

# HARMONIZING TRUCK TRANSPORTATION

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## INTRODUCTION

Canada and Mexico are now the leading trading partners with the United States, accounting for a total trade value of around \$480 billion in 1998. This is a testimony to the success of efforts to liberalize trade, reduce tariffs, and build integrated industrial sectors, which culminated in the NAFTA which took effect in January 1994. Trade has continued to grow despite some problems in the Canadian and Mexican economies including the abrupt currency devaluation in Mexico and prolonged devaluation in Canada.

Trucking moved over 70 percent of the \$480 billion trade between Mexico, Canada and the United States. In spite of the importance of this mode, there is little trucking standardization within NAFTA. The need for harmonization in this sector was recognized during the NAFTA negotiations and a Land Transportation Standards Sub-Committee (LTSS) on trucking was established to address driver, vehicle, operations, infrastructure, and safety issues. Progress has been delayed by the postponement of the border states access stage of the NAFTA. This paper details progress made on trucking harmonization and identifies key current issues remaining to be addressed.

## NAFTA TRADE

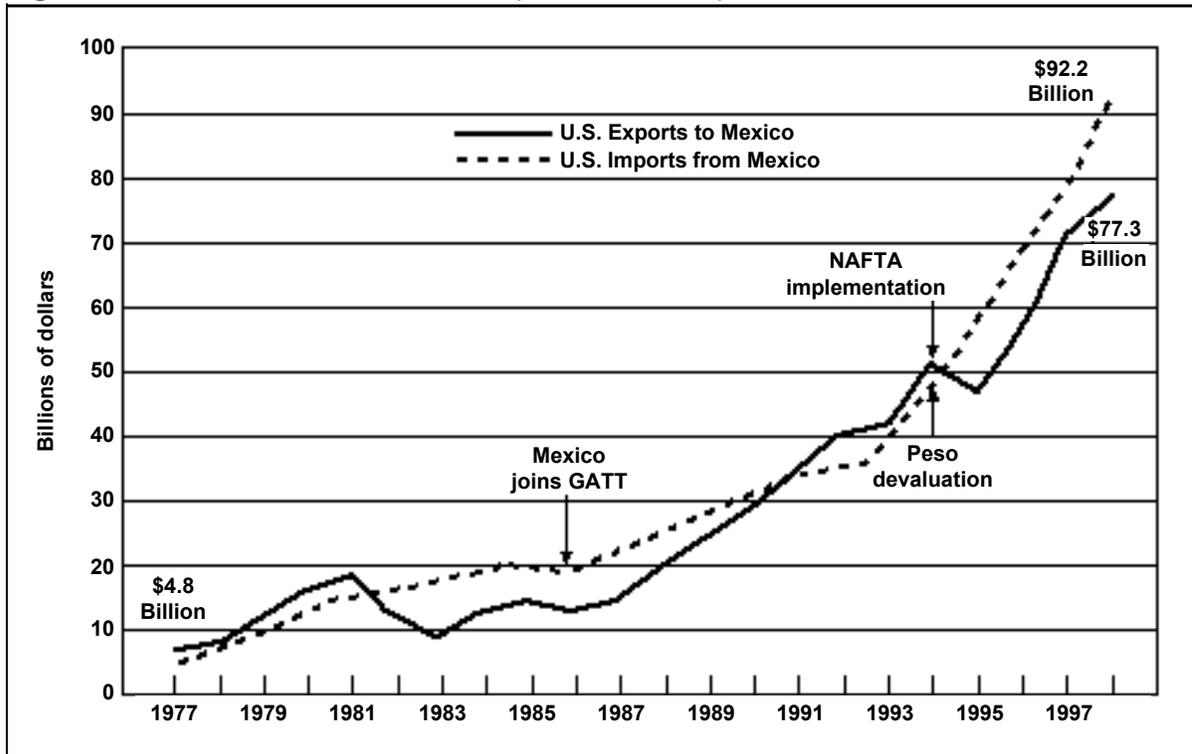
Canada and the United States, along with other signatories, joined the General Agreement on Tariffs and Trade (GATT) in 1946. Canada has been the largest trading partner of the United States for many years. Similarities in economic policies that stimulated industrial integration and the growth of regional trade, particularly in the motor vehicle industries, have underpinned this economic success. The closeness of Canadian and U.S. economic policies resulted in the U.S.-Canada free trade agreement, which was signed in 1988 and which established the basis for the enlarged NAFTA. Trade between the United States and Canada grew from \$77 billion of exports and \$88 billion of imports in 1986, to \$133 billion of exports and \$157 billion of imports in 1996. The dramatic trade growth was primarily a result of the integration of manufacturing operations, the impetus of the U.S.-Canada free trade agreement, and implementation of the NAFTA (McCray and Harrison, 1999).

Mexico, on the other hand, did not join GATT until 1986 and its economic policy prior to that date was characterized by import substitution and high tariff barriers, which made it difficult to obtain import permits and placed severe restrictions on foreign investment. Figure 1 shows the growth in U.S.-Mexico trade over the past two decades.

