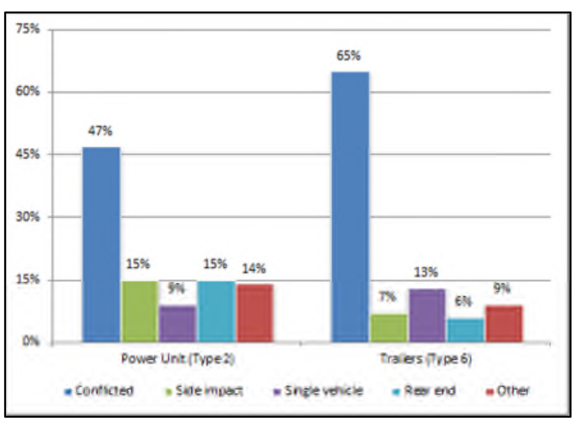


Figure 5. Claims Distribution by Cause



3.2 Claim Rate Analysis

Relationship of Claims to Number of Registered Vehicles

The next part of the analysis examines the historical trend in the number of claims per year relative to the number of actively insured trucks (power units) and trailers.

On average, claims increased 10.6% and 2.6% per year for power units and trailers respectively from 2002 to 2011. Over the same period, the number of actively insured vehicles increased by 11.1% and 5.0% per year for power units and trailers respectively. For both power units and trailers, the lower rate of growth in claims translates into a lower claim or collision rate per vehicle as shown in Table 5. This is primarily a result of a reduction in the claim rate per vehicle between 2007 and 2011.

Table 5. Ratio of Claims to Actively Insured Vehicles

Claims per unit	Power Units (Type 2)				Trailers (Type 6)			
	Dump	Log	Tank	Total	Dump	Log	Tank	Total
Ratio of claims to insured vehicles								
2002	0.32	0.11	0.13	**0.18**	0.04	0.02	0.02	**0.02**
2006	0.34	0.14	0.08	**0.21**	0.03	0.02	0.02	**0.03**
2007	0.32	0.14	0.04	**0.20**	0.03	0.02	0.01	**0.02**
2011	0.25	0.13	0.09	**0.18**	0.02	0.02	0.02	**0.02**
Annual Growth Rate								
2002-2011	-2.5%	1.6%	-3.7%	**-0.5%**	-9.6%	4.2%	-0.4%	**-2.3%**
2002-2006	1.9%	5.3%	-10.4%	**2.9%**	-5.6%	11.4%	-1.8%	**3.5%**
2006-2011	-5.8%	-1.3%	2.0%	**-3.2%**	-12.7%	-1.1%	0.7%	**-6.6%**

For power units the "claims to vehicle" ratios varies during the last 10 years but remains close to 0.20. In 2011, tank trucks had the lowest claim rate at 0.09, while the highest rate belonged to dump trucks at 0.25. The claims history for commercial trailers is significantly lower than for power units and very stable for all categories. This is in part due to the higher number of trailers. In this case, the ratio is commonly around 0.02. For all power units together there is a 0.5% drop in rate while for all trailers combined the drop is 2.3% per year.

Collision Rates Based on Vehicle Kilometres Travelled (VKT)

The above analysis focussed on changes in the number of actively insured vehicles and the number of claims. To capture the exposure rate of the vehicles on the highway, crash rates are normally expressed in terms of crashes per Million Vehicle Kilometres Travelled (MVK). In this case, we use the claims as a proxy for collisions modifying the indicator to reflect claims per million vehicle kilometres (MVK) by vehicle type.

According to the stakeholder survey, each truck-trailer unit travels on average 75,000 km/year. This translates to 300 km per day assuming 250 active days per year. Thus, as shown in Table 6, in 2011, the average rate is 2.4 claims/MVK for Type 2 Power Units, and 0.2 claims/MVK for Type 6 trailers. As each truck can carry only one trailer at a time, in practice the exposure of trailers is less than the 75,000 km/yr travelled by each truck. Using the 2011 trailer to truck ratio, the claim rate for connected trailer is close to 1.9 claims/MVK. As this is just another way of accounting for the claim rate, over the period 2002 to 2011, we observe a drop in rate for power units overall (-0.5%) and for trailers (-2.3%). Over the five years from 2006 to 2011 we observe a reduction in the rate for both power units (-3.2% per year) and trailers (-6.6% per year). This could in part be due to technological enhancements with improved in-vehicle safety devices.

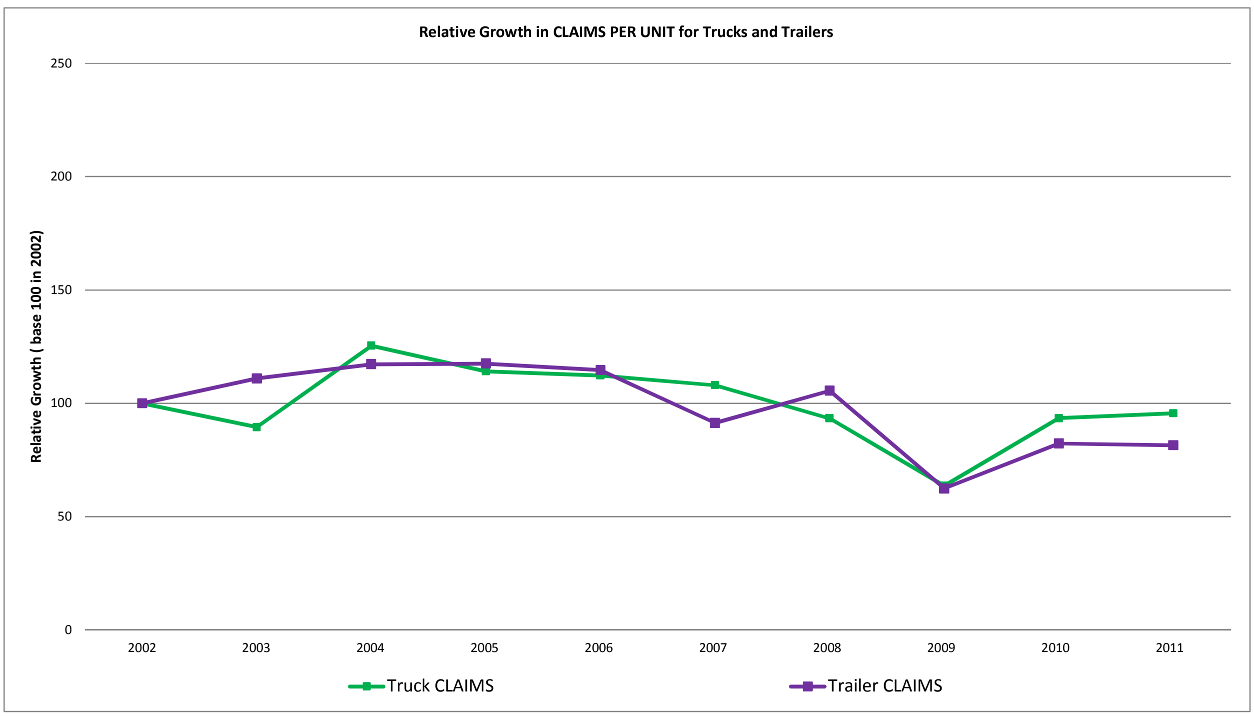
Table 6. Ratio of Claims to Registered Vehicles per Million Vehicle-km

Claims per MVKT	Power Units (Type 2)				Trailers (Type 6)			
	Dump	Log	Tank	Total	Dump	Log	Tank	Total
Claims per million Vehicle KM Per Year								
2002	4.26	1.50	1.71	**2.46**	0.52	0.21	0.26	**0.30**
2006	4.59	1.84	1.10	**2.77**	0.41	0.33	0.24	**0.35**
2007	4.26	1.87	0.60	**2.66**	0.35	0.23	0.18	**0.28**
2011	3.40	1.72	1.22	**2.36**	0.21	0.31	0.25	**0.25**
Annual Growth Rate								
2002-2011	-2.5%	1.6%	-3.7%	**-0.5%**	-9.6%	4.2%	-0.4%	**-2.3%**
2002-2006	1.9%	5.3%	-10.4%	**2.9%**	-5.6%	11.4%	-1.8%	**3.5%**
2006-2011	-5.8%	-1.3%	2.0%	**-3.2%**	-12.7%	-1.1%	0.7%	**-6.6%**

As Figure 6 illustrates, there was a notable decrease in claim rates between 2007 and 2009 for both vehicle types.

As before, this rate is normalised to base 100 in 2002 to account only for the relative progression of the curves.

Figure 6. Profiles for Relative Growth of Claim Rates for Power Units and Trailers



3.3 Analysis of MoTI Data

The trend in collisions shown by the MoTI data is presented in Figure 7 and Figure 7a which illustrates the total number of collisions between 2002 and 2011 inclusive for six classes of truck. This data covers only collisions on numbered provincial highways and represents a subset of the collision data for the province. The class of most interest in this study is shown by the red line (Combination unit truck/heavy). Over the 10 year period there was a reduction in the number of reported collisions for all trucks, including the combination units. Between 2002 and 2006 inclusive, the average collision rate for all trucks was 1,384 collisions per year. This reduced to 1,121 per year for the period 2007 to 2011 inclusive, a reduction of 19%. The reduction is tempered by a spike in collisions in 2006. We see a higher reduction for collisions involving the combination unit/heavy truck where the average rate over the two same periods fell from 127 per year to 66 per year, a 48% reduction.

We note that the vehicles affected by the proposed weight reduction are only a subset of this group. Furthermore, the data is limited to collisions on numbered provincial highways. Nevertheless, the data shows there has been a dramatic reduction in the number of reported truck collisions over the period. With the number of insured vehicles increasing, as shown in the previous section, this implies that the collision rate per vehicle has reduced considerably.

Figure 7. Truck Collisions on Provincial Highways (2002 to 2011)

