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Module 7: Professional Driver Training, part I

Purpose:

To provide the rationale for training of professional drivers

Learning Outcomes:

Upon completion of the modules the participant will be able to:

- List at least five special responsibilities of professional drivers that support the need for specialized training
- Compare characteristics of the trucking and carrier industries in Canada with those of the professional driver industry in China
- Compare the severity and costs of crashes involving trucks and passenger vehicles

Contents:

- A. Rationale for training
- B. Profiles of the commercial vehicle and carrier industries
 - Trucking industry
 - Bus, taxi and other professional auto drivers carrying passengers
- C. Crash severity and comparative costs
 - Large Trucks
 - Buses
 - Fleet drivers
- D. Role of other road users

Format:

1. Overhead Presentation

- General overview of reasons for requiring drivers of commercial and public service vehicles to have specialized training

2. Group Discussion

1. Describe in general terms, characteristics of the trucking industry in China
2. Identify key reasons why specialized training of professional drivers is needed in China
3. List the challenges in enhancing existing training for professional drivers in China

Rationale for training

Truck drivers do a lot more than drive. They are expected to oversee loading and unloading as well as load balancing, and accept responsibility for vehicle safety. They must obtain permits for trans-border shipments and keep careful records of their movements, cargo transfers and fuel consumption using log books or on-board computers. They interact with dispatchers, often using sophisticated computerized and satellite-based systems. In many cases they are required to have detailed knowledge of hazardous goods handling and labeling procedures.

There appears to be little formal research evidence on the benefits of training for commercial vehicle drivers. Although Christie and Mayhew (1999, Executive Summary) stated in their report that there is little evidence to suggest that compulsory training for commercial drivers would lead to reduced crash risk or involvement, this statement was based on just two studies.

However, the opinion shared among organizations such as the Federal Motor Carrier Safety Administration (FMCSA), American Association of Motor Vehicle Administrators (AAMVA) and the Canadian Council of Motor Transport Administrators (CCMTA) is that driver training could be an effective safety countermeasure. In addition, many large trucking companies have professional driver training as a job requirement for driver positions, and/or conduct their own training programs.

Training for drivers, particularly upgrading for experienced drivers is seen as a major challenge for the trucking industry in a number of jurisdictions. In Canada, for example, the Canadian Trucking Human Resource Council (CTHRC) has been established to address many of the challenges related to training, including:

- Lack of basic literacy and numeracy skills
- Need for commercial drivers to demonstrate specific knowledge, vehicle-handling skills and appropriate attributes
- Lack of training for new drivers, particularly in new technologies
- Need for workplace health and safety committees and health and safety training

Profiles of the commercial vehicle and carrier industries

Although the licensing classes for vehicles driven by professional drivers vary across jurisdictions, vehicles are generally categorized according to their cargo:

- Trucks and other heavy vehicles that transport goods and animals
- Passenger-carrying vehicles, including buses, taxis and limousines

In Canada, “commercial vehicles” are defined by the National Safety Code for Motor Carriers (CCMTA, 1998) as:

A truck, tractor or trailer, or combination thereof, exceeding a registered gross vehicle weight of 4500kg.

OR

A bus designed, constructed and used for the transportation of passengers with a designated seating capacity of more than 10, including the driver, but excluding the operation for personal use.

Professional drivers have special responsibilities, some of which are listed below:

- Commercial vehicle truck drivers:
 - Responsibility for goods
 - Safety of other road users
 - Vehicle condition for load-carrying and travel

- Other professional drivers, including commercial bus drivers and taxi drivers
 - Carrying passengers
 - Safety of other road users

- Police drivers
 - Responsibility to set a good example
 - Safety of other road users

The following sections provide a profile of these industries in Canada that is widely available from the Canadian Government. A similar analysis has been conducted for the main job categories (National Occupational Categories, “NOC”) and is typical of information gathered in various jurisdictions. Once such information has been gathered about an industry, it can be used to inform decision-making at all levels. It also provides this program with a common basis for discussion of issues in Module 8. For example, discussions of curriculum, training programs, testing and licensing must be based on the understanding that the vehicles differ from one another in fundamental ways.