After peso devaluation in 1981 and an approximate two-year period of readjustment, trade (both exports and imports) has grown steadily. When Mexico made the decision to join GATT, it also instituted a series of far-ranging economic policies including liberalization of industrial activity, removal of entry restrictions, deregulation in many sectors (including trucking), and a program of privatization of state assets. This, combined with the growing strength of the U.S. economy, powered U.S.-Mexico trade growth well before the signing of NAFTA.

In 1980, maquiladora employment was around 120,000 and had grown to around 860,000 by the end of 1997. It should be noted that such trade is relatively independent of the Mexican economy. Rather, it reflects the strength of the U.S. economy to which most of its products are exported. This mitigated the impact of the peso devaluation in 1995 because maquiladora trade was, if anything, stimulated by lower Mexican prices whereas the traditional continental trade was severely constrained in terms of its import capacity.

**Figure 1: U.S.-Mexico Trade 1977-98 (Actual Dollars)**



Source: Bureau of Transportation Statistics, *Transborder Surface Freight Data*. U.S.D.T. 1998.

## TRANSPORTATION MODES

On a dollar-value basis, trade between Canada and the United States is dominated by truck transport. In 1996, trucks transported an estimated \$102 billion of exports to Canada and \$103 billion of imports from Canada. Rail, the second most dominant mode, transported \$16 billion of U.S. exports and \$42 billion of U.S. imports. Air trade was the third most dominant mode, and transported \$12 billion of

U.S. exports and \$6 billion of U.S. imports. There were also \$2 billion of exports and \$5 billion of imports carried by sea. While truck imports and exports are relatively balanced, there is nearly three times the value of U.S. imports by rail as exports by rail. Air trade between the United States and Canada has twice the value of exports than imports, while sea trade has twice the value of imports than exports (McCray and Harrison, 1999).

Trucks also dominate U.S.-Mexico trade flows. Table 1 gives a breakdown of the key commodity groups carried by surface mode for both imports and exports. In 1996, trucks transported an estimated \$44 billion of exports to Mexico and over \$48 billion of imports from Mexico. Rail was the second most dominant mode, transporting \$5 billion of U.S. exports and over \$12 billion of U.S. imports. Sea trade was the third most dominant mode, transporting \$3 billion of U.S. exports and \$9 billion of U.S. imports (mostly crude oil). There were also \$2 billion of exports and \$2 billion of imports carried by air. Truck and air transportation dominate the southbound shipments, while for rail and sea shipments there is a northbound dominance.

**Table 1: 1996 U.S. – Mexico Surface Trade by Mode – Key Commodity Groups (\$ million)**

Commodity	U.S. Imports				U.S. Exports			
	Truck	Rail	Other	% Truck	Truck	Rail	Other	% Truck
Agricultural	2,893	63	0	98	1,252	574	8	68
Food	872	280	31	74	882	778	96	50
Minerals/Metals	3,322	554	82	84	4,914	750	28	86
Chemicals/Plastics	1,509	227	4	87	6,246	504	26	92
Wood/Pulp	2,540	53	1	98	2,597	300	2	90
Textiles/Apparel	4,801	4	11	100	3,053	149	7	95
Ind machinery	6,288	652	660	83	6,260	216	7	97
Electrical machinery	17,796	37	882	95	12,644	129	5	99
Transport equipment	2,946	10,408	64	22	3,957	1,683	357	66
Instruments	1,957	0	382	84	1,262	24	16	97
Miscellaneous	3,427	18	607	85	1,024	12	1,990	34
Totals	48,351	12,296	2,724		44,091	5,119	2,542	

Source: Bureau of Transportation Statistics, *Transborder Surface Freight Data*. U.S.D.T. 1998.

