
Western U.S.-Canada

Crossborder Case Study

U.S. DOT Comprehensive

Truck Size & Weight Study

Report No. 5

To

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Activity II: Task D Conduct Regional and Local Trucking Case Studies

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The primary objectives of the U.S. Department of Transportation's Comprehensive Truck Size and Weight (TS&W) Study are to:

- assess the potential economic, safety, and environmental impacts of changing existing TS&W limits; and
- identify opportunities to increase the efficiency of freight transportation while preserving safety and highway infrastructure.

Reports which have been completed for the TS&W Study, to date, include the following:

- (1) Synthesis of Truck Size and Weight Studies and Issues
- (2) Analysis of the Truck Inventory and Use Survey from the Truck Size and Weight Perspective for Trucks with Five-Axles or More
- (3) Truck Size and Weight Modelling Workshop
- (4) Truck Size and Weight Performance-Based Workshop
- (5) Western U.S.-Canada Crossborder Case Study.

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This document was prepared for use in the U.S. Department of Transportation's Comprehensive Truck Size and Weight Study. The views expressed are those of the author(s) and are not necessarily those of the U.S. Department of Transportation.

Executive Summary

This case study examines trucking across the western U.S.-Canada border and how it is influenced by truck size and weight (TS&W) regulations. Western border trucking differs from eastern border trucking in terms of the types of commodities being handled (high quantities of relatively low value, resource-based commodities), the density of truck volumes (many miles of roads with relatively low volumes of traffic), and the TS&W regulatory regimes arising from many grandfather exemptions and the resulting truck configurations. Also, the implications of a range of possible Federal TS&W policy initiatives on western border trucking are considered.

Highway Crossings on the Western Border

The western border reaches from the western end of Lake Superior to the West Coast. There are 54 highway crossings of the border. Twenty-eight involve: (1) an Interstate System (IS), National Network (NN), or National Highway System (NHS) highway; (2) a two-way commercial traffic flow of more than 12,000 trucks per year, or (3) both. The western border accounts for one-third of all trucking across the Canada-U.S. border.

Geographical Proximity of Western Canada and the United States

Truck travel times between western Canada and most of the United States west of the Ohio River and the southern section of the Mississippi River are less than travel times from western Canada to central Canada (Toronto) and east (Montreal and beyond). The proximity of western Canada to this area and its markets, the similarity in economic and industrial activities between western Canada and the north and mid-west United States, and the ease of crossborder trade have created strong trade and transportation linkages across the border.

Trade Across the Western Border

Most western border trucking is associated with local and regional trade. Economic sectors of particular importance in this trade are--agriculture (grains, livestock, seed, produce, peat moss); wood and paper (logs, lumber, shakes, newsprint, printed material); chemicals, metals, and minerals (potash, soda ash, petroleum); machines, vehicles, and farming and resource extraction equipment.

TS&W Regulations Governing Trucking Along the Western Border

There are a myriad of different TS&W regulations governing trucking across the western border. The laws and regulations governing western border trucking are promulgated and administered by twelve different entities: the States of Washington, Idaho, Montana, North Dakota, and Minnesota; the U.S. Federal Government; the Provinces of British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario; and the Roads and Transportation Association of Canada (RTAC) interprovincial agreement on uniform vehicle weights and dimensions.

For longer distance crossborder trucking, such as between Winnipeg and Mexico, or Calgary and Los Angeles, or a triangular operation involving Wyoming, Idaho, and Saskatchewan, additional regulatory regimes influence fleet and loading characteristics. In total, at least 63 TS&W regulatory regimes can at some time or another influence North American trucking, including trucking across the western border.

Differences among the State gross vehicle weight (GVW) limits, for example Minnesota at 80,000 pounds, North Dakota at 105,500 pounds, and Montana at 131,060 pounds, can have as much or more of a role in designing the vehicles used in crossborder trucking as differences among Canadian Provinces and U.S. States where the GVW limit on Manitoba secondary highways is 124,300 pounds, which connect with North Dakota State highways with a limit of 105,500 pounds.

Weight Limits

- Axle weight limits of 20,000 and 34,000 pounds on single and tandem axles respectively govern the axle weights of most trucking crossing the western border under regular operation. These limits apply to IS, NN and all principal State highways in the five border States. They are equal to or more restrictive than the corresponding axle weight limits specified for most connecting highways in Canada.
- The de facto GVW limit is 105,500 pounds or more for most western border crossings, except for four crossings to and from Minnesota. A GVW limit of 131,060 pounds applies in Montana (except for the special ISTEA provision for a GVW of 137,500 pounds between Shelby, Montana and the Montana-Alberta border). Major highways in Minnesota are limited to 80,000 pounds GVW.
- For a given GVW limit, Bridge Formula B governs the number of axles and axle spacings required of most trucking across the western border under regular operation. The formula is, for the most part, more conservative than corresponding load distribution requirements specified for connecting highways in Canada.
- The combination of the requirements of Bridge Formula B, variations in its enforcement by different States (for example, North Dakota does not enforce the inner bridge requirements on non-IS highways), and the various GVW caps and length limits, now frozen by the ISTEA, and State laws has created a number of unintended consequences in

terms of vehicle characteristics operating across and along the western border. Examples are lift axles, wide-base tires, and excessively long drawbars between trailers and between trucks and trailers.