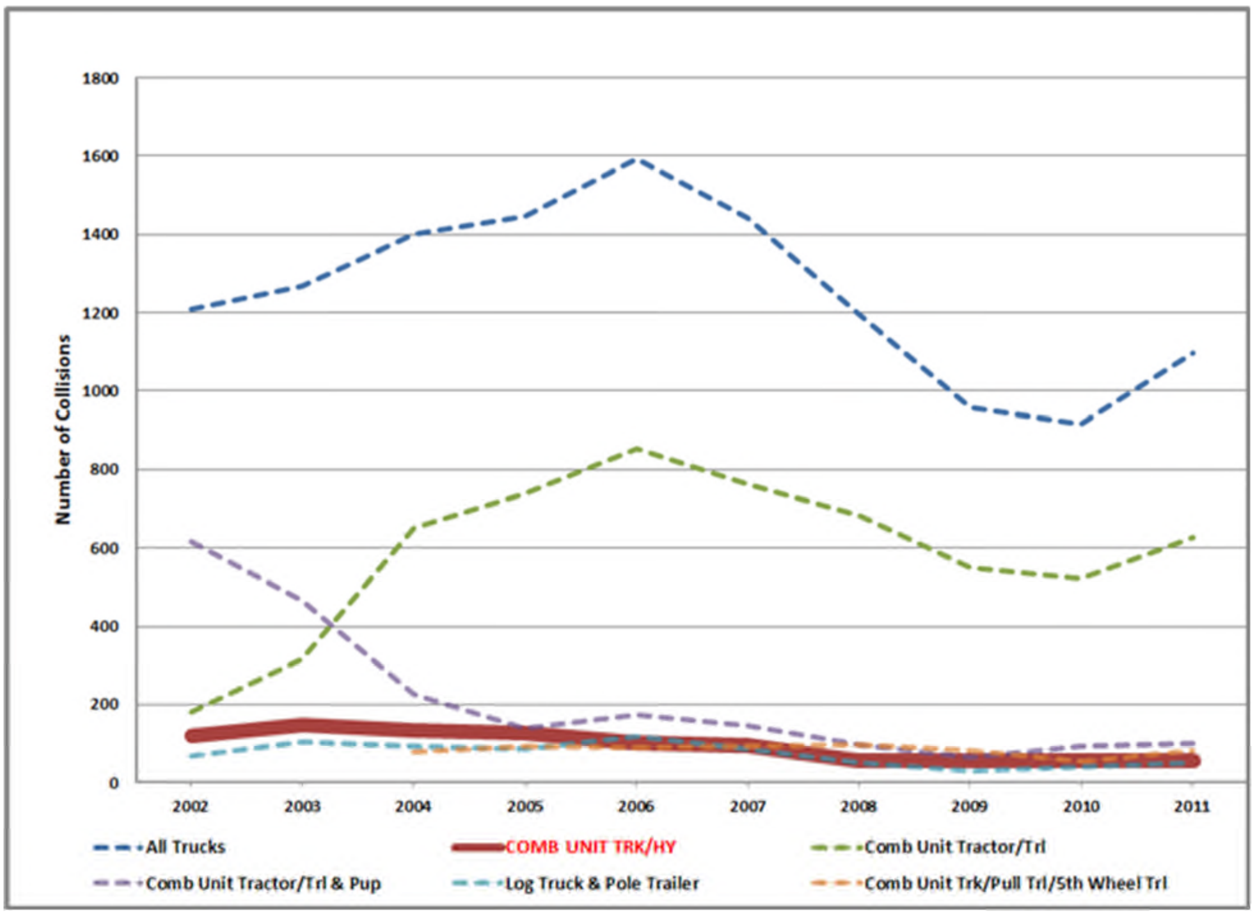
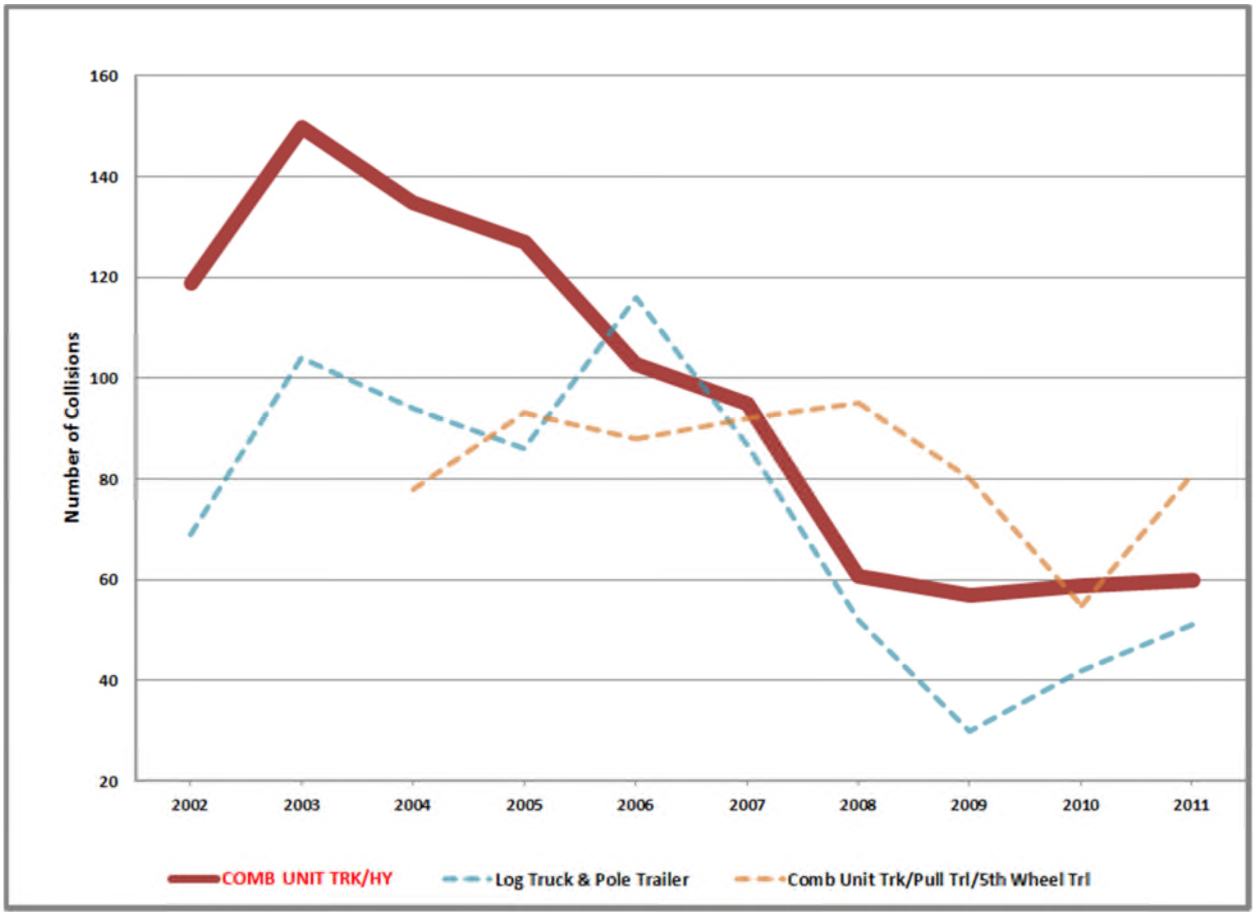


Figure 7A. Collisions on Provincial Highways (Selected Trucks 2002 to 2011)



The MoTI data also includes a summary of the primary causal factors for the reported collision. Table 7 lists the top 10 causal factors for truck collisions on provincial highways between 2007 and 2011. The top two factors which contributed to over 30% of collisions were "driver inattentive" and "road conditions". We also note that wild animals were cited as a causal factor in 4% of the collisions. As the trailer status or type was not included, it is unclear whether a reduced weight limit for quad axle trailers would reduce the number of these types of collision.

Table 7. Causal Factors for Truck Collisions (2007-2011) on Provincial Highways

Factor	Frequency	%
Driver Inattentive	1,145	20.4%
Road Condition (ice,snow,slush)	580	10.3%
Driving too Fast for Condition	553	9.8%
Wild Animal	226	4.0%
Driver Error/Confusion	217	3.9%
Following too Closely	191	3.4%
Failure to Yield Right of Way	142	3.5%
Fell Asleep	133	3.4%
Cutting in	102	1.8%
Improper Passing Maneuver	102	1.8%

3.4 Quantification of Additional Capacity Required

Based on the findings from the interviews with truck operators, the scheduled trailer weight reduction will have a number of impacts. One of the main consequences will be to *increase the number of truck-trailer trips required to deliver the same payload*.

There are two options at this point: 1) increase productivity, i.e. more trips per truck-trailer unit, or 2) increase the fleet, i.e. purchase more trucks and trailers.

As previously noted, the database available does not contain information on the payload for crashes of the relevant vehicle classes. It is therefore *impossible to determine whether or not the reduction in weight allowance will directly affect the claim rate*. Nevertheless, if we assume that the crash rates will remain constant, if there is an increase in the number of trips required to carry the same payload, this should in fact invoke an **increase** in the number of claims. *At a minimum, for there to be a net safety benefit of the weight reduction, any reduction in collision rates would have to be sufficient to offset the increase in the number of collisions due to the higher exposure of the vehicles.*

To quantify these potential benefits indirectly, this study estimated the *reduction in claims that would be necessary to offset the increase in costs*. The key to this estimation is determining how to transport the extra load (3,000 kg for each truck-trailer trip that is no longer allowed): either by more trips per truck or more trucks at the same trip rate.

Theoretically, if we assume trailers and power units currently carry a full payload, the weight allowance reduction would result in additional trips to deliver the extra load of 3,000 kg per trip. The number of additional trips will partly depend on the validity of this "full load" assumption and the extent to which load could be transferred to the power unit. For the purpose of this study, which is to estimate the potential maximum cost impact of the reduction, it is reasonable to assume a full load as a starting point as the operator will try to maximise the use of both the power unit and the trailer every time.

In practice, only tandem drive trucks which cannot absorb the redistribution of the load from the trailer, within the total licensed load, due to the limited weight per axle on the power unit, will be most affected by the reduction. The analysis was therefore based on the *payload carried by a tridem/quad trailer combination*. The relationship between the Gross Vehicle Weight (GVW) of a tridem/quad axle unit and the maximum payload that can be carried by this vehicle combination is shown in Table 8. The payload that can be carried by the power unit will remain unchanged at 17,600 kg. For the trailer the payload will be reduced from 26,500 kg to 23,500 kg.

Table 8. Weight Characteristics of Tridem/Quad Axle Truck-Trailer Combination

Component	Status	Existing weight	With reduction	Change
Power Unit	Gross Vehicle Weight (1)	26,100 kg	26,100 kg	None
	Unloaded weight (2)	8,500 kg	8,500 kg	None
	Maximum Payload (3)	17,600 kg	17,600 kg	None
Trailer	Gross Vehicle Weight (4)	34,000 kg	31,000 kg	-3,000 kg
	Unloaded weight (5)	7,500 kg	7,500 kg	None
	Maximum Payload (6)	26,500 kg	23,500 kg	-3,000 kg
Combination	Gross Vehicle Weight (1+4)	60,100 kg	57,100 kg	-3,000 kg
	Unloaded weight (2+5)	16,000 kg	16,000 kg	None
	Maximum Payload (3+6)	44,100 kg	41,100 kg	-3,000 kg

We can see that while the Gross Vehicle Weight is reduced from 60,100 kg to 57,100 kg (5.0% reduction) the payload that can be carried is reduced from 44,100 kg to 41,100 kg (6.8% reduction).

The following sequence shows how we can estimate an approximate value for the additional capacity necessary to maintain the same overall load movement.

The key assumptions are:

- A fleet that is fully loaded, i.e. a tandem drive truck and quad trailer combination with a power unit weight of 26,100 kg and the trailer weight of 34,000 kg = 60,100 kg total per combination.
- A payload weight of 44,100 kg for the existing condition.
- An average distance travelled by each truck of 300 km per day.
- An average trip of 50 km, thus 6 trips per day per truck.
- A fleet utilisation rate of 90% (i.e. 90% of the actively insured trucks are actually used on a daily basis).
- A total of 250 active days per year.
- A constant ratio of "number of trailers /number of power units". In this case a ratio of 7.6 as reported in 2011.
- The excess load to be carried with the new reduced allowance (but fully loaded) configuration: the power unit Gross vehicle weight of 26,100 kg and the GVW for the trailer of 31,000 kg i.e. 57,100 kg per combination, down from 60,100 kg.
- The payload per combination is reduced from 44,100 kg today to 41,100 kg with the reduction as per Table 8.

Under these assumptions, we establish two options:

1. The reduced payload per trip is handled by increasing the number of trips made by the current fleet to avoid the capital costs of purchasing new units; or
2. The excess load is handled by operation additional truck-trailer combinations assuming that productivity cannot increase.

The first case could be unrealistic if the trip rate increase is not marginal, but it is necessary to keep the analysis focused on the effects of the change on the current fleet.

In Table 9 we provide the sequence of the estimation on the basis of a fleet of 1,000 fully loaded truck-trailer combinations. We can remark the following:

- **Lines 1 to 12**: summarise the basic assumptions.
- **Line 15 to 18**: 238 M kg is the total volume to be transported (Line 15), which remains constant. This can be handled by 5,400 trips/day (Line 13) at a payload of 44,100 kg per trip, or by 5,794 trips/day (Line 16) at 44,100kg per trip. This implies 394 extra trips per day (Line 17) to carry the displaced16 M kg (Line 18).

Option 1 – Maintain same fleet, increase productivity:

- **Lines 19 and 20**: the trip rate increases by 0.44 per truck to handle the load. The new rate = 6.44 trips/day/truck.
- **Line 23**: the productivity and use of truck per day increases 7.3%.
- **Lines 24 to 27**: the total daily output remains constant at 238 M kg but it is redistributed between trucks and trailers (40% v. 60% currently; 43% v. 57% under reduced allowance).

Option 2 – Increase fleet, maintain productivity:

- **Line 34**: the trip rate remains constant at 6.0 trips/day/truck.
- **Line 40**: output required that exceeds capacity under reduced allowance is 16 M kg.
- **Line 42**: 66 additional in-service truck-trailer combinations = 16 M kg / 41,100 kg / 6 trips per truck per day.
- **Lines 45 and 46**: 73 new trucks (1,073 total fleet) and 533 new trailers (8,129 total fleet) assuming 90% utilisation.