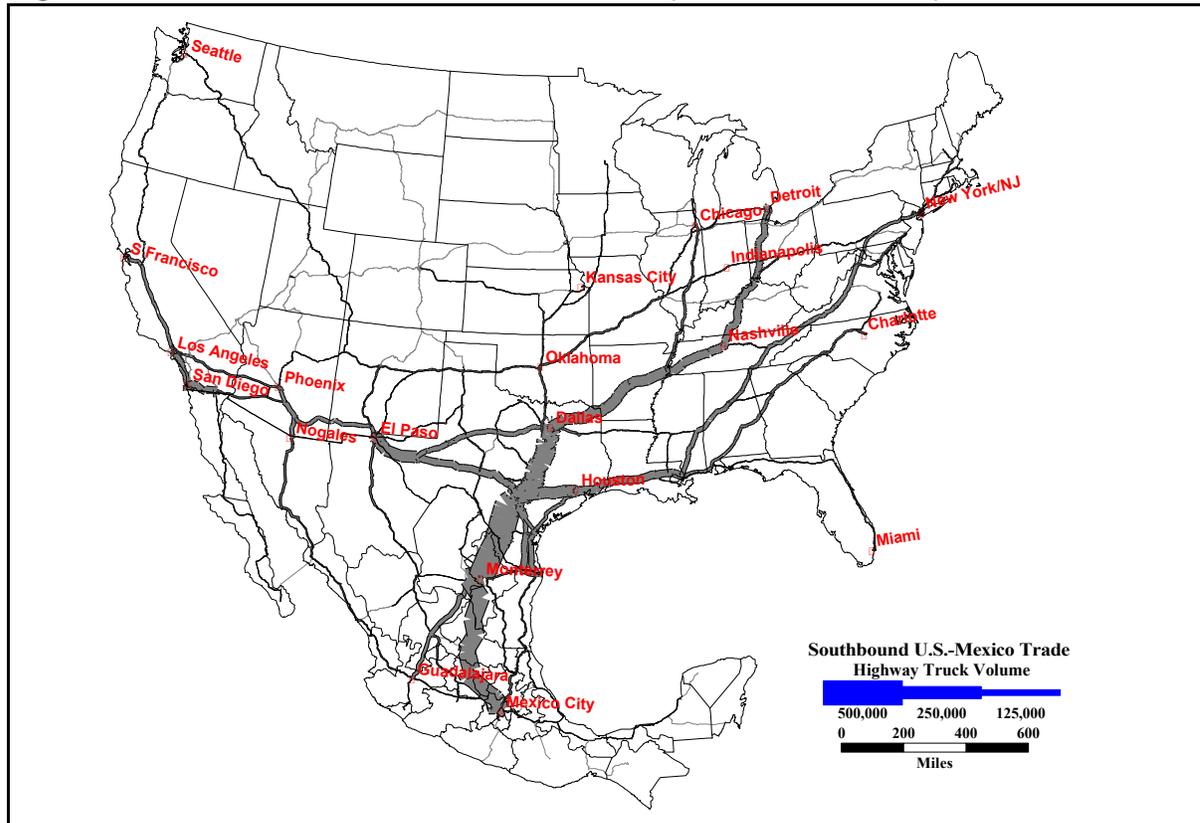
## TRANSPORTATION CORRIDORS

For the surface transportation modes, where does the NAFTA trade flow? John McCray of the University of Texas at San Antonio has developed ways of reading various trade data bases – not structured for transportation planning purposes – and plotting the likely routes for the different modes. From the previous section it is clear that the two key surface transportation modes are trucks and rail, both of which move on fixed infrastructure. From different data sources, it is possible to allocate both northbound and southbound shipments between the three countries in terms of broad origins and destinations. This allows calculations to be made estimating the least cost routing for the origin and destination pairs, which in the

case of trucks, uses the U.S. interstate system. There is a substantial body of research addressing a variety of routing and mapping for truck modes. (McCray, 1995; Boske and Harrison, 1995; McCray, 1998; Rico, Mendoza and Mayoral, 1998).

In Canada, much of the industry lies close to the United States border, and the trade highway network is small. In Mexico, there are two types of trade. Maquiladoras are situated close to the border and only use local routes to reach Mexican locations. For the deeper trade, the Mexican highway network is constrained by the physical topography of the country, which produces a relatively simple highway network for NAFTA trucks. Within the United States, a majority of truck movements are made across the U.S. interstate system, a fact repeatedly confirmed by discussions with shippers and trucking companies. An example of the interaction of the Mexican and U.S. truck trade flows is given in Figure 2. For transportation planning purposes, trade flow analysis is extremely helpful because it identifies distinct international trade corridors that can be designed, built and managed in ways that improve the passage of trade vehicles.

**Figure 2: U.S. – Mexico NAFTA Truck Corridors (Southbound Trade)**



Source: Fluidizing, *Truck Corridors Between the United States and Mexico*. 1999.

## HARMONIZATION

Loss of sovereignty is not an issue in the NAFTA as it is in other trading arrangements such as the European Union (EU). In the EU, there are areas of

legislation enacted out of Brussels that impose common standards on all EU member countries. Some of these include transportation directives and issues. In the NAFTA, there are no such actions and accordingly, the three countries must negotiate agreements in order to resolve differences in critical areas that impact international trade. Trucking is one such area. In the trucking sector, there are important differences between the three nations in terms of industry structure, types of operations, access to capital, and vehicle size and weights, which in part affect profitability, productivity, infrastructure investment and safety.

Trucking harmonization was addressed under the NAFTA Land Transportation Standards Subcommittee (LTSS), which draws membership from the three nations. The LTSS meetings on trucking harmonization were held regularly after signing, but have taken place with less urgency after the U.S. government unilaterally postponed the second phase of the NAFTA trucking legislation. The various stages of this legislation are now presented.

## **NAFTA TRUCKING LEGISLATION**

In Article 102 in the General Part of the NAFTA treaty, the transportation objective is stated as:

*Eliminate barriers to trade in, and facilitate the cross-border movement of, goods and services between the territories of the Parties. (Canada, Mexico, United States. Description of North American Free trade Agreement. 1992).*

Land transportation is an integral part of liberalized trade, and under the NAFTA it was intended that previous restrictions on motor carriers would be gradually phased out over several years. Prior to signing, U.S. carriers were not allowed to operate in Mexico. Under the agreement, three years after signature U.S. motor carriers were to be allowed access to Mexican border states, with reciprocal Mexican access to U.S. border states, for international shipments. At the same time, Mexico was to allow foreign investment of up to 49 percent in Mexican truck companies that deliver international cargo. Six years after the agreement went into affect all signatories were to be allowed full cross-border access for international shipments. And seven years following the enactment of the agreement, foreign investment in Mexican motor carriers could reach 51 percent controlling interest. A decade after the agreement went into affect, foreign interests were allowed to have full control. Even so, no party was required to lift ownership restrictions on companies transporting domestic cargo. The agreement did allow negotiations to take place within seven years concerning increased concessions for overland carriers. The United States could use this position to seek rights for U.S. trucking companies wanting to carry purely domestic cargo in Mexico. The LTSS schedule for completing compatibility on a number of key trucking issues is shown in Table 2 and formed the basis for harmonization meetings and discussions before 1995.