- Split tandems are used in semitrailers in the western border States. They allow, where permitted, operating five-axle tractor-semitrailers at a GVW of 86,000 pounds and more flexibility in loading at lower GVWs. The 10-foot spread of these axles is effectively prohibited by the Canadian RTAC regulations and by the western Canadian provinces. Ontario and Quebec permit the use of split tandems.
- Tridem- and quadrem-axle arrangements are used across and along the western border and often incorporate lift axles and wide-base tires. One major trailer manufacturer indicates that tridems are becoming the axle arrangement of choice for many carriers in the northwest region.
- Differences in tire load limits among the ten western jurisdictions have no significant effect on western border trucking. Canadian regulations generally discourage the use of wide-base tires by placing limits on the total allowable load per tire. In certain western border States, on the other hand, the tire load limit of 600 pounds per inch of width with no limit on the total allowable load per tire tend to encourage the use of wide-base tires.
- Canada's steering axle limit of 5,500 kilograms causes problems for U.S. trucks at certain crossings. U.S. vehicles entering Manitoba from I-29 can come in with a steering axle load of as much as 6,000 kilograms, and are required to move their fifth wheel to comply with the 5,500 kilograms requirement.

Dimensions

- Western border States (except Minnesota) permit 14-foot high vehicles. This is 6 inches more than allowed in the western Provinces. Fourteen-foot high vans are common throughout the western United States particularly with specialized truckload carriers. These vehicles are being permitted to operate into at least one western Province. Alberta has proposed 14 feet as the height limit for the Canamex Corridor (see Appendix C), an international trade corridor originally proposed by Alberta that extends from Alberta generally along I-15 to California and Mexico.
- RTAC regulations require the wheelbase of a tractor to be within the range of 3.0 to 6.2 meters (118 inches to 244 inches). Some U.S. carriers wish to operate tractors having shorter (2.7 meters--106 inches) or longer wheelbases (6.7 meters--265 inches) into the western Provinces. Some Provinces prohibit use of these non-RTAC tractors, others allow their use under special permits, while still others ignore their non-compliance.

Truck Combinations Used Along and Across the Western Border

The complex TS&W regulations applicable in the western border region allow and lead to the use of many different truck configurations along and across the western border. Several are unique to the region. Small trucks of four or less axles dominate the truck fleets in western border States (90 percent in North Dakota; 80 percent in Washington, Idaho and Minnesota; 75 percent in Montana). For the western border fleet of trucks that has five or more axles:

- Tractor-semitrailer combinations are most common--7 of 10 in Washington and Idaho, 8 of 10 in Montana, and 9 of 10 in North Dakota and Minnesota (86.6 percent nationwide). The tractor-semitrailer fleet in the western border States is complicated. It consists of conventional five-axle units, five-axle units with a split tandem axle on the semitrailer, six-axle tractor-semitrailers (some with wide-base rather than dual tires on the semitrailer), seven-axle tractor-semitrailers (with a lift axle on the tractor), eight-axle tractor-semitrailers (with lift axles on both the tractor and semitrailer).
- Truck-trailer combinations are the next most common--1 of 5 in Washington and Idaho; and 1 of 10 in Montana, North Dakota and Minnesota (7.5 percent nationwide). These include a variety of truck-trailer combinations with five, six, seven and eight-axles.
- Tractor-double trailer combinations follow--1.5 of 10 in Washington and Idaho, 1 of 10 in Montana, 1 of 20 in North Dakota, and 1 of 100 in Minnesota (5.9 percent nationwide). These include a variety of double-trailer A-trains, including western doubles and Rocky Mountain doubles, with from five to nine-axles; a few seven- or eight-axle double-trailer C-trains; and eight-axle double-trailer B-trains. The ISTEA freeze limits the cargo-carrying length of these units on the NN to 68 feet in Washington, 95 feet in Idaho, 93 feet in Montana, and 103 feet in North Dakota.
- Triple-trailer combinations are either non-existent as in Washington and Minnesota or infrequent (less than 0.1 percent nationwide).
- Containers are moved by truck between Seattle and Vancouver, often using a variety of vehicles specially-designed to comply with the combined effects of Bridge Formula B, the 105,500-pound Washington State GVW cap, Washington trailer length limits, and Canadian RTAC regulations.