Table 9. Sequence of Estimation of the Required New Number of Trips to Handle the Excess Load

		Weight Allowance			
		Current	**Reduced**	**Comments**	**Line**
BASIC ASSUMPTIONS					
Payload carried per unit (kg)	Tandem Truck (Power Unit)	17,600	17,600	Remains unchanged	1
	Quad-axle Trailer	26,500	23,500	Reduced by 3,000Kg	2
	Truck-Trailer COMBINATION	**44,100**	**41,100**	New combined total weigh allowance	3
Fleet (vehicles)	Total trucks	**1,000**		Assume a generic fleet of 1,000 units	4
	Total trailers	7,576		Based on 2011 ratio	5
	Ratio	**7.58**		2011 ratio	6
Performance Assumptions (per truck-trailer)	Trips per day	6.0			7
	KM per trip	50			8
	Active days per year	250			9
	KM per year	**75,000**			10
	Utilisation	90%		% of vehicles in service	11
	In-service truck-trailers	**900**		**Assuming a need for spares**	12
Output (for total fleet)	CURRENT Total trips per day	5,400			13
	Capacity per trip	44,100	41,100	For each truck-trailer combination	14
	Total output per day	**238**	**238**	**M kg. To remain constant**	15
	FUTURE Total trips per day		5,794	7.3% More trips to maintain same output	16
	Total additional trips per day		**394**	**Difference to maintain same output**	17
	Additional payload to be carried		**16**	**M kg.**	18
OPTION 1: keep the SAME FLEET SIZE (Active truck-trailers)					
New Performance Required for the same fleet	Additional trips per day		0.44	394 new trips by same 900 truck-trailer fleet	19
	Revised trips per truck per day	**6.0**	**6.44**	**Increased trip rate**	20
	KM per trip	50	50	No change in conditions	21
	Active days per year	250	250	No change in conditions	22
	KM per year	**75,000**	**80,474**	**Increased km per truck per year**	23
	Output for Trucks per day	95	102	Increase due to more trips per truck	24
	Output for Trailers per day	143	136	Decrease due to reduced trailer allowance	25
	Output over fleet capacity	**0**	**0**	**No additional truck-trailers**	26
	Total	238	238	M kg. Total output to remain constant	27
	Additional in-service truck-trailers	**0**	**0**	**0 new in-service truck-trailers**	28
	Total in-service truck-trailers	**900**	**900**	**Same fleet**	29
	Utilisation	90%	90%	same % of vehicles in service	30
	Total truck-trailer combination	**1000**	**1000**	**0 new Trucks**	31
	Total Trailers	**7,576**	**7,576**	**0 new Trailers**	32
OPTION 2: keep the SAME PRODUCTIVITY (Trips/Truck)					
New Fleet Required for the same productivity	Additional trips per day		0.0	No additional trips per truck	33
	Revised trips per truck per day	**6.0**	**6.0**	**Constant trip rate**	34
	KM per trip	50	50	No change in conditions	35
	Active days per year	250	250	No change in conditions	36
	KM per year	**75,000**	**75,000**	Same km per truck	37
	Output for current Trucks per day	95	95	Maintain same current truck capacity	38
	Output for current Trailers per day	143	127	Maintain same current trailer capacity	39
	Output over fleet capacity	**0**	**16**	**Handled by additional truck-trailers**	40
	Total	238	238	M kg. Total output to remain constant	41
	Additional in-service truck-trailers	**0**	**66**	**66 new in-service truck-trailers**	42
	Total in-service truck-trailers	**900**	**966**	**Additional fleet required**	43
	Utilisation	90%	90%	same % of vehicles in service	44
	Total Trucks	**1,000**	**1,073**	**73 new Trucks**	45
	Total Trailers	**7,576**	**8,129**	**553 new Trailers**	46

Respecting all the basic assumptions, the key figures can be normalised for requirements of a generic 1,000 truck fleet, so we would need either:

- A Productivity increase of 7.30% (from 6.0 to 6.44 trips per truck-trailer combination per day), or
- A Fleet Size increase of 7.30% (73 additional trucks for every 1,000 truck fleet, with the corresponding 533 additional trailers assuming the 2011 ratio).

3.5 Quantification of Additional Costs of Weight Reduction

Costs of Additional Trips

Additional trips will lead to an increase in costs, which can be split into direct and indirect costs as follows:

Direct Costs

- Labour costs (TIME) for truck drivers: assuming 90 minutes per trip and $30 per driver-hour.
- Other costs (OPERATION) costs: assuming $0.52 per km and 50 km per trip.
- Claim costs (EXPOSURE): accounting for more claims as a function of more km travelled 6.44 trips per truck per day and 50 km per trip.

Indirect Costs

Additional highway maintenance cost of the pavement should be offset by the benefits from lighter truckloads. At the same time, the overall effect of increased traffic volumes on environmental costs should be marginal given the total fleet size.

Value of Collision Costs

There are two general approaches for estimating the ‘cost’ of a collision:

1. **Based on claims**: that is by equating the collision to the actual value of the settlement from ICBC.
2. **Based on social costs**: that is by accounting for lost earnings, pain and suffering and indirect costs associated with a collision, i.e. the amount society is willing to pay to avoid collisions.

The latter approach is typically used when assessing the value of an initiative aimed at reducing the frequency and or severity of crashes.

Although a truck collision at a critical location on the network can impact traffic over a broad area for an extended period of time, particularly in urban areas, this study does not include the disruption effects to traffic resulting from a crash. In contrast, however, this assessment also excludes the savings associated with less congestion due to the reductions in crashes.

As noted earlier, in the period 2007 to 2011, 80% to 90% of the claims for the selected trucks and trailers were *“property damage only”*. Furthermore, the police incident reports indicate that 2.3% of the attended crashes of interest included a fatality.

However, due to the confidentiality, complexity and uniqueness of each claim, ICBC did not provide information on the value of claims for trucks collisions. To address this gap of information, the analysis applied sensitivity curves by assuming a range of values per crash claim. An initial cost of $100,000 per claim was used.

Value of the Weight Reduction

To estimate a value for the weight reduction we apply the concept of *opportunity costs*; that is, we ask the following basic question:

> *What would we have to do in the current state (with no weight reduction and given increased exposure due to the additional distance travelled) to recover the expected additional costs in the new state (with a weight reduction and additional amount of EXPOSURE, OPERATION and TIME costs as a function of more distance travelled)?*

In this case, EXPOSURE refers to additional cost associated with claims due to greater exposure of trucks on the road; TIME refers to increased time costs due to wages for more driver-hours; and OPERATION refers to additional fuel and other costs due to more vehicle-kilometres.

The only option in the current state to recover the additional costs of these three elements of the future conditions is to reduce the collision (or claim) rate. If enough collisions could be avoided, the additional costs would be offset. This leaves open the question of whether or not the reduction in claims necessary is actually achievable. Also, the value placed on the claim influences the cost of the additional exposure. Therefore, it is better to evaluate a range of values. As a starting point, nevertheless, we fix a cost for the claim to estimate a base reduction required and then vary the cost to estimate the range of values. As there was no claim cost provided in the database a rate of $100,000 per claim was used.

The sequence of the estimation on the basis of a fleet of 1,000 truck-trailer combinations assuming a present aggregate claim rate of 4.22 claims/MVK and $100,000 per claim is shown in Table 10.

- **<u>Lines 1 to 10</u>**: summarise the basic assumptions. Note that we use tandem trucks as they are most likely to be affected, lowering the total combination payload from 44,100 kg to 41,100 kg (Line 3). Trips per truck have to increase from 6.0 to 6.44 trips per day (Line 7) to cover the extra output assuming the same fleet size.
- **<u>Lines 11 to 30</u>**: estimate the cost of the additional trips for a constant fleet per year. The TIME (for extra driver-hours) costs are $4.43M/year (Line 16), the OPERATION (for extra vehicle-km) costs are $2.56M/year (Line 22), and the EXPOSURE (for extra claims due to extra travel) costs are $2.08M/year (Line 29). The total additional cost under these conditions is $9.07M per year for a 1000 truck-trailer fleet.
- **<u>Lines 31 to 43</u>**: compare the current state against the future (reduced weight) state under the current claim rate. The current rate, 4.22 claims/MVK, results from adding the rate for trucks to the rate for trailers (Line 37) because claims are independent for both units. Also, the rate for trailers is not applicable over the entire fleet of trailers but rather only for those hitched to a truck (otherwise they would not be exposed to a collision). As before, the total cost difference from current to future state yields $9.07M per year. This is the amount that has to be recovered by reducing claims (Line 43). At $100,000 per claim there would need to 91 fewer claims per year to recover the additional costs.
- **<u>Lines 44 to 55</u>**: compares the current state against the equivalent state under a new claim rate required to achieve the necessary cost savings. In this case, we must reduce the rate by 30% (Line 55) to recover an equivalent of $9.07M per year in claims (Line 50). The new break even rate is 2.96 claims/MVK (Line 45) for all trips made by the fleet.

Table 10. Analysis for Potential Costs of Weight Reduction

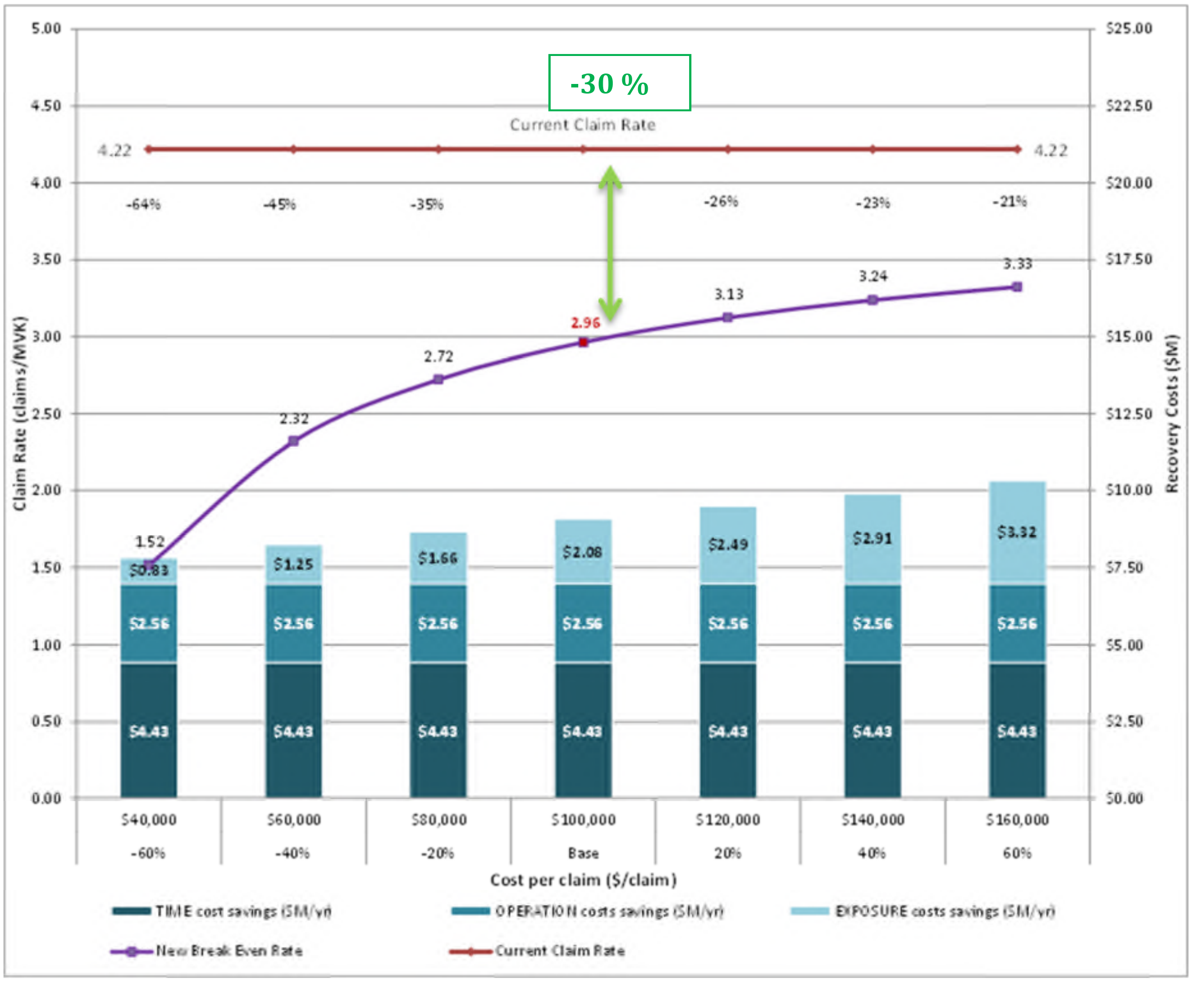
		Weight Allowance Condition				
		Current	**Reduced**	**Difference**	**Comments**	**Line**
BASIC ASSUMPTIONS						
Payload carried per unit (kg)	Tandem Truck (Power Unit)	17,600	17,600	0	Remains unchanged	1
	Quad-axle Trailer	26,500	23,500	-3,000	Reduced by 3,000Kg	2
	Truck-Trailer COMBINATION	**44,100**	**41,100**	-3,000	New combined total weigh allowance	3
Fleet (truck-trailer combinations)	Fleet size	**1,000**	**1,000**	0	Generic fleet of 1,000 truck-trailers	4
	Utilisation rate	90%	90%	0	% of vehicles in service	5
	Active fleet	**900**	**900**	**0**	**Assuming a need for spares**	6
Trips	Trips per day per truck	6.0	6.4	0.4	Increased trip rate	7
productivity increase of 7.30%	**Total trips per day**	5,400	5,794	394		8
	Active days per year	250	250	0	Assume only work days	9
	Total trips per year	1,350,000	1,448,500	98,500		10
COST ESTIMATION FOR SAME SIZE FLEET						
Additional TIME costs (based on additional HOURS of resources used)	Time per trip (hr)	1.50	1.50	0	90 minute round trip	11
	Total time per day (hr/day)	8,100	8,691	591		12
	Total time per year (hr/year)	2,025,000	2,172,750	147,750		13
	Wages ($/hr)	$30.00	$30.00	0	Wage for drivers	14
	Time cost per day ($/day)	$243,000	$260,730	$17,730	For entire fleet per day	15
	TIME cost per year ($M/year)	**$60.75**	**$65.18**	**$4.43**	**TIME cost for entire fleet per year in Millions**	16
Additional OPERATION costs (based on additional KM of operation of vehicles)	Distance per trip (km)	50.00	50.00	0	Average distance per round trip	17
	Total distance per day (km)	270,000	289,700	19,700		18
	Total distance per year (km)	67,500,000	72,425,000	4,925,000		19
	Operation ($/km)	$0.52	$0.52	0	Averge OC rate including fuel and other costs	20
	OC per day ($/day)	$140,400	$150,644	$10,244	For entire fleet per day	21
	OC per year ($M/year)	**$35.10**	**$37.66**	**$2.56**	**OC for entire fleet per year in Millions**	22
Additional EXPOSURE costs (based on additional KM of exposure to collisions)	Claim rate for trucks (claims/MVK)	2.36	2.36	0	Based on 2011 rate per MVK	23
	Claim rate for trailers (claims/MVK)	1.86	1.86	0	Fleet rate prorated to trailers hitched to trucks	24
	Aggregated claim rate truck-trailer	**4.22**	**4.22**	**0**	**Aggregate because claims are independent**	25
	Total distance per year (MVK)	67.50	72.43	4.93	Additional exposure in MVK	26
	Expected total claims per year	285	305	21	For entire distance exposure per year	27
	Cost per claim	**$100,000**	**$100,000**	**$0**	**Assume a base cost per claim**	28
	EXPOSURE costs per year ($M/year)	**$28.46**	**$30.54**	**$2.08**	**TIME cost for entire fleet per year in Millions**	29
TOTAL additional costs	**Aggregated costs per year ($M/year)**	**$124.31**	**$133.38**	**$9.07**	**TOTAL cost to operate fleet per year in $M**	30
OPPORTUNITY COST ESTIMATION BASED ON CLAIM RATE REDUCTION						
Claim equivalents for Costs	Cost per claim	**$100,000**	**$100,000**	**$0**	Assume a base cost per claim	31
	Equivalent claims for TIME	608	652	44		32
	Equivalent claims for OPERATION	351	377	26		33
	Equivalent claims for EXPOSURE	285	305	21		34
	Total equivalent claims	**1,243**	**1,334**	**91**	**91 less claims due to additional operation**	35
Current vs. Future State under current claim rate	Total distance per year (MVK)	67.50	72.43	4.93	Additional exposure in MVK	36
	Claim rate truck-trailers (claims/MVK)	4.22	4.22	0	Current rate	37
	Cost per claim	$100,000	$100,000	$0		38
	Number of claims from EXPOSURE	285	305	21	Additional claims due to more exposure	39
	EXPOSURE costs per year ($M/year)	$28.46	$30.54	$2.08		40
	OC per year ($M/year)	$35.10	$37.66	$2.56		41
	TIME cost per year ($M/year)	$60.75	$65.18	$4.43		42
	Total FUTURE costs ($M/year)	**$124.31**	**$133.38**	**$9.07**	**$9.1M to be recovered by reducing claim rate**	43
Current vs. New Claim Rate for Future State	Total distance per year (MVK)	72.43	72.43	0.00	Use new distance travelled to reflect higher exposure	44
	Claim rate truck-trailers (claims/MVK)	4.22	2.96	-1.25	Revised rate required	45
	Cost per claim	$100,000	$100,000	$0		46
	Number of claims for EXPOSURE	305	215	-91	Fixed number to find needed reduction in rate	47
	Total EQUIVALENT costs ($M/year)	**$30.54**	**$21.47**	**-$9.07**	**$9.1M recovered by reducing claim rate -30%**	48
Equivalent vs. Future State	Total FUTURE costs ($M/year)	$124.31	$133.38	$9.07	Costs with Current Claim Rate	49
	Total EQUIVALENT costs ($M/year)	$30.54	$21.47	-$9.07	Savings from reduced claim rate	50
	Difference	-	-	**$0**	**If difference is $0, cost have been recovered**	51
	Current claim rate	4.22				52
	New claim rate	2.96				53
	Factor	0.70				54
	% change	**-30%**				55