As we now know, the second phase did not take place. In early December 1995, the U.S. Secretary for Transportation, Federico Peca announced that the U.S. was unilaterally postponing the second phase due to a lack of preparedness, particularly in the area of vehicle safety. It was broadly understood to be a political move, encouraged in part by the U.S. trucking unions who were fearful that Mexican companies and labor would have competitive advantages in the movement of international trade. The action of the U.S. government was doubly surprising in that it chose not to follow a dispute resolution process (Chapter XX) that was embedded in NAFTA. For their part, the Mexican government officials were dismayed that the United States had chosen to break a critical treaty clause so early in the life of the NAFTA.

**Table 2: LTSS Dates for Completing Compatibility Efforts Scheduled After U.S. Border was to Open**

Dates	7/95	12/95	7/96	1/97	Jan 2000
Efforts					
Non-medical driver standards					
<b>NAFTA allows border states access</b>					
Medical driver standards					
Vehicle e-related standards					
Vehicle size/weight					
Traffic control devices/pavement markings					
Hazardous materials regulations					
<b>NAFTA allows full access</b>					
 <b>Key NAFTA dates</b>					

No doubt distrustful of future U.S. government actions, Mexico was not encouraged to review, harmonize, or change any legislation regarding the trucking industry while the second phase of NAFTA was postponed. Trucking therefore remained largely as it was prior to the signing of the NAFTA, particularly at the southern border. U.S. trucks interlined with Mexican over-the-highway companies to deliver continental trade and a variety of arrangements remained in force for the delivery of goods to the maquiladoras. The postponement in turn stymied much of the work undertaken by the earlier LTSS process with respect to truck harmonization and slowed momentum. This persists to the present and many critical areas remain to be addressed. Although a wide range of issues was addressed by the LTSS on trucking harmonization, three critical areas emerged. These relate to vehicle size and weight legislation, driver and operational characteristics, and the general issue of highway safety. These are now detailed.

## TRUCK SIZE AND WEIGHT ISSUES

In the last 50 years, trucking in the United States, Canada and Mexico has grown in importance to the point where it is now the prime mode for domestic trade. The combination of improved highway infrastructure, deregulation, and more productive vehicles has underpinned the growth of truck market share. And productivity needs continue to drive the standards upwards, either for vehicles that are capable of carrying more volume or more weight. International trade can be categorized into commodities that fill the trailer before reaching the legal weight limit (termed “cubing out”), or commodities that cause the vehicle to reach its axle and gross weight limits before it fills the trailer (termed “weigh out”). Efficiency and productivity have been the driving force behind truckers demands for larger vehicles and underpins the debate over size and weight issues among the three nations, since there are wide differences in the permitted truck sizes and weights in the three signatory countries.

*Canada.* Canada’s size and weight legislation is primarily the responsibility of provincial governments. In many provinces, the population centers are sparse and there is a lack of alternative modes to trucking. In this instance, we would expect (as in Australia) to see the use of larger and more productive vehicles to move agricultural and industrial products. Canadian provincial laws permit a variety of configurations including semi-trailers with lift axles, tridem, double trailers which when normally coupled are called A-trains, and double articulated trailers called B-trains. The limits for these configurations vary across provinces. With regard to NAFTA trade entering the U.S., although some larger vehicles are permitted entry on the permit to border states, the majority of trade passes on five-axle semi-trailer (3S2) vehicles loaded to U.S. limits. The preferred vehicle for NAFTA operations from a Canadian perspective is the B-train which, in Canada, can be loaded to a maximum weight of around 137,000 pounds (NAFTA, 1995).

*United States.* In the United States there was a continuing and often bitter battle in the 1980s over the desire of the trucking industry to use larger trucks, particularly longer combination vehicles (LCVs). Under 1982 federal legislation, doubles were limited to 28 feet for each trailer, five-axle semi-trailers were limited to 80,000 pounds on the interstate system, and no advantages were offered to six-axle semi-trailer vehicles under normal use (NAFTA, 1995). In about 6 mid-west states, heavier vehicles were “grandfathered” and allowed to operate because they were in existence at the time of the 1982 legislation.

The trucking industry had grown to become the key U.S. mode in the previous 20 years and, by the 1980s, spurred by deregulation, had invested in 28-foot and 48-foot semi-trailers. The trucking industry wished to use this capital investment to best effect by operating triple 28s and double 48s over the interstate system, therefore permitting gross volumes and gross weights in excess of current legislation. These vehicles were called long combination vehicles (LCVs) and were strenuously resisted by the railroad companies, the American Automobile Association, and citizen action groups. Railroads argued that trucks were already cross subsidized and to permit

trucks further productivity advantages would be ruinous to U.S. railroad profitability. Studies indicated that shares of various commodity markets would be lost to the more productive LCVs if they were permitted to compete over railroad corridors (NAFTA, 1995; Association of American Railroads, 1994).