Because of these varying TS&W regulations, depending on the jurisdictions being crossed and the highway classes used, trucks crossing both the international and State borders in the western region may: (1) be stretched or contracted using adjustable drawbars; (2) have axles raised, lowered, or re-positioned; (3) have fifth wheels re-positioned; (4) have tires removed or added; or (5) have loads modified or shifted.

Truck Usage in Western Border States

The importance of trade in local and regional commodities is reflected in truck usage in the five western border States. One-third of the 287,100 registered trucks in the five States are used for transporting farm products. An additional one-third are used for transporting building materials, processed foods, live animals, lumber and fabricated wood products, and transportation equipment.

Most trucks in the western border States operate within their base States (9 of 10 trucks drive less than 25 percent of their mileage outside of their home State) and within 200 miles of home (9 of 10 truck miles). About 1 of 20 trucks drive 75-100 percent of their mileage outside the base State. About 1 of 20 trucks operate in the 200-500 mile range, and another 1 of 20 with trip lengths of greater than 500 miles.

Most trucking in the western border States occurs at weight levels that are much lower than the governing GVW limits. Seven of 10 truck movements occur at an average GVW of up to 40,000 pounds, which generally requires no more than three-axles. Eighty-five percent occurs at average weight of up to 60,000 pounds, which requires no more than four-axles. About 97.5 percent occurs at average weight levels of up to 80,000 pounds, which requires no more than five-axles. About 1.5 percent occurs at an average GVW of up to 100,000 pounds, which requires six or seven-axles. About 1.0 percent occurs at weights up to 130,000 pounds, which requires eight or nine-axles.

Trucking Across the Western Border

The western border accounted for about 5,100 two-way truck movements per day in 1994. Ninety-five percent of all truck movements across the western border occur on highways where the governing GVW limit is either 105,500 pounds as in Washington, Idaho, and North Dakota or 131,060 pounds in Montana. Montana also has a 137,800-pound weight limit for the section of I-15 from the Canadian border to Shelby, Montana. This is allowed under a special provision in the ISTEA to allow vehicles meeting the RTAC limits access to an intermodal facility at Shelby. Only 5 percent of these movements directly cross the Minnesota-Manitoba border, which is controlled by the 80,000-pound limit.

Ten times as much truck traffic moves across the western border as moves between western and eastern Canada via the Trans-Canada Highway (5,100 per day versus 500 per day). Some western border movements travel through the United States between western and eastern Canada.

Trucking across the western border is growing. There has been a 25 percent increase in two years from 1992 to 1994. One major crossing has experienced a ten-fold increase in 20 years. Many factors have affected this. Among them are economic growth, deregulation of trucking, increased use of prorationing taxation systems, freeing-up of agricultural product trading, branchline abandonment on both sides of the border, increased fertilizer use, the U.S.-Canada Free Trade Agreement, the NAFTA, and most recently the low value of the Canadian dollar.

The six most heavily used crossings account for three-quarters of the western border truck movements. These are Blaine-Pacific on I-5 (1,820 crossings per day), Pembina-Emerson on I-29 (669 crossings per day), Sweetgrass-Coutts on I-15 (460 crossings per day), Sumas-Huntington on U.S. 9 (359 crossings per day), Portal-North Portal on U.S. 52 (301 crossings per day), and Eastport-Kingsgate on U.S. 95 (194 crossings per day). About 1 of 10 trucks moving southbound across the western border are empty. One-third of the northbound trucks are empty.

Many western Canadian carriers have established operating arms in the United States. In 1994, two of every three northbound trucks entering Canada across the western border were Canadian-registered. One-third were registered in the United States. A number of Canadian carriers have recently established associations with Mexican carriers. When employing U.S. drivers and equipment, the U.S. base allows them to operate both within the United States as well as between the United States and Canada, and in time, into Mexico.

Implications of Federal TS&W Policy Options

What would happen to western border trucking if there was no change in the current limits and scope of application of Federal TS&W provisions? Based on recent experience:

- More specialized western border vehicles would be introduced. These include increasing use of six-, seven-, and eight-axle tractor-semitrailer units and seven- and eight-axle truck-trailer units.
- A variety of (often undesirable) long-drawbar A-trains and truck-trailer combinations would remain and probably see increased use.
- U.S.-Canada crossborder traffic probably will grow at a rapid rate.
- Split tandems and wide-base tires will be increasingly employed.

What would happen to western border trucking if certain Federal TS&W regulation was devolved to the States?

Federal Length Limits (minimum) Since these limits are already equaled or exceeded in the five western border States, no effect is expected.