The next step is to evaluate the sensitivity of the estimated cost to changes in the cost per claim. The initial estimation assumed a base cost of $100,000 per claim. To understand the behaviour of the cost curve, the sensitivity analysis assumes a range of -60% to +60% by steps as the shown in Table 11. The resulting costs that are to be recovered range from $7.82 M at a cost of $40,000 per claim to $10.32 M at $160,000 per claim. The impact of using different assumption for the claim rate is shown in Figure 8.

Table 11. Sensitivity of the Claim Rate Reduction as a Function of Cost per Claim

Variable		Variation of COST PER CLAIM						
		-60%	-40%	-20%	Base	20%	40%	60%
Cost per claim	($/claim)	$40,000	$60,000	$80,000	**$100,000**	$120,000	$140,000	$160,000
Current Claim Rate	(claims/MVK)	4.22	4.22	4.22	**4.22**	4.22	4.22	4.22
Break Even Conditions								
New Break Even Rate	(claims/MVK)	1.52	2.32	2.72	**2.96**	3.13	3.24	3.33
Change required	(%)	-64%	-45%	-35%	**-30%**	-26%	-23%	-21%
Total cost recovered	($M)	$7.82	$8.24	$8.65	**$9.07**	$9.49	$9.90	$10.32

Figure 8. Sensitivity of the Claim Rate Reduction as a Function of Cost per Claim



As Figure 8 illustrates, a lower value for claims requires a higher reduction in collisions to make up for the total costs (i.e. more “lower value” claims have to be eliminated to add up to the total costs) as the TIME and OPERATION cost comprise a greater proportion of the additional costs to be recovered. As the cost for a claim increases, the curve becomes less sensitive. Although the additional costs of TIME and OPERATION are constant, the EXPOSURE costs depend directly on the price of the claim. Therefore, as the cost per claim increases, the EXPOSURE component of the additional costs starts to overwhelm the other two components. Eventually, the reduction of the claim rate becomes directly proportional to the cost per claim (a straight line).

4 PHASE B – CONSULTATION

4.1 Introduction

Consulting the trucking industry to gather insight about the operation of the trailers of interest provides essential information for decision-makers. The Ministry of Transportation requested that this consultation take place *before the deadline for implementing the scheduled regulation change*.

The consultation reports on general industry experience related to the safety and operational performance of the heavy vehicles in question. It enquired specifically about the fleet, use, and safety-related improvements to provide testimonials on performance and operation of the province's quad-axle inventory. The industry consultation also gathered input on the anticipated effects of the proposed changes in axle weights, and how stakeholders felt the change would affect them. Finally, the consultation exercise tries to provide an independent opinion on the possible value of the impacts of the weight reduction.

4.2 Methodology

General Approach Followed

The consultation process consisted of three stages: *notification, promotion of participation and actual consultation*. The MoTI actively participated in the first two stages, notifying stakeholders and promoting their participation, but not in the actual survey which followed a completely independent process.

Notification Protocols

In November 2011, MoTI issued a circular to notify owners and operators of the truck configurations that were subject to the trailer weight reduction that the measure was to be postponed until 31 December 2011. This deadline was subsequently extended again to 31 December 2012. For this announcement, the MoTI used its website through the following links:

http://www.th.gov.bc.ca/CVSE/CTPM/Com_Circulars/2010/101109_comp_circ_06-10.pdf

http://www.th.gov.bc.ca/cvse/whatsnew.html

The website provided a general summary on the background of this study and noted that: "Stakeholder consultation will be an important component of the project, combining input into the process with industry and industry knowledge".

Promotion of Participation

The active involvement of stakeholders and interest groups was important to this project not only as a means to disseminate proposed changes to the Commercial Transport Regulation, but also to draw on expertise, ideas and perspectives when assessing any potential impact of the weight reductions. As with all consultation, this phase may also have identified any unintended side effects or problems with the proposed changes as early as possible.

The industry operators are either independent owners or are represented by organizations including, but not limited to:

- The BC Stone, Sand and Gravel Association
- The BC Trucking Association
- Northern BC Trucking Association
- Truck Loggers Association
- Central Interior Logging Association
- North West Loggers Association
- Interior Logging Association

The MOTI contacted each of the major trucking organizations and provided them with the background description and a sample survey questionnaire for distribution to their membership. MOTI also published the same information on their website so that it would be readily accessible. The following link provides access to the MOTI website:

http://www.th.gov.bc.ca/cvse/commercial_transport/vehicle_weight_reducn_stdy/index.htm

The background description captured the essence of the proposed regulation changes. It provided the timeframe for the consultation to give stakeholders a chance to prepare for the upcoming survey. Interested participants would contact MOTI and subsequently be available for consultation.

Consultation Process

The consultation phase consisted of a two-way exchange of information and opinion through a personalised telephone survey. The systematic collection and subsequent analysis of empirical information followed a step-by-step process. Most importantly, it required developing appropriate questions to ensure participants provided an insightful understanding of the impacts of the weight reduction.

Questionnaire Design

The questionnaire design ensures coverage of the topics of most interest to the CVSE. It also ensures that the questions asked to industry representatives are unbiased. The design characteristics of the questionnaire include:

- Geographical coverage.
- Safety performance and annual km travelled.
- Types of commodities that are hauled in quad-axle trailers.
- Configuration types required by this study.
- Inventory and related improvements spanning several years.

In addition to the inventory of the fleet, the questionnaire asked participants to provide a description of how, where and when their fleet is utilised, and to describe how their fleet has evolved since 1988, as many of these vehicles have changed considerably. Another piece of relevant information was the age of the vehicles. The survey also requested an indication of the approximate annual kilometres driven to assess the vehicles safety performance for the sample population.

The topics covered by the questionnaire are summarized in Table 12.

Table 12. Topics in Consultation Interviews

General	Specific Questions
Fleet Size and Composition	Fleet inventory, operations and experience
	Percent of fleet with the subject configurations
	Age of fleet
Equipment Use and Level of Exposure	Main operating areas or regions
	Predominant travel route types; i.e. resource roads, provincial highways or other
	Average travelled distance or hours of operations
	Typical trip lengths
	Types of loads or cargo
	Collision and/or roll over history
Vehicle Technology Changes Since 1989	Technological enhancement undertaken to the vehicle fleet and when
	New technologies or future trends involved in the renewal of older equipment in the fleet
Feedback On Proposed Weight Reduction	Feedback
	Economic Impact
	Understanding of the changes on the existing fleet and the cost
	Implications and comparing these to the net safety benefits

As mentioned earlier, the questionnaire was distributed by MOTI through a notification protocol. Subsequently, MOTI contacted the various trucking associations throughout the province and asked that all their members receive the information. Once notified, any stakeholder interested in participating in the industry consultation contacted MOTI, and their names were added to the participant list. The actual survey took place, independent of MOTI, from August to September 2012.

Not all potential participants responded. Of the 27 stakeholders contacted, only 19 participated in the interviews. These participants represented a fleet of approximately 300 trucks.

4.3 Findings from Industry Consultation

Participants answered a common questionnaire over the phone. The interviews yielded enough information to build a database of the responses. A summary of the responses to each of the categories of question is shown in Table 13.

Fleet Characteristics

Participants provided a description of their current fleet and the number of quad-axle units they own and/or operate. These are summarized in Figure 9. The operators had between five and 40 years of experience in trucking operations. This section of the questionnaire covered:

- Fleet inventory, operations and experience.
- Percent of fleet with the subject configurations.
- Age of fleet.

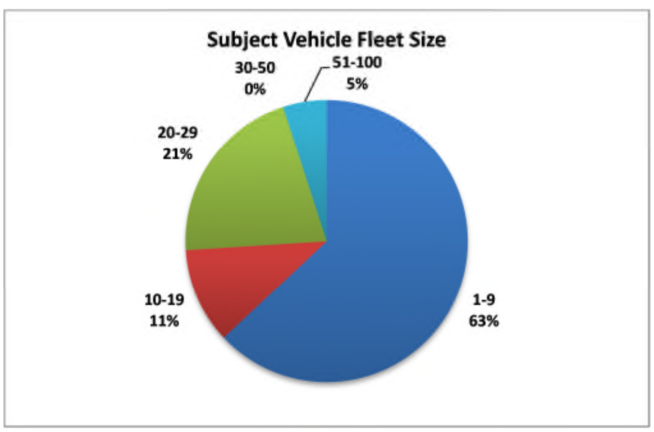
Table 13. Summary of Fleet Characteristics

Category	Participants	Distribution (%)
Subject Vehicle Fleet Size		
1-9	12	63%
10-19	2	11%
20-29	4	21%
30-50	0	0%
51-100	1	5%
Combination Type & Description		
Straight Truck and Full Trailer	16	85%
Tandem/Tridem Truck/Trailer	1	5%
Other Combinations	2	10%
GVW		
<60,500 kg	4	21%
60,500 to 63,500 kg	15	79%
>63,500 kg	0	0%
Total	**19**	**100%**

*The Straight Truck and Full Trailer is defined by Appendix F of BC Commercial Transport Regulation (CTR).