This debate culminated in the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1992, which froze truck configurations at their 1982 levels. This effectively restricted both debate and the potential operation of heavier vehicles on the U.S. interstate although there have been moves in some states to allow the regular operation of heavier vehicles. The story does not end there, however, and while U.S. operators have been restricted to 1982 gross vehicle weight limits, they have taken advantage of the opportunity to operate longer trailers. These trailers were first limited to 53 feet, but have now been extended to 55 and 57, and even 59 feet in length, thus offering enormous advantages in moving commodities that cube out.

*Mexico.* Mexico has undergone substantial changes to its trucking industry since 1986. First, it embraced deregulation of the industry, particularly with respect to entry and competition. Initially, the Mexican truck fleet was relatively old and unsophisticated but this has changed in the 1990s. Mexican legislation permits a wide range of vehicle types, some of them heavy. The nine-axle A-train double, for example, can operate at over 146,000-pound gross vehicle weight (NAFTA, 1995). Because of constraints in the geometry and design of much of its highways, the length of such vehicles and the roads upon which they operate is restricted. The fleet is largely dominated by five-axle semi-trailers running at a limit of around 97,000 pounds and a smaller number of six-axle semi-trailers permitted to operate at around 107,000 pounds.

There are also some extremely heavy short doubles that can operate at over 140,000 pounds gross vehicle weight. In addition to the higher limits of its vehicles, when compared with the United States, the issue is compounded by a general lack of enforcement by state and federal police. This allows truckers to determine their own load levels, which are generally higher than those that are legally permitted. Evidence collected at the Mexican Institute of Transport (1992) clearly demonstrates the scale of this problem and indicates some of the consequences, much of which relate to accelerated pavement consumption and vehicle safety.

The effect of NAFTA trade has been remarkable on Mexican trucking operations. Interlining with U.S. and Canadian companies has brought about higher vehicle standards and operating practices. Currently, many Mexican trucking companies linked to over-the-highway movement of international trade are indistinguishable from their Canadian and U.S. counterparts in terms of the equipment and driver competence. There is also strong evidence that the flagrant overloading seen in continental Mexico is not transferring to the movement of international trade at the border (Harrison, Boske and McCray, 1997). However, the postponement of the NAFTA Phase 2 trucking laws means that no Mexican trucks

have yet begun widespread regular operations in the contiguous U.S. states, so its effect is unknown.

## **WHAT DOES THE TRUCKING INDUSTRY WANT?**

From what can be determined from the various literature, Canadian truckers would prefer to operate a B-train double at a fairly heavy limit, perhaps exceeding 115,000 pounds. U.S. truckers would first like to operate longer trailers into Mexico since they already have heavily invested in this equipment. They would prefer to have permits for 53- and 55-foot trailers, particularly productive in the movement of high volume commodities. And in terms of gross weight, the U.S. trucking industry has shown interest in a six-axle semi-trailer tridem design with a gross limit of around 96,000 pounds, in line with EU truck limits. The Mexican trucking companies would also support a six-axle semi-trailer tridem, but operating at a slightly higher weight.

Efforts in the early LTSS meetings<sup>7</sup> focused on developing a single vehicle specification that would comprise a NAFTA “envelope” vehicle, but increased productivity is only half the picture. Also important is the impact that these larger vehicles would have on the corridor infrastructure over which they travel, and the safety of the users who share these highways. The acrimonious debate on LCVs in the United States during the 1980s and early 1990s centered on productivity gains versus the costs of strengthening pavements and bridges while ensuring that these corridors remained open and safe to regular traffic. Not only would there be direct engineering costs associated with this program of strengthening but there would also be unavoidable congestion through the work zones so created (Weissmann and Harrison, 1991). As well, the vague and unresolved feeling that sharing the highway in congested sectors with these large trucks would essentially be unsafe remains a powerful force among those objecting to the use of such vehicles.

On all agendas of the LTSS committees on truck harmonization, size and weight considerations have been near the top, yet they remain broadly stalled and appear to remain unresolved in the near future. The sovereignty arrangements in the NAFTA suggest that Canadian and Mexican trucks entering the United States in the future will simply have to meet the U.S. domestic limits currently in force.

## **TRUCK DRIVER, OPERATIONS, AND SAFETY ISSUES**

*Driver Issues.* While driver regulations in Canada and the U.S. are relatively similar, there are wide differences in Mexico (American Truckers Association, 1992). Mexican drivers carry more responsibility in terms of the consequences of their actions in the event of an accident. Should any injury occur in an accident involving a truck, it is likely that the truck driver will be taken away for questioning and possibly incarcerated for a period of time until preliminary investigations are complete. And

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<sup>7</sup> Personal communication with Robert Cuellar, LTSS member 1994-97. February, 1999.

unlike their northern counterparts, Mexican drivers do not complete a daily record log of their activities to ensure that they stay within the driving laws for hours of operation and periods of rest. Drivers in Mexico pass more stringent medical tests in order to qualify for a commercial driver license and they must face a more challenging operational environment in terms of supporting infrastructure.