Federal Axle Weight Limits The States could elect to increase single- and tandem-axle weight limits on the Interstates within their borders. None of these States have over the years elected to increase axle weights on non-IS highways under their respective authorities. Differences with Canadian tandem axle limits could effect some pressure.

The 80,000-Pound GVW Cap In the five western border States, the only highways on which the Federal 80,000-pound GVW cap applies are in Minnesota. In the other four States, it is the GVW

limits imposed by the ISTEA freeze (and the ISTEA Shelby exemption) that are the Federal GVW limits of influence. What Minnesota would do with the authority to relax the 80,000-pound GVW limit on its Interstate highways is not known. To date, Minnesota has elected to maintain an 80,000-pound GVW limit (or less) on all highways in the State.

Bridge Formula B: Except for North Dakota, the five western border States apply Bridge Formula B on all highways. North Dakota applies the provisions of the formula on Interstate highways, but ignores inner bridge requirements and allows 48,000-pound tridems on non-Interstate highways. Given no Federally-imposed Bridge Formula B, North Dakota might choose to extend its bridge formula policy to Interstate highways. The other four States would probably proceed cautiously concerning liberalizing Bridge Formula B provisions, particularly given that they have these provisions on the rest of their road network without being obliged to do so by Federal law.

ISTEA Freeze on GVWs: The GVW freeze of ISTEA applies to the operation of combinations involving a truck tractor and two or more cargo-carrying units on Interstate highways. The GVW levels incorporated in the freeze in these five border States is the same as the GVW limits these States used for many years prior to the freeze.

From the western border crossing standpoint, only three of the 54 western border crossings are directly affected by the weight aspect of the ISTEA freeze. These are the crossings for Interstate Routes I-5, I-15, and I-29. In the case of I-15, the Canadian RTAC GVW limit of 137,800 pounds is already allowed by the ISTEA from the Canadian border to Shelby, Montana. The GVW limit on all but these three crossings are under State authority.

ISTEA Freeze on Lengths: The “box-length” freeze of ISTEA applies to the operation of combinations with two or more cargo units operating on the NN. The length limits incorporated in the freeze in these five border States is the same as the length limits these States used for many years prior to the freeze. From the Canadian perspective, none of these ISTEA cargo-carrying length limits would be viewed as particularly restrictive. From the western border crossing standpoint, twenty of the 28 western border crossings of interest are actually directly affected by the length aspect of the ISTEA freeze, including those for I-5, I-15, and I-29.

One potentially positive effect of eliminating the ISTEA freeze by devolution to the States would be facilitating WASHTO efforts to achieve improved uniformity in regional TS&W regulations as these relate to cargo-carrying length limits on NN highways.

What would happen to western border trucking if Federal size provisions were applied to non-NN highways on the NHS? This would have little or no effect. These size provisions, exclusive of the ISTEA freeze, are minimums and are already surpassed by the western States more or less throughout their networks.

What would happen to western border trucking if Federal weight provisions including grandfather authority was applied to non-IS highways on the NHS in conjunction with the above size provisions? The major impact of this would be associated with the application of the

weight limits of the ISTEA freeze to a significantly expanded highway network in each State. This could prohibit flexibility and rationalization within individual States, and cooperation among adjacent States.

What would happen to western border trucking if Federal weight provisions were modified to accommodate freight moving in interstate and international commerce particularly in containers on NHS highways? The crossborder movement of international containers along I-5 between the Ports of Seattle, Washington and Vancouver, British Columbia is estimated to involve about 135 truck trips per day each way, about 15 percent of the total truck movement. Many of these movements take place on vehicles specially designed to handle fully loaded 40-foot containers within the weight distribution provisions of Bridge Formula B. Others occur on five-axle tractor-semitrailers, often experiencing overloads on the drive tandem axle. Some containers are moved crossborder in double-trailer combinations (for example, with one 40-foot container plus one 20-foot container, or three 20-foot containers together).

The option of using a six-axle tractor-semitrailer for container movements across the United States and Canada, within Washington, and to and from adjoining States could be expected to have a substantial response by industry. It would reduce the use of the existing, specially designed equipment now used for these movements.

There is some, probably very limited, movement of international containers between Alberta and Shelby, Montana along I-15 for trans-shipment on the Burlington Northern (BN) Railway pursuant to the special weight provisions of ISTEA. Since these movements now occur in Canadian configurations at Canadian weights (for example, a six-axle tractor-semitrailer at 96,000 pounds) and Canadian axle spreads, little change would be expected here.

There are also limited movements of international containers between northern Minnesota and Winnipeg, Manitoba and between the BN mainline through North Dakota and Winnipeg. Providing for the effective employment of six-axle tractor-semitrailers for these movements could encourage these exchanges and support trade corridor proposals such as those along I-29 and I-35.