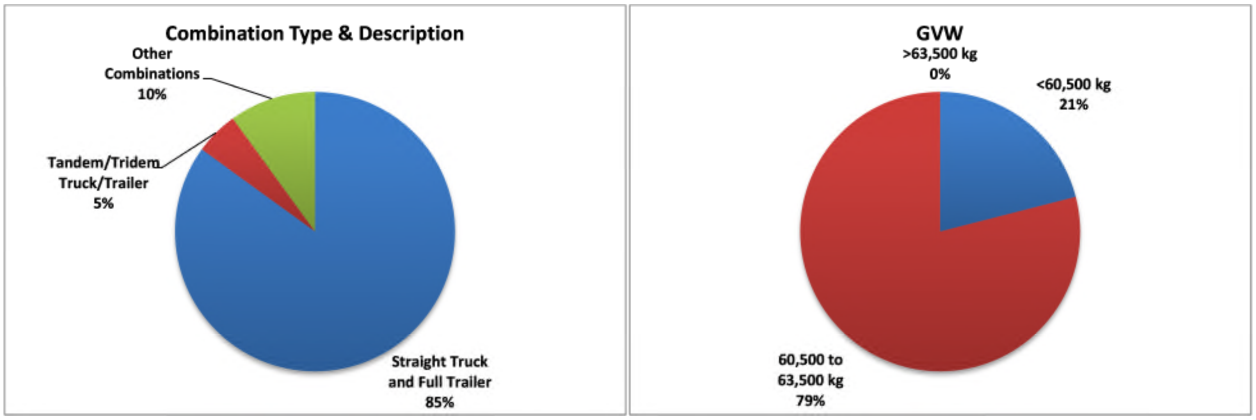
The fleet of the operators who responded to the survey own and/or operate 300 vehicles that fall under to the categories subject to the reduction. Many participants reported having additional vehicles.

Figure 9. Fleet Size



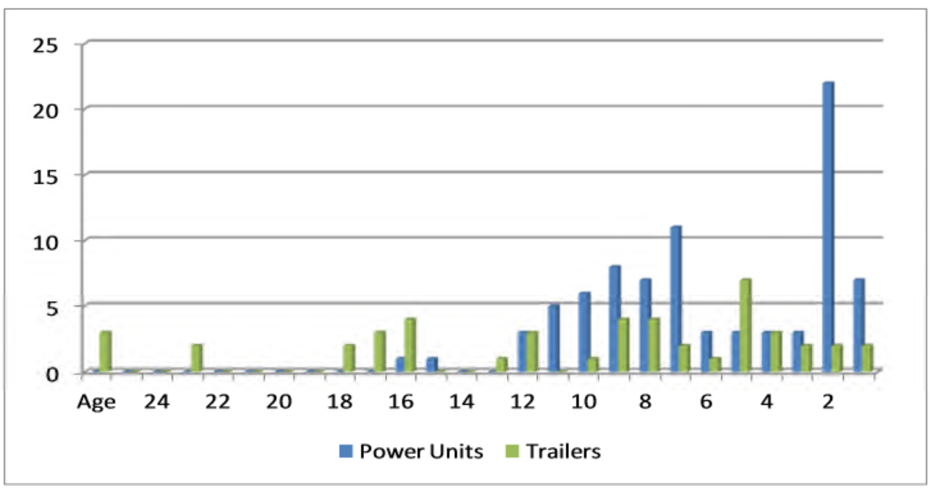
Of the vehicles that would be affected by the reduction, a majority of the respondents described the *Straight Truck and Full Trailer* combination as the most common type potentially affected. Also, the majority of the gross vehicle weights (GVW) were in the range of 60,500 to 63,500 kg, consistent with the subject vehicles, as the following graphs show. A graphic representation of the fleet characteristics is provided in Figure 10.

Figure 10. Fleet Combination Type and Weight



As shown in Figure 11, which illustrates the distribution of the age of the vehicles, the average age for the sample of vehicles was approximately 5 years for the power units and 9.5 years for the trailers.

Figure 11. Age Distribution of Subject Vehicles of Participants in the Consultation



Equipment Use and Level of Exposure

The intention of the 1991 MoU was to define a national standard for trucks used in inter-provincial operations. This section of the consultation focussed on determining whether the subject vehicles were either used for long distance transportation, across national or inter-provincial road networks, or limited to operations within BC. This section of the questionnaire covered predominant routes travelled, and other trip descriptors such as level of exposure to accidents, as well as a description of their cargo and is summarized in Table 14 and Figures 12 and 13.

This section of the consultation focused on:

- The main geographic operating areas or regions.
- Predominant travel route types; i.e. resource roads, provincial highways or other.

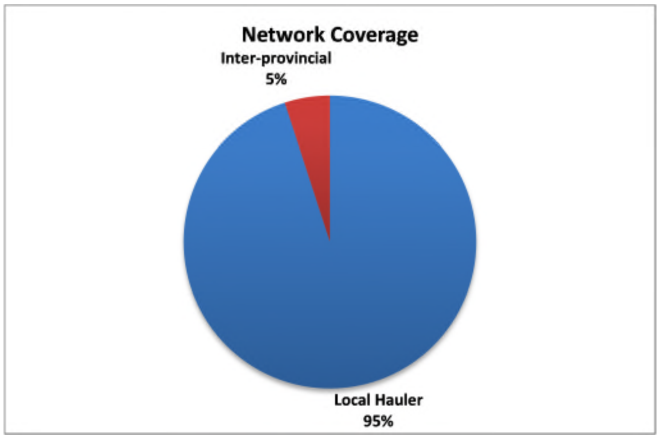
- Average travelled distance and hours of operations.
- Typical trip lengths.
- Types of loads or cargo.
- Collision and/or roll over history.

Table 14. Fleet Utilisation

Category	Participants	Distribution (%)
Commodity Type		
Long Logs	5	26%
Short Logs	5	26%
Fuel/Liquids	5	26%
Gravel Material	2	11%
Other	2	11%
Geographical Distribution		
North East	2	10%
North West	4	20%
Interior	9	50%
Southern Interior	2	10%
Out of Province	1	5%
Rest of BC	1	5%
Network Coverage		
Local Hauler	18	95%
Inter-provincial	1	5%
Total	**19**	**100%**

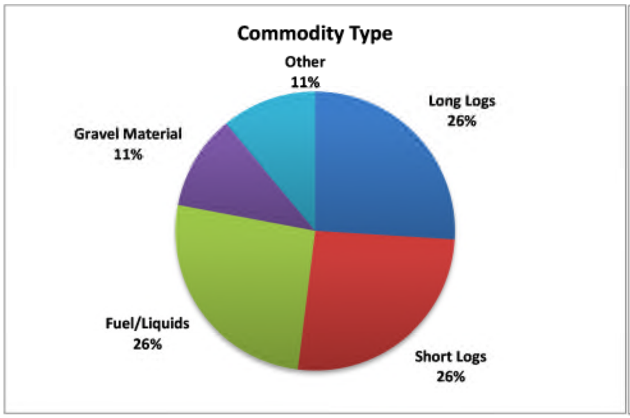
The respondents defined short hauls as single-day trips with half of the trips loaded and half of them empty. They also reported round trips of a range of 15 to 800 km. The average minimum distance was 155 km and the average maximum distance was 457 km. The majority of short haul trips are in the range of 150 to 500 km.

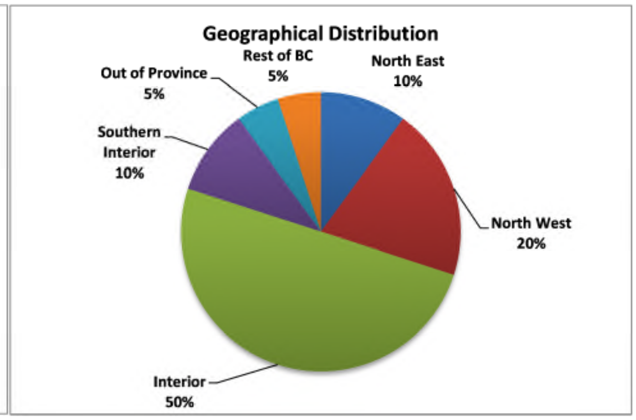
Figure 12. Network Coverage



The majority of participants described most of their trips to be about half on a provincial public road, and half on resource roads. The information regarding the commodity types and the geographic coverage of the vehicles, as well as the haul distance, provide an idea of equipment use and level of exposure.

Figure 13. Commodity Type and Fleet Geographical distribution





Enhancements to the Fleet

Participants commented on technological improvements of their fleet since the trailer weight reduction was first raised. These improvements are mostly related to enhanced control and manoeuvring and replacement of older equipment in the fleet. The comments also provided a history of how the trailer manufacturing industry has adopted new technology.

The results indicate that the fleet has undergone many improvements over the past 20 years. Participants almost unanimously echoed the sentiment that today's truck bears little resemblance to those used in the late 1980s and early 1990s. Many of these improvements have now become 'standard issue' in newly manufactured equipment.

The participants identified a long list of improvements as shown in Table 15 are as follows.

Table 15. Improvements to the Fleet Reported by Participants

Type of Improvement	Improvement
Braking System	▪ Addition of ABS ▪ Manual slack adjusters on brakes ▪ Automatic slack adjustors ▪ Disconnected ABS for Safety Reasons* ▪ Addition of disc brakes ▪ Improvement in stopping distance
Safety Improvements	▪ Driver programs including drug and alcohol testing. ▪ Speed reporter when speed exceeds 100 km/h ▪ Automatic fuel shut offs if speed exceeds 105 km/h ▪ Internal log book for swerves ▪ Increased length of reach in Power Unit PU ▪ Pitch offset ▪ Airbags in front Steering Axle ▪ Achieved Highest ICBC discount available
Communication/Electronics	▪ Satellite tracking /GPS Tracking ▪ Introduction of hands free devices ▪ Addition of electronic stability control ▪ Wiring improvements ▪ New alternator starter

Type of Improvement	Improvement
Fuel Monitoring	▪ Pumping fuel remote control ▪ Fuel monitoring computers
Loading	▪ Wider low-profile bunk ▪ Ability to use every available lineal meter of length for four bunks instead of a conventional three bunk scenario ▪ Lower Deck height ▪ Bunks placed for best axle and load distribution ▪ Scales on trailers ▪ Widened trailer width from 8' to 8'6" width ▪ Increased spread to 66" (from 56")
Vehicle Mechanics/Truck operation	▪ Wider axles ▪ Adjusted spacing to tridems ▪ Lengthened wheel base of truck and trailer from 170" to 251" ▪ Changed tire size ▪ Low profile ▪ Automatic no gears) ▪ Lighter but more fragile equipment like aluminum stakes and wheel ▪ Shorter tail frame on extendable reaches

*Activation of ABS identified as a potential safety issue for trucks operating over steep terrain.

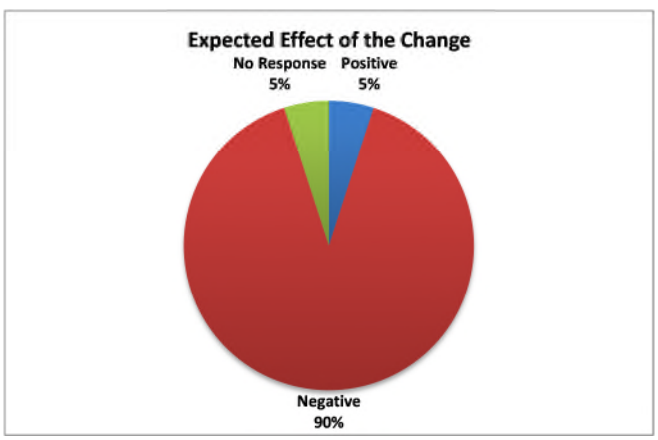
Additional findings were that:

- Most participants only keep their power units for about 5 years. Moreover, the age of equipment being driven on BC highways is on average approximately 5 years. The trailers last longer, about twice the time.
- Also, owners limit the alteration to their vehicles, so as not to void the manufacturer's warranties.

Feedback on Proposed Weight Reduction

The questionnaire asked participants to provide, in their experience, what they anticipate would be the impacts of this change. Most considered the measure negative as shown in Figure 14.

Figure 14. Industry Perception of the Impact of the Proposed Weight Reduction



Those that indicated negative impacts were asked to provide an estimate of the monetary value of the effect. They reported impact in two broad categories: direct and indirect. The *direct impacts* refer to those that affect either a) only the fleet operator, or b) the trucking industry as whole. The indirect impacts refer to those that affect society in general. The corresponding appendix contains the specific comments related to the impacts collected in the survey.

The potential perceived impacts vary across industry sectors depending on commodities transported. For those that transport liquids, the direct impacts include concerns with cargo sloshing, creating instability and **increasing the potential for roll over.** For those transporting long logs, the reduction on the trailer component was also a concern, depending on the power unit driven (tandem vs. tridem).

The participants' message was that the response to the reduction in weight was not as simple as loading less cargo on the trailer. In the case of liquid transporters, their current trailers meet the standard of 34,000 kg and their trailers would become worthless; they would need new trailers to transport their goods safely.