There are two broad classes of Mexican drivers in terms of their operating requirements. One class is similar to the over-the-highway drivers in the United States and Canada. These drivers take loads from interlining points at the U.S. border to delivery points in continental Mexico using the various classes of Mexican highways. A second class also collects trailers at the border but this time delivers them to maquiladoras and other consolidation points within the old ICC commercial zone (approximately a 20km bandwidth along the border). In Baja California, Mexican truckers operate vehicles that are registered in both countries and provide the service between points of production like Los Angeles and the assembly plants in the Mexican border state.

As already indicated, the belief that not enough had been done to insure that Mexican drivers were able to meet the U.S. regulations was the main reason given by the U.S. government for the postponement of the enactment of the second phase of the NAFTA trucking legislation. It is therefore not surprising that the LTSS harmonization agenda continually addressed issues related to drivers and how best to prepare them for operating equipment in the three signatory countries.

Language also plays an important part in constraining the interchange of drivers between Mexico and its northern counterparts. And some effort was undertaken by U.S. DOTs to develop signs that were able to convey, either in terms of dual language or pictorial design, the appropriate information to the driver. However, although pronounced NAFTA corridors have been established, there is little dual language signage to facilitate international drivers. Captain Lester Mills of the Texas Department of Public Safety indicated that in recent checking of Mexican commercial drivers away from the border in Texas, over half of the drivers issued with tickets were for reasons *not* associated with equipment safety. Rather, they were for failure to understand the driver regulations currently in place in the United States, particularly those related to the daily completion of log books and record sheets<sup>8</sup>.

**Operations.** The highway industry “support” infrastructure between Mexico and its northern counterparts is also vastly different. In Mexico, there are few large truck stops. As a result, accommodation, safe parking for equipment, and other matters taken for granted in the north are entirely absent. Diesel fuel is different and in the past the high sulfur content has given rise to costly engine failures. Communications are only now beginning to improve, not in terms of the general infrastructure, but in terms of individual Mexican companies. The ability to visit a U.S. or Canadian truck stop and telex material, receive faxes, use computers, or use

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<sup>8</sup> Personal communication, February 1999.

inexpensive telephone systems, is not generally possible in Mexico. Finally, there is the whole issue of crossing vehicles at the border.

Of course, the border is not homogenous and arrangements at different ports of entry vary widely depending of the characteristics of the commodities and whether the trade is maquila or continental (Weissmann et al., 1993). In California, there is a relatively straightforward interlining arrangement that works smoothly, aided by substantial investments by the State of California in border infrastructure and inspection facilities. In Texas, the other large NAFTA state, border crossings differ substantially and there has been criticism of the antiquated and costly processes required to cross equipment. Giermanski (1997) of Texas A&M International University at Laredo has been critical of this process, which he regards as quasi-monopolistic, particularly in the role played by the Mexican brokers. The requirement of Customs, federal agency compliance, and drug interdiction, overlaid with the infrastructure needs, which in Texas includes bridges, have resulted in a whole range of different processes. Table 3 shows the different U.S. federal agencies involved in clearing agricultural imports at the border, hinting at the complexity faced by shippers.

**Table 3: Multiple U.S. Federal Agencies at Border Impact Truck Shipments of Imported Agricultural Produce.**

Federal Agency	Responsibilities
Food and Drug Administration (FDA)	Food safety, safe to eat
Environmental Protection Agency (EPA)	Tolerance levels for any pesticides
Animal and Plant Health Inspection Service (APHIS)	Food not infested with pests
Agricultural Marketing Service	Issuing Perishable Agricultural Commodities Act (PACA) licenses
Federal Highway Administration	Administering credentials for trucking company, truck and driver
Immigration and Naturalization Service (INS)	Enforcement of nationality and citizenship regulations for vehicle operator
U.S. Customs Service (USCS)	Collecting duties, conducting enforcement of trade agreement with respect to tariffs.

Source: Linn, 1999.

In many ports of entry, a drayage company moves the trailer between trucking company depots in the two nations. While this makes sense in terms of meeting the challenges currently presented by the complex bi-national regulations, there are agreements at certain gateways that result in a lack of competition between drayage companies located on either side of the border. This results in large numbers (sometimes exceeding 40 percent) of empty trailers and single tractors moving across the infrastructure, adding to congestion and raising the costs of movement. While there is certainly debate about the value that is added by many of these processes, it would seem that there is room for harmonization in the system that would lead to lower costs and higher efficiencies.