In other cases, participants expressed an implied need to abandon the tandem drive power units in favour of the tridem units in order to redistribute the weight they currently carry (prior to the weight reduction). Participants expressed a concern that their tandem drive units would eventually be rendered worthless by this change, as they would need to increase the proportion of tridems within the fleet at a significant cost.

Direct Impacts

Almost all the participants reported expected direct impacts. These included those that affected the drivers and operators directly such as:

- Wages of drivers would drop since wages depend on a percentage of the payload delivered.
- Profits would drop.
- Costs would increase and be transferred to the prices of goods.

The reported dollar value of the impact varied widely. The value depends on the personal and professional experience, and services provided. In addition to direct impacts, many participants provided additional comments on effects to the industry and to drivers. These included:

- An existing shortage of quad-axle trailers (the current demand exceeds the supply).
- A backlog in manufacturing of quad-axle trailers (there is a waiting list on orders).
- A shortage of drivers. There are no additional drivers available to meet the demand if more trucks are needed to move the payloads.
- The production of all the mills will drop by an equivalent amount.
- Significant risks in safety as a result of liquids being hauled with tanks partially full as it would lead to instability of the load and an increase in roll-over potential and instability from side to side and forwards when braking.

Given the BC topography, there is a strong feeling that there is no other configuration that can replace the quads.

Indirect Impacts

The indirect impacts generally affect society as a whole. Some of the comments include:

- Increased number of trucks on the road causing greater exposure of passenger vehicles.
- Increased wear and tear on the road from a greater number of trucks.
- Deterioration of the standing Mountain Pine Beetle wood: since the mountain pine beetle haul depends on the quads, if the mountain pine beetle wood is not hauled in a timely manner, given that the wood is dead, its value if left standing longer could drop significantly.

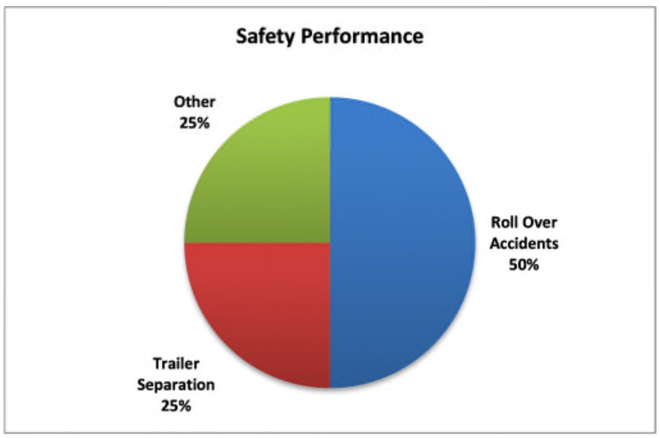
- Environmental concerns related to additional fuels and GHG emissions from moving more trucks such as tridems vs. tandems to make up the weight reduction.

In summary, the impacts are almost unanimously perceived as negative to industry. The concerns are, in summary, either direct, where they affect the driver or the industry, or indirect, where they affect society. All the direct impacts could be quantified by the participants, but the value varied depending on the commodities the service.

Safety Performance of the Fleet

With respect to safety, the questionnaire focused on single vehicle accidents i.e. where only the subject vehicle is involved. Examples of such a case would be roll-overs or trailer separation. For these accident types, participants provided the vehicle crash record of their fleet over the last ten years. The distribution of the crash types is shown in Figure 15 as follows:

Figure 15. Safety Performance – Type of Single-Vehicle Accidents



For the sample, all of the reported accidents occurred in the winter, and road conditions were thought to have been a contributing factor. Of the accidents reported, two were injuries and six were property damage related. None involved fatalities. Based on a reported annual VKT of 40,000 to 250,000 km, the calculated accident frequency or rate is extremely low for the subject vehicle classes.

5 CONCLUSIONS

The mandate of this study was to review the potential safety benefit that could be achieved from a reduction in the allowable maximum weight for quad-axle trailers registered in BC. The study drew on available data from CVSE, ICBC and MoTI and included consultation with representatives of the trucking industry.

According to the MoU, the allowable weight for quad-axle trailers will be reduced from 34,000 kg to 31,000 kg.

5.1 Scope and Objectives

The objectives of this study are to:

- Determine the historical trend in the collision rate for specific tractor and trailers affected by the weight reduction;
- Assess qualitatively the benefits and the costs of the weight reduction;
- Understand the implication of the weight reduction from the point of view of fleet operators; and
- Make recommendations on the best way to quantify the potential safety benefits that could be achieved with a reduced maximum trailer weight allowances.

5.2 Data Inventory

Available data from CVSE, ICBC and MoTI were reviewed: The characteristics of the available data are as follows:

- The data does not allow specific tractor-trailer configurations to be isolated from other commercial vehicles.
- Claim records for the power unit or truck and the trailer are filed independently with no cross reference. If a truck was not damaged in a collision, there is no record of claim for the truck; if the trailer was not damaged there is no claim record for the trailer.
- There is no detailed information about the cause of crashes and what role weight may have played in the crash.
- The claim record does not include documentation whether a trailer was attached at the time of the crash, and for trailers, whether it was empty, partially loaded, fully loaded or over-loaded.
- The type of connection between the power unit/truck and trailer was not provided.
- There is no detailed description of the type of trailer or the product being carried.
- The claim data only covers travel on public roads. Collisions on private roads, for example logging roads, are not covered.
- Data collected by CVSE at weigh scales was not applicable for this study.
- ICBC provided data for both commercial vehicles (Trucks) and commercial trailers from 2002 to 2011. The data was limited to the body styles that would be most affected by the proposed weight reduction. This included the number of actively insured vehicles and trailers and claim records related to these.
- The ICBC records do not provide specific data for the subject truck configurations. To narrow down the data, records of the potentially relevant commercial vehicles and trailers for selected body styles by licensed maximum gross vehicle weight were used for the analysis.

- MoTI provided crash data for collisions involving various truck-trailer combinations between 2002 and 2011. The MoTI data is based on the MV6020 incident report form and covers reported collisions on numbered Provincial Highways.

5.3 Data and Trend Analysis

Over 80% of the claims involving the selected commercial vehicles and trailers were property damage only with no casualties. This results in a low claim value.

From the analysis, there was an increase in the number of insured trucks and trailers. The number of claims involving the selected truck-trailer types increased, but at a lower rate than for registered vehicles. Based on an assessment of claims and vehicle kilometre travelled in a year, the claim rate is decreasing for all of the selected body styles. No evidence of an increase in claim rates was found.

The MoTI crash data shows that over the period 2002 to 2006 there were an average of 127 crashes per year for the category of truck-trailer combination covered by the weight reduction. This decreased by 48% to 66 collisions per year between 2007 and 2011.

The observed 2011 average crash rate for power units was 4.22 claims/Million Vehicle Km (MVK).

5.4 Impact of Weight Reduction

If the quad-axle trailer weight reduction were introduced, extra trips will be required to deliver the same payload. A 7.3% increase in productivity would be required to carry the same payload with the same fleet of vehicles. All other things being equal, this would result in an increase in the number of crashes. A reduction of collision rates of 30% would be required to offset the additional cost associated with increased mileage.

The extra truck trips will lead to an increase in direct costs, including wages and fuel cost. The increased travel could trigger higher highway maintenance costs due to an increase in the number of trucks. There will also be environmental impacts due to increased emissions.

To achieve a break-even situation whereby the saving from reduced collisions offsets the extra cost, would require an approximately 30% reduction in the claim rate. The actual percentage is related to the average cost per claim. This may not be easy to achieve.

5.5 Industry Consultation

Results from interviews with truck owners/operators found the following:

- Participants generally felt that the industry consultation process was invaluable;
- The industry consultation demonstrated that the potential impacts resulting from a possible weight reduction vary across industry sectors depending on commodities transported;
- The data collected demonstrated that the reduction in weight is not as simple as loading less cargo on the trailer;
- There is a quantitative cost to reducing the trailer weight by 3,000 kg, both to owners and drivers; and finally
- Given the small number of reported crashes from the participants, the safety benefits that may be gained by a weight reduction based on the consultation data would be limited.

5.6 Recommendations and Next Steps

Based on the preliminary analysis of the available data, the study concluded that:

- Between 2002 and 2011, the claim rates for all of the selected power units and trailers which are covered by the Commercial Transport Regulation decreased.
- Between 2007 and 2011, the number of reported collisions per year on provincial highways for the vehicle class most affected by the weight reduction decreased by 48% when compared to the period 2002 to 2006.
- The direct costs associated with a reduction of the maximum allowable trailer weight would be considerable.
- The potential savings resulting from a reduction in the associated collision rate would unlikely cover the increase in the direct cost resulting from extra truck trips (fuel, wages and increased claims/collisions).
- There are a number of challenges associated with the weight reduction including a shortage of drivers, a limited trailer inventory and loading of bulk fuel trailers.
- The proposed weight reduction could have an adverse effect on the trucking industry.

Based on the above, we do not consider it beneficial to reduce the maximum allowable weight for quad-axle trailers in BC. A reduction of the maximum allowable weight for quad-axle trailers is therefore not recommended at this time.

In order to be able to more effectively analyze the network safety impact of the weight reduction to the specific truck-trailer combinations requires modifications to the collection and recording of data related to vehicle registration and claims/collision reporting. Specific recommendations include:

- <u>Enhanced Data from Weigh Scales</u> – information covering the day, time, location, truck configuration, trailer weight, type of connection, and digital photo image records;
- <u>Vehicle Registration</u> – include specific registration fields for the type of trailer and trailer axle configuration; and
- <u>Crash Records</u> – include information on status of the trailer at time of crash, i.e., was a trailer attached, what was the load condition, what were the contributing factors/causes of the crash.

A detailed investigation of specific collisions involving the subject trailers would also be useful to determine the role that trailer weight may have played in the crash.

APPENDIX A

ADC REFERENCE GUIDE: BODY STYLES

ADC Reference Guide: Body Styles

PASSENGER - VEHICLE TYPE 1

BODY STYLE	ABBREVIATION	CODE
CONVERTIBLE		
2 door	2DCON	01
4 door	4DCON	02
sport	2DSPT	05
STATIONWAGON		
2 door	2DRSW	11
4 door	4DRSW	12
TWO DOOR		
coupe	2DCPE	22
fastback	2DRFB	23
hardtop	2DRHT	24
sedan	2DSDN	25
FOUR DOOR		
coupe	4DCPE	42
fastback	4DRFB	43
hardtop	4DRHT	44
sedan	4DSDN	45
HATCHBACK	HATBK	71
DUAL PURPOSE	DUALP	37
LIMOUSINE	LIMO	58
AMPHIBIOUS VEHICLE	AMPHI	90
DUNE BUGGY	DUNEB	91
GOLF CART	GLFCT	92
SNOWMOBILE	SNOWM	94
INDUSTRIAL/FARM WHEELED ATV	ATV	95
LOW SPEED VEHICLE	LSV	96
THREE WHEELED	3WHEL	97
WORK UTILITY VEHICLE	WUVEH	KX

MOTORCYCLE - VEHICLE TYPE 3

BODY STYLE	ABBREVIATION	CODE
OPEN MOTORCYCLE	MC	XX
LIMITED SPEED MOTORCYCLE	LTDMC	38
TRIKE	TRIKE	XT
ENCLOSED MOTORCYCLE	ENCMC	XE

MOTOR HOME - VEHICLE TYPE 5

BODY STYLE	ABBREVIATION	CODE
MOTOR HOME	MOHOM	60

TRUCKS - VEHICLE TYPE 2

BODY STYLE	ABBREVIATION	CODE	BODY STYLE	ABBREVIATION	CODE
ARMOURED CAR	ARMCR	HB	PALLET	PALET	DF
BOOKMOBILE	BOOK	BK	PANEL	PANEL	AC
BOX	BOX	DA	PICKUP	PU	AD
BULK CARRIER	BULK	DB	PUMPER	PUMPR	EJ
CAB & CHASSIS	CABCH	DJ	SEDAN DELIVERY	SDEL	AE
CAB OVER	CBOVR	DK	SEISMOGRAPH	SEISM	SE
CEMENT MIXER	MIXER	EP	SNOW BLOWER	SNOW	SN
COMPRESSOR	COMPR	EA	SPREADER	SPRED	SD
CONCESSION	CONSN	CN	STAKE	STAKE	DE
CREWCAB	CRCAB	BB	SWEEPER	SWEEP	EM
DUMP	DUMP	CA	TANK	TANK	CE
EMERGENCY	EMGCY	ET	TOW CAR	TOWCR	EL
FIRE	FIRE	EE	TRUCK (INCL. TOW TRUCK)	TRUCK	DH
FLAT DECK	FLDCK	DD	TRUCKSTER	TRSTR	TR
FLOAT	FLOAT	FL	TRUCK TRACTOR	TRACT	HN
GARBAGE	GRBGE	CB	TUNNEL WASHER	TNLWR	TN
GIRAFFE	GIRAF	EF	UTILITY	UTLTY	AF
LABORATORY	LABOR	LB	VAN	VAN	DG
LADDER	LADDR	EG	WELDER	WELDR	EK
LOGGING TRUCK	LOGTR	CC	WINCH	WINCH	ER
LOW SPEED VEHICLE	LSV	LS	WINDOW VAN	WVAN	PA
PACKER	PACKR	CD	WRECKER	WRCKR	EN

PASSENGER CARRYING COMMERCIAL VEHICLES - VEHICLE TYPE 2

BODY STYLE	ABBREVIATION	CODE	BODY STYLE	ABBREVIATION	CODE
BUS	BUS	BA	HANDY DART (SPECIAL VEHICLE BUS)	HANDY	BG
BUS FREIGHTER	BUSFR	BF	SMALL BUS FREIGHTER	PASFR	BH
CREW BUS	CREWS	BE	CLUBWAGON	CLWGN	13
CRUMMY	CRUMY	BC	LIMOUSINE (FOR HIRE)	LIMO	LM
DOUBLE DECKER BUS	DBLDK	BD	TAXI	TAXI	TA
INTERCITY BUS	HWBUS	BI	SNOW VEHICLE	SNOWV	93
PUBLIC TRANSIT BUS (SCHEDULED BUS)	TRANS	BT	AMBULANCE	AMBUL	HA
SCHOOL BUS (SPECIAL ACTIVITY BUS)	SCBUS	BL	HEARSE	HEARS	HL

FARM & INDUSTRIAL VEHICLES - VEHICLE TYPE 2

BODY STYLE	ABBREVIATION	CODE	BODY STYLE	ABBREVIATION	CODE
BACKHOE	BKHOE	KA	GRADER	GRADR	KH
BACKHOE/LOADER	BKLDR	KW	ICE SURFACER	ICES	KT
BULLDOZER	BLDZR	KL	LIFTER	LIFTR	KK
CONVEYOR	CONVR	CO	LOADER	LOADR	KE
CRANE	CRANE	EB	MOWER	MOWER	KF
CRAWLER	CRAWL	KB	PAVER	PAVER	KN
DIGGER	DIGGR	KC	ROLLER	ROLLR	KG
DRILL	DRILL	ED	SKIDDER	SKIDR	KP
EXCAVATOR	EXCAV	KM	TRACTOR	TRCTR	KJ
FARM	FARM	KS	TRENCHER	TRENC	KR
FORK LIFT	FKLFT	KD	WORK UTILITY VEHICLE	WUVEH	KX

TRAILERS - VEHICLE TYPES 4 AND 6

BODY STYLE	ABBREVIATION	CODE	1400 KG & UNDER	OVER 1400 KG
AERATOR	AERTR	AR	Type 4	Type 6
AUTOMOBILE	AUTO	ML	Type 4	Pleasure/recreation - Type 4 Commercial use - Type 6
BEAR TRAP	BEAR	BR	Type 4	Type 6
BOAT	BOAT	MA	Type 4	Pleasure/recreation - Type 4 Commercial use - Type 6
BOOSTER	BOSTR	PK	Type 4	Type 6
BOX	BOX	MB	Type 4	Type 6
BULK	BULK	PM	Type 4	Type 6
CATTLE/ LIVESTOCK	CATTL	CT	Type 4	Type 6
CEMENT	CEMNT	MC	Type 4	Type 6
CHIP	CHIP	PG	Type 4	Type 6
COMPRESSOR	COMPR	ME	Type 4	Type 6
CONCESSION	CONSN	CS	Type 4	Type 4
CONVEYOR	CONVR	CV	Type 4	Type 6
CRUSHER	CRSHR	PX	Type 4	Type 6
DOLLY	DOLLY	DO	Type 4	Type 6
DRILL	DRILL	PT	Type 4	Type 6
DUMP	DUMP	PN	Type 4	Type 6
DUNE BUGGY	BUGGY	MJ	Type 4	Type 6
FLAT DECK	FLDCK	FD	Type 4	Type 6
FLOAT	FLOAT	NT	Type 4	Type 6
GENERATOR	GENR	GR	Type 4	Type 6
HIGH BOY	HIBOY	PH	Type 4	Type 6
HORSE	HORSE	MD	Type 4	Pleasure/recreation - Type 4 Commercial use - Type 6
HOUSE	HOUSE	NE	Type 4	Type 4
LABORATORY	LABOR	LR	Type 4	Type 6
LIGHT PLANT	LIGHT	LT	Type 4	Type 6
LOGGING	LOG	PC	Type 4	Type 6

BODY STYLE	ABBREVIATION	CODE	1400 KG & UNDER	OVER 1400 KG
LOWBED	LOWBD	PD	Type 4	Type 6
LOWBOY	LOBOY	PJ	Type 4	Type 6
MIXER	MIXER	MG	Type 4	Type 6
MOBILE MACHINERY	MMACH	NY	Type 4	Type 6
MOTORCYCLE	MCYCL	MM	Type 4	Pleasure/recreation - Type 4 Commercial use - Type 6
MOWER	MOWER	NG	Type 4	Type 6
MULTI	MULTI	NW	Type 4	Type 6
OFFICE	OFFC	MP	Type 4	Type 4
POLE	POLE	PE	Type 4	Type 6
PORTABLE	PORT	PO	Type 4	Type 6
PUMP	PUMP	PP	Type 4	Type 6
PUP	PUP	PR	Type 4	Type 6
REEFER VAN	REEFR	RR	Type 4	Type 6
ROD BENDER	ROD	PW	Type 4	Type 6
ROLLER	ROLLR	MR	Type 4	Type 6
SEMI	SEMI	PS	Type 4	Type 6
SNOWMOBILE	SNOWM	MK	Type 4	Pleasure/recreation - Type 4 Commercial use - Type 6
SPREADER	SPRED	SP	Type 4	Type 6
STOCK CAR	STOCK	MX	Type 4	Type 6
SWEEPER	SWEEP	MT	Type 4	Type 6
TANK	TANK	PL	Type 4	Type 6
TAR KETTLE	KETTL	PY	Type 4	Type 6
TENT	TENT	NA	Type 4	Type 4
TRAVEL	TRAVL	NC	Type 4	Type 4
UTILITY	UTLTY	MF	Type 4	N/A
VAN	VAN	PF	Type 4	Type 6
WELDER	WELD	MH	Type 4	Type 6
WOOD SPLITTER	WOOD	WS	Type 4	Type 6

APPENDIX B
COMMENTS FROM STAKEHOLDERS' CONSULTATION

COMMENTS FROM STAKEHOLDERS' CONSULTATION

- We're paid by the tonne; pay load is 39,000 or 8% would be in a loss situation; green environmental concerns includes the number of trips required would be 8% higher.
- We expect a cost increase of about $300,000/year on a sales volume of $2 million or an added cost of 10-15%.
- Mills want to achieve payloads. These units are competing with other configurations that provide 63,500 Kg.
- 10% of total income for haul for tandems and 3-5% of tridems increase in operating cost per litre of fuel; increased in number of deliveries; increase costs in wear and tear and in maintenance costs; unsafe transportation of cargo due to increased load instability since each compartment is "sloshing" cargo creating increasing instability from side to side and forwards when braking n/a; does not own a quad trailer.
- The 3,000 kg drop in weight will mean a loss of 60 cents per tonne per hour. Based on our daily volume of 70,000 tonnes, this works out to $42/day or over $10,500 per unit per year in losses.
- $3.86/tonne hour x 3 tonne = $11.58/hour x $2100 hour/year = $24,318/truck/year. Multiply this times 16 trucks in our fleet and the total is $389,088 per year to the company. In addition, the driver's percentage is 26% or $6,322.68 per driver per year.
- Impact would be hopelessly negative to business, increasing significantly in cost, using more vehicles and more fuel, etc. For Quesnel, based on payload alone, costs would increase annually for 3,000,000 tonnes by $0.25/tonne or $750,000.
- Annual fuel consumption requirements will be 350,000 liters of extra diesel consumed, with resulting increased emissions. At current market price, that is $450,000.
- 5% more vehicles and operators required to do the current function. That equals 3-5 vehicles extra on the road per year for our business alone.
- These upward cost pressures will render the margin cost portions of our timber supply uneconomical, reducing the timber supply available to run our facilities.
- These figures are for Quesnel alone. When expanded to the province, the costs are very significant.
- We expect to lose money on each trip, every day, every year. On a 5 hr. trip, we'll lose $60/trip/day; we plan on three trips for our trucks per day, or $180/day/truck, or about $8,000/month for both trucks overall, a loss of about $80,000/year. In addition, the driver loses 30% of this in wages since they get paid by the % of what the truck makes. In addition, this affects the mountain pine beetle wood. If we can't get the full weight on truck load max on trailer, we have to compensate to maximize the payload. This means more trips since we won't be hauling as much. Shortage of trucks will affect contractors in the long run.
- If this drop by 3 tonnes goes ahead it will cost each truck $37,500 every year. That's what it would cost the industry.
- 3,000 kg works out to about $200 loss per day for a truck, and about $75 loss per day for driver.
- Paid by the tonne, and based on three trips per day, my loss would be anywhere from $90 to $140 to $250 for one truck per day, depending on the tonne-$. Three tonne lighter will make up some time.

APPENDIX C

QUEBEC ROAD VEHICLE LOAD AND SIZE LIMITS GUIDE

Road vehicle
LOAD AND SIZE LIMITS
GUIDE

2013 Edition

UN QUÉBEC POUR TOUS

Québec

This publication was created by the Direction du transport routier des marchandises and edited by the Direction des communications at the ministère des Transports du Québec (MTQ).

This publication is also available in French under the title *Guide des normes de charges et dimensions des véhicules routiers*. Both French and English versions are available on the website of the ministère des Transports du Québec.

For more information, you can:

- dial 511;
- go to the Ministère's website at: www.mtq.gouv.qc.ca; or
- write to the following address:

Direction des communications
Ministère des Transports
700, boul. René-Lévesque Est, 27e étage
Québec (Québec) G1R 5H1

Concerned with protecting the environment, the ministère des Transports du Québec encourages the use of paper produced from recycled fibre for the production of its printed materials and recommends that this publication be downloaded.

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WARNING

This publication presents the main provisions of the *Vehicle Load and Size Limits Regulation* (Order in Council 24-2013).

The information it contains is provided for guidance only. The reader should refer to the regulations for more complete information.

For several years now, the ministère des Transports du Québec has been working at harmonizing Québec standards with those of other North American administrations. However, in spite of these efforts, some differences may remain. Therefore, even if a vehicle complies with Québec regulations, it is important to check the rules applicable in other administrations before driving the vehicle outside Québec.

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INTRODUCTION

The Vehicle Load and Size Limits Regulation applies to all heavy and light road vehicles, except for road vehicles designed to fight fires. The main purpose of this regulation is to ensure the safety of road users and protect road infrastructure (bridges and roadways). It defines standards limiting, for example, dimensions, axle loads and total loaded mass for vehicles travelling on public highways.

The regulation provides certain details that are not mentioned in this guide. Please refer to the regulation for more information.

MAXIMUM AUTHORIZED LOAD BY CLASS OF AXLES

The maximum authorized load for a class of axles is the lowest of the three following values:

1. The sum of all tire capacities in the class;
2. Solely for the front axle class: the load capacity of a front axle or the sum of the load capacities of the front axles (GAWR);
3. The axle class load limit prescribed in the regulation.

1 Concerning the sum of all tire capacities in the class:

It is indicated by the manufacturer on the side of the tire. There are usually two figures:

- "D" when tires are dual-mounted;
- "S" when tires are single-mounted.

Dual-mounted tires: the capacity of the inner tire is the same as that of the outer tire, unless otherwise ascertained.

Single-mounted tires: the tire capacity must not exceed 10 kg per mm of nominal width of the tire tread. This tire width provision does not apply to:

- front axles;
- front axles equipped with single tires of size **445/50**R22.5 or **455/55**R22.5;
- classes B.44 and B.45 self-steering axles.

2 Solely for the front axle class: concerning the load capacity of a front axle or the sum of the load capacities of the front axles (GAWR):

The load capacity of a front axle or the sum of the load capacities of the front axles (GAWR) is:

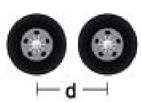
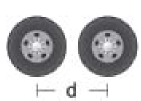
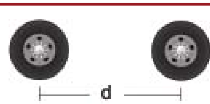
- 5,500 kg for a class B.1 axle;
- 11,000 kg for a combination of axles belonging to class B.2 or B.3.

The axle capacity can be higher when indicated by the manufacturer of the road vehicle by the person who made alterations on or to a vehicle with the approval of the Société de l'assurance automobile du Québec in accordance with section 214 of the Québec *Highway Safety Code*.

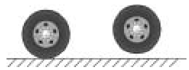
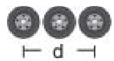
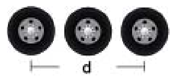
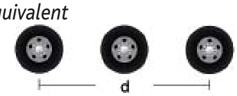
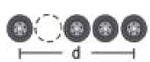
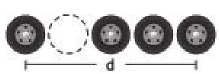
3 Concerning the axle class load limit prescribed in the regulation:

The axle class load limit prescribed in the regulation is indicated in Table 1.