*Safety.* This has been a critical concern to NAFTA, federal and state agencies, the trucking industries in both countries, and the general public. The LTSS

harmonization committee always included safety as a critical component in its various efforts to harmonize processes, yet it remains unclear how to implement and finance new strategies. A recent U.S. DOT study is highly critical of safety mechanisms on the U.S. side of the border (Hall, 1999) and follows on a series of earlier GAO reports on the same subject (U.S.GAO, 1996 and 1997). The failure of Mexican authorities to adequately enforce safety programs, particularly overweight trucks, lends credence to these findings. However, some of the findings and data cited may be exaggerated. In many safety checks, whether conducted by state agencies like Texas DPS or U.S. DOT officials, the vehicles inspected are not done randomly. They are selected primarily because either there is visual evidence of an infraction (such as a load incorrectly roped) or other behavior such as slow acceleration indicating heavy load. If it is the case that safety inspectors choose vehicles that they believe are breaking the law, then taking the numbers for infractions and expressing them as a percentage of the total trucks traveling through the port of entry is statistically flawed. Yet this is what seems to be occurring in the treatment of some of the safety statistics. And it should also be remembered that many of the trucks that are coming through ports of entry are drayage vehicles moving within the old commercial zones. They are not going deep into the border states, nor would they ever even if permission were granted. If longer routes were being contemplated, Mexican truckers would use equipment of a higher quality. However, safety is such a sensitive concern in all three countries that it remains a critical issue that must be addressed in any debate associated with harmonizing trucking operations.

## **CURRENT STATUS OF KEY TRUCKING HARMONIZATION ISSUES**

*Vehicle Productivity.* This continues to be a central element in any discussions on lowering costs for the trucking of international trade. There is currently no likelihood of an “envelope” truck being accepted for use within the three signatory countries. The current environment of safety and congestion in the United States simply does not favor the introduction of larger combination trucks. A six-axle tridem semi-trailer truck might find favor with some parties but its operation in the United States would require new federal legislation. Border U.S. states may allow larger trucks on the non-federal roads and Mexican truckers will be able to apply for 2060 permits<sup>9</sup>. Finally, LTSS efforts may focus on developing clearly understood, and enforceable, vehicle standards in each nation.

*Infrastructure Impacts.* The growth of truck volumes associated with NAFTA trade has accelerated the consumption of the highway infrastructure in the three NAFTA countries, particularly the United States. This consumption is primarily on pavements and bridge decks and associated cost is the impact that these truck volumes have on other users, both in terms of congestion and vehicular safety. Although there is great debate as to the type of costs, most studies have recognized

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<sup>9</sup> In Texas, truckers can apply for an annual permit (\$120) under House Bill 2060 to operate at ten percent over axle load and five percent over gross load on non-federal highways.

that the scale of the problem is daunting (Barnhart, 1996). An interesting development is the recognition that the full range of costs associated with infrastructure use should be used in economic evaluations. Cost items traditionally regarded as externalities (accidents, air quality, and noise) are now being considered, along with vehicle operating costs, time delays and congestion (Louis Berger and Associates, 1998; Delucchi, 1996).

**Financing Infrastructure.** In most countries, highways are financed out of general revenues, assisted by a range of direct taxes and fees levied on the trucking industry. In the United States, a trust fund mechanism funded principally by fuel taxes paid by vehicle owners, including truckers, provides the financing for highway infrastructure. This fund is reallocated back to the states, which then support the federal and state highway systems within their borders. For over 50 years, the guiding principle of highway investment in the United States has been one of joint use. Efforts have been made to identify which component of the infrastructure funding is most fairly associated with the class of vehicle (e.g., pavement strength with trucks and capacity with automobiles) and this cost allocation is periodically reviewed and calibrated. The last two reviews were undertaken in 1997 and 1982.

There is evidence that costs may not be accurately allocated among classes. In many states, the heavy vehicle (i.e. the international trade truck) does not pay its full share of highway costs (like Texas) and is subsidized by other road users (Euritt, 1994). Clearly, a mechanism is needed that insures that all vehicle configurations pay their share in order for the system to be efficient and in equilibrium. And if heavy trucks already do not pay their full share, then the consequences of permitting larger vehicles to operate without adjustments in the cost allocation process could give rise to further imbalances and subsidization.

**Safety.** This continues to be a key issue in the LTSS process and has recently attracted the attention of U.S. federal entities. Earlier, the General Accounting Office (GAO) undertook several studies on vehicular safety and recommended several policies, including weigh-in-motion sites near the border. Recently, the U.S. DOT has conducted a further study and issued several recommendations, summarized in Table 4. Though the statistics on truck non-compliance may be flawed, the subject is of great concern to all parties and calls for distinct actions of the type identified by the U.S. DOT study. Finally, the safety aspects related to the movement of hazardous materials have always been discussed at LTSS meetings, though little has been done at the border areas where the problem is most serious. Routing and compliance with the various U.S./Mexican bi-national agreements on hazardous materials remain currently under review.

**Table 4: U.S. DOT Recommendations on Insuring Mexican Safety Compliance on U.S. Highways.**

1. Establish partnerships between U.S. federal and state agencies to ensure consistent enforcement.
2. Work with Mexican carriers to obtain more information on trucks and drivers when operating authority applications are filed.
3. Develop DOT identification numbers to differentiate between border zone and interior U.S. operations.
4. Establish a NAFTA program director for transport-related issues to promote border-wide enforcement and safety efforts.
5. Establish a federal interagency group to coordinate border issues with state and federal agencies.
6. Develop a program to supplement state inspectors at the border with federal inspectors.

Source: Linn, 1999.

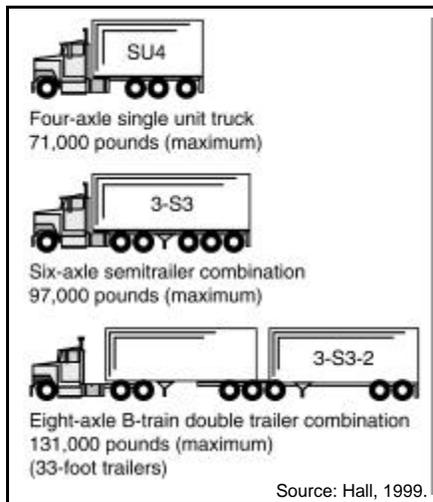
## CONCLUSION

The key aspects of truck harmonization in NAFTA have remained remarkably consistent since the enactment of the treaty. Truckers want more productive vehicles, the community wants vehicles to be safer, and the federal and industrial sectors want the system to be more efficient and cost-effective. The key current points are now identified.

*Truck Size and Weight.* The consensus approach to the problem of common vehicle types with higher productivity is still being sought at different levels of federal and state government and within the industry. Although an “envelope” vehicle seems now to be less likely, there is substantial interest in adopting the European standard of a 96,000-pound six-axle semi-trailer truck, which would provide both additional weight and volume for shipping purposes. The debate on standardization has been spirited and long, yet no real progress has been made since 1992. NAFTA international trade is still largely moved in 48-foot containers into Mexico with slightly longer vehicles permitted into Canada based on the standards that are set in each of the three countries. The emphasis therefore has been on developing a clearly comprehensible set of standards that truckers can follow if and when trucking beyond the border zones becomes permitted. Recently, the U.S. DOT looked at the impact of larger vehicles in a substantial study on truck size and weight (U.S. DOT, 1998).

Various scenarios were examined including one purporting to be a NAFTA vehicle. The various configurations are shown in Figure 3 for a 51,000-pound tridem, and the results show that the major impact of such vehicle types on the U.S. system will be in terms of extensive and expensive bridge strengthening costs. How these would be funded is, of course, a critical issue and may well take away any competitive advantage provided by the more productive configurations.

**Figure 3: U.S. FHWA Truck Size and Weight Study: 51,000 Pound Tridem-Axle.**



**Truck Safety.** The current solution to this appears to be more enforcement manpower and a higher number of inspection sites, some of them installed with permanent weigh-in-motion equipment. This is an interesting development since research suggests it is not the most cost effective safety program. Evidence by Savage and Moses 1995 indicates that a better program is one that has more direct contact with truck operators rather than drivers. They evaluated two programs, one based on the current U.S. state DPS systems where vehicles are pulled over, inspected, and citations issued to the driver. The other is where the U.S. DOT visits the premises of the companies, evaluates their records, and

inspects the whole fleet. The paper shows clearly that a superior cost-benefit impact is reached by dealing directly with the companies, which has important implications for cross-border NAFTA trucking. It is highly likely that owner-operators will not dominate this trade. Currently, a few large trucking companies dominate the trade and we would expect that the requirements for capital financial guarantees and other matters would mean that medium and large companies hold NAFTA trade. If DOT inspections by Mexican, U.S., or Canadian federal authorities can concentrate on changing company policies with respect to safety, they will be more successful than dealing on a case-by-case basis where individual trucks in the fleet are pulled over randomly for inspection.

**Border Crossings.** There is clearly a momentum building to improve border crossings in terms of both their infrastructure and their processes. An attempt was made to address the issue with the North American Trade Automation Prototype (NATAP), which recently concluded its pre-pilot stage. Data concerning the manifest, vehicle, driver, tractor, are encoded and given electronically to the Customs authorities in both countries to facilitate processing. This has not worked well on the southern border where the situation is complicated by interlining between two major trucking companies using a drayage company, but it does seem that it is inevitable that improvements will be forthcoming, which will facilitate and harmonize the trucking process more effectively. Recent research has indicated that the technologies appropriate for these border operations are complex and currently inadequate (Attala, 1999). However, since technology is changing so rapidly, it might only be implemented in the next century.

**Trade Corridors.** The clear identification of corridors allows thought to be given to how best to plan the various types of services to facilitate the movement of trade. Inland ports are beginning to provide new levels of intermodal service away from the border and if the problems of drug interdiction can be addressed, it seems that trade in bond may be able to pass more rapidly through border positions to be handled at these inland ports. This may well also be important for the movement of

hazardous materials which has been an agenda item on the LTSS for many years. The current process for hazardous materials is spotty and imprecise. Although hazardous materials imported from the U.S. to Mexico are supposed to be returned, the records clearly show that this is not taking place. And hazardous materials are being moved through heavily populated areas along the border, which is a clear safety issue. The recognition of distinct international trade corridors with appropriate technical support to expedite trade movements and connected to more efficient border ports of entry will allow more accurate tracking of transportation of hazardous materials.

*NAFTA Trade Transportation Planning.* Finally, it should be remembered that while trucking is the key surface transportation mode, there are other important complimentary surface modes including rail and pipeline services. It is important to integrate *all* surface modes into an overall NAFTA transportation plan. The critical element in planning is to recognize that goods are being taken from producers to consumers and the whole chain needs to be evaluated to ensure that the process remains efficient. And for federal and state investment purposes, all modes need to be considered to ensure that the best decisions, both modal and intermodal, are being made on a tri-national basis.

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