Table 1

Class of axles		Load limit prescribed in the regulation: Normal period	Load limit prescribed in the regulation: Thaw period
Front axles			
B.1	*A front axle* 	9,000 kg	9,000 kg
B.2	*Front tandem* 	16,000 kg	16,000 kg
B.3	*Two or more front axles* 	15,000 kg	15,000 kg
Rear axles			
B.10	*Single axle* 	10,000 kg	8,000 kg
B.20	*Two axles or more*  *d < 1.2 m*	10,000 kg	8,000 kg
B.21	*Tandem*  *d ≥ 1.2 m*	18,000 kg	15,500 kg
B.25	*Two axles*  *1.2 m ≤ d < 2.4 m*	13,500 kg	11,000 kg
B.25.1	*Two axles*  *d ≥ 2.4 m*	18,000 kg	15,500 kg

Retour à la table des matières

	Class of axles	Load limit prescribed in the regulation	
		Normal period	Thaw period
B.26	*Single axle and one "donkey" axle* 	10,000 kg	8,000 kg
B.30	*Three axles*  $d \geq 1.2\,m$	18,000 kg[1]	15,500 kg[1]
B.31	*Tridem or tridem equivalent*  $2.4\,m \leq d < 3\,m$	21,000 kg[2]	18,000 kg[2]
B.32	*Tridem or tridem equivalent*  $3\,m \leq d < 3.6\,m$	24,000 kg[2]	21,000 kg[2]
B.33	*Tridem or tridem equivalent*  $3.6\,m \leq d \leq 3.7\,m$	26,000 kg[2]	22,000 kg[2]
B.40.1	*Four axles or more*  $1.2\,m \leq d < 2.4\,m$	18,000 kg	15,500 kg
B.40.2	*Four axles or more*  $2.4\,m \leq d < 3.6\,m$	23,000 kg	20,000 kg
B.41	*Four axles or more*  $3.6\,m \leq d < 4.2\,m$	26,000 kg	22,000 kg

1 Until December 31, 2014, the load limit is increased to 26,000 kg during a normal period and to 22,000 kg during the thaw period for a tridem or tridem equivalent with a "d" dimension of 4.8 m or more, provided the vehicle was assembled before November 1, 1998.

2 The limit is reduced by 1,000 kg in the case of a tridem equivalent.

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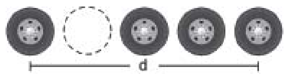
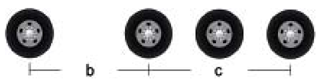
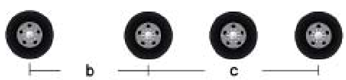
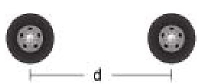
	Class of axles	Load limit prescribed in the regulation	
		Normal period	Thaw period
B.42	*Four axles or more*  *4.2 m ≤ d < 4.8 m*	26,000 kg	22,000 kg
B.43	*Four axles or more*  *d ≥ 4.8 m*	28,000 kg	24,000 kg
B.44[3]	*A self-steering axle in front of a tridem equipped with a suspension system designed to distribute the mass evenly between all axles, within about 1,000 kg, and without possible adjustment*  *2.5 m < b ≤ 3.0 m* *3 m ≤ c < 3.6 m*	32,000 kg	27,500 kg
B.45[3]	*A self-steering axle in front of a tridem equipped with a suspension system designed to distribute the mass evenly between all axles, within about 1,000 kg, and without possible adjustment*  *2.5 m < b ≤ 3.0 m* *3.6 m ≤ c ≤ 3.7 m*	34,000 kg	29,500 kg
B.56	*Two axles (type C double train)*  *d < 3 m*	17,000 kg	16,000 kg
B.57	*Tandem + single axle (type C double train)*  *d < 3 m*	23,000 kg	23,000 kg

3 Until December 31, 2014, the self-steering axle may be replaced by a single axle for a vehicle assembled before January 1, 2003, whose length is 15.5 m or less. This provision is extended until December 31, 2019, for a tank semi-trailer assembled before January 1, 2003 and whose length is 15.5 m or less.

Until December 31, 2019, the "b" dimension may be at least 2.4 m for a vehicle assembled before January 1, 2014.

Until December 31, 2019, the suspension system designed to evenly distribute the mass between the self-steering axle and the tridem axle, within about 1,000 kg, is not required in vehicles assembled before October 1998.

Retour à la table des matières

Special measures and exception

The load limit prescribed in the regulation is decreased by 1,000 kg per axle equipped with only 2 tires that:

- are not part of a front axle class;
- are not wide-tread **445/50**R22.5 or **455/55**R22.5; or
- do not belong to the self-steering axle equipped with single tires with a nominal width of at least 365 mm for class B.44 and at least 385 mm for class B.45.

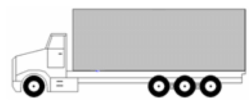
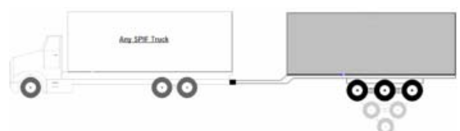
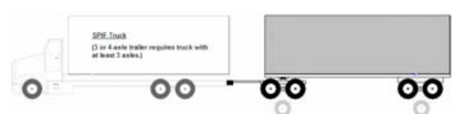
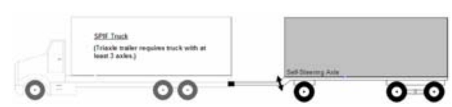
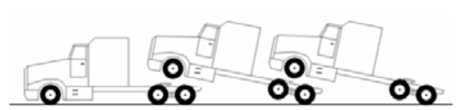
During the thaw period, the axle load limits prescribed in the regulation for a normal period apply to a tow truck hauling a vehicle that has been in an accident or has broken down, been seized or abandoned and, in all cases, without a load.

APPENDIX D
ONTARIO SPIF CLASSIFICATION

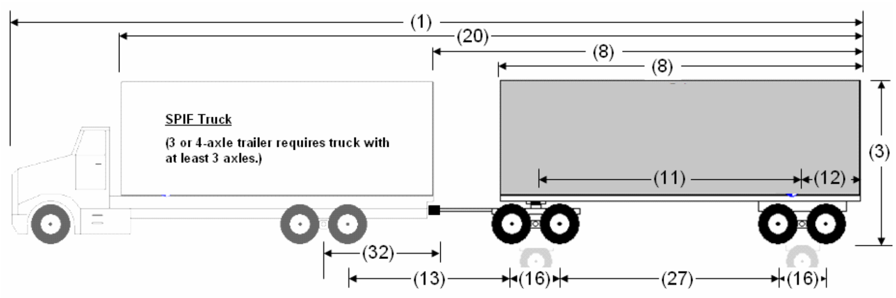
Guide to:

Vehicle Weight and Dimension Limits in Ontario

July 2012

SPIF Vehicle	Description	Schematic (alternative axles shown in shadow)
#22	**Twin-steer Tandem-drive Truck**	
#23	**Self-steer Triaxle Truck**	
#24	**Tri-drive 4-Axle Truck**	
#25	**Twin-steer Tri-drive 5-Axle Truck**	
#26	**Truck and Fixed Axle Pony Trailer**	
#27	**Truck and Self-steer Triaxle Pony Trailer**	
#28	**Truck and Full Trailer**	
#29	**Truck and Self-steer Triaxle Full Trailer**	
#30	**Truck and Tridem-axle Full Trailer**	
#31	**Saddlemount combination**	

SPIF #28
DESIGNATED TRUCK-TRAILER COMBINATION 3 — TRUCK AND FULL TRAILER



Configuration Description

Designated Truck-Trailer Combination 3 is composed of a Designated Truck 1 combined with a 2-axle full trailer or a Designated Truck 2, 3, 4, 5, 6, or 7 combined with a 2, 3 or 4-axle full trailer.

The trailer has a single drawbar connected to a front turntable or trailer converter dolly and has two axle units consisting of a single axle in front of a rear single axle, a single axle in front of a rear tandem axle or a tandem axle in front of a rear tandem axle.

Exceptions

Until December 31, 2025, the dimensional limit for Hitch Offset (32) does not apply if the truck was built before July 1, 2011.

Until December 31, 2025, the dimensional limits for Wheelbase (11), Effective Rear Overhang (12), Inter-vehicle-unit Distance (13), Track Width (19), Box Length (20) and Inter-Axle Spacing (27) do not apply if the trailer was built before July 1, 2011.

DIMENSIONAL LIMIT CHART (TO QUALIFY AS SPIF #28)

	Ref	Feature	Dimensional Limit
Overall	(1)	Overall Length (including load)	Max. 23m
	(2)	Width (including load)	Max. 2.6m
	(3)	Height (including load)	Max. 4.15m
Truck		Refer to Schedules 19-25 for Designated Trucks	
Full Trailer	(8)	Length	Not controlled
	(8)	Length (excluding the drawbar, including load)	Max. 12.5m
	(11)	Wheelbase	Min. 6.25m
	(12)	Effective Rear Overhang (including load)	Max. 4.0m
	(13)	Inter-vehicle-unit Distance between: – single and single, tandem, or tridem – tandem and tandem – tandem and tridem	 Min. 3.0m Min. 5.0m Min. 5.5m
	(16)	Tandem Spread	1.2 to 1.85m
	(19)	Track Width – single tires – dual tires	 2.45 to 2.6m 2.5 to 2.6m
	(20)	Box Length (including load)	Max. 20m
	(27)	Inter-Axle Spacing	Min. 5.0m
	(32)	Hitch Offset: – single or tandem drive truck – tridem drive truck	 Max. 1.8m Max. 2.5m

Qualifying Preconditions SPIF #28

Additional Lift Axles: [Reg 413/05 s5(1)]
- may not be deployed in Ontario

Rear Impact Guard is required on trailer unless: [Reg 413/05 s6]
- trailer was manufactured prior to September 2007, or
- trailer was exempted from having a guard by US or Canadian federal standards at time of manufacture.

Tire Width [Reg 413/05 s8]
- all tires must be at least 150 mm wide

WEIGHT LIMIT CHART FOR VEHICLES QUALIFYING AS SPIF #28

Feature	Weight Limit
Truck Weights	Refer to Appropriate Weight Limit Chart (Schedules 19-25)
Trailer Axle Maximums: (lowest of a, b and c)	
a) by manufacturer's axle rating or default	i. GAWR, if verified ii. If GAWR not verified, the sum of the maximum tire load ratings, as specified on the tire side walls.
b) by tire width	10 kg × combined tire widths in mm
c) by axle unit description	Single Axle (Single tires) 9,000 kg Single Axle (Dual tires) 9,100 kg Tandem Axle 18,000 kg
Allowable Gross Vehicle Weight: (lower of i and ii)	i. AGVW of Designated Truck plus trailer axle maximums ii. Until December 31, 2025, 1. if trailer is built before July 2011, the weight in Vehicle Weight Table 30 2. if trailer is built after June 2011 and A. trailer wheelbase is less than 7.25m, the weight in Vehicle Weight Table 31 B. trailer wheelbase is 7.25m or greater, the weight in Vehicle Weight Table 30 After 2025, 1. if trailer wheelbase is less than 7.25m, the weight in Vehicle Weight Table 31 2. if trailer wheelbase is 7.25m or greater, the weight in Vehicle Weight Table 30

Vehicle Weight Table 30: Allowable Gross Weight on Designated Truck-Trailer Combinations (kilograms)

Base Length (metres)	Inter-Vehicle-Unit Distance (metres)	Number of Axles in the Truck-Trailer Combination					
		3	4	5	6	7	8+
any base length	less than 3.6	25,450	33,000	35,000	39,000	49,000	53,000
less than 11m	3.6 and over	25,450	35,000	41,000	42,500	52,000	55,000
11.0 to less than 12.0	3.6 and over	25,450	35,000	42,500	45,000	52,000	55,000
12.0 to less than 13.0	3.6 and over	25,450	35,000	44,500	47,000	52,000	55,000
13.0 to less than14.0	3.6 and over	25,450	35,000	44,500	49,500	52,000	55,000
14.0 to less than 15.0	3.6 and over	25,450	35,000	44,500	51,500	53,000	55,000
15.0 to less than 16.0	3.6 and over	25,450	37,000	44,500	53,500	53,500	55,000
16.0 to less than 17.5	3.6 and over	25,450	37,000	46,000	53,500	55,000	55,500
17.5 to less than 18.5	3.6 and over	25,450	37,000	46,000	55,000	58,000	59,000
18.5 to less than 19.5	3.6 and over	25,450	37,000	46,000	55,000	60,500	61,500
19.5 and over (front axle less than 8,000 kg)	3.6 and over	25,450	37,000	46,000	55,000	61,500	62,500
19.5 and over (front axle 8,000 kg or more)	3.6 and over	24, 450	37,000	46,000	56,000	63,000	63,500