Trucking industry

In 1997, the for-hire trucking industry employed nearly 150,000 people in Canada, about one third of the workers in the transportation industry (HRDC Trucking Industry Profile). Employment in the trucking industry has been increasing in recent years. According to Statistics Canada census data, truck driving is Canada’s largest single occupation among men, with about 223,000 men employed in 1996. This includes many drivers of small delivery vehicles and utility trucks that are not considered part of the trucking industry.

Statistics Canada data indicate that in 1997 for-hire large trucking companies handled 39% of all domestic tonnage moved that year, compared with 50% for rail and 11% for marine transportation.

The industry has recognized that replacing the drivers who will be retiring soon is a critical challenge. A 1998 human resource study published by the CTHRC estimated that 20% to 30% of drivers then working would retire over the following ten years. In addition, the study found that carriers expected to increase their demand for drivers by an average 13% by 2000.

NOTE: There is already a shortage in the United States. This shortage affects commerce and constrains the capacity for implementing innovations in the industry, such as graduated licensing programs.

The top five occupations, or related groups of occupations, in the Canadian trucking industry account for more than 82% of total trucking industry employment (1996)....They are:

- Drivers
- Clerks
- Material Handlers
- Managers
- Mechanics and Maintenance Trades

Drivers

Drivers include both truck drivers and delivery drivers, the former account for about 56% of the workforce with delivery drivers accounting for less than 4% according to census data. Drivers include both employees and owner-operators.

The typical driver is described in the Canadian Trucking Human Resources Council study as “a middle-aged man with a high school education and 17 years of driving experience”. Prior to becoming a truck driver, he was most likely to have been working as a labourer or farm worker. Only 5% of employee drivers and 3% of owner-operators are women. Minorities are also under-represented in the industry.

Three quarters of owner-operators are former drivers. They tend to be older and have more experience than company drivers do, but on average they have less formal education.

The skills required of drivers depend greatly on the industry of their employer and the size of the truck they drive. In general, delivery drivers have more client contact and there is a greater requirement for interpersonal skills. Long-distance drivers require varying skills associated with load balancing and safety checks depending on the type of vehicle involved. Flat bed trucks, tanker trucks and vehicles transporting dangerous goods are considered the most challenging. Drivers who operate on trans-border routes are expected to have the skills necessary to clear customs.

A driver’s license of the appropriate category is a minimum requirement, but not a guarantee of success, and most employers look for considerable experience. As a result, typical entry ages are well into the 20s. Some employers use driving tests that are much more difficult than those used by licensing authorities. Drivers are also expected to have good arithmetic skills and knowledge of trip planning, energy-saving driving techniques and cargo handling.

The trucking industry is relatively highly unionized, although difficulties in defining the industry obscure the precise unionization rate. The Teamsters Union is the dominant organization in the for-hire segment of the industry, and the Canadian Auto Workers also represent many drivers. Private fleet workers are generally represented by industrial unions if they work for unionized companies.

Technological changes

The HRDC Canadian Trucking web site states that several technological developments are driving change in the Canadian trucking industry. They can be grouped into four areas. These developments have worked together to greatly improve the efficiency of the industry. [For example] they have contributed to an increased volume of shipping by making it more feasible for widely spread industrial operations to work together. But at the same time...there has been increased concentration of the industry, characterized by many mergers and acquisitions. The technological developments are:

Computerization of offices	For example, arrangements can be made pre-clear customs before the truck arrives at the border
Computerization of vehicles	Includes real-time monitoring of vehicle performance resulting in reduced wear and tear as well as better fuel economy and the ability to predict maintenance needs. (In addition can replace Log Book (“Lie Book”) with a “Black Box.”)
Communications and satellite tracking	Makes it possible to monitor the exact location of vehicles using the Global Positioning System, and to display truck locations on an electronic map
Electronic data interchange	Communications between shippers and their customers combines with satellite tracking to facilitate just-in-time (JIT) delivery systems and to expedite other types of shipment

Bus, taxi and other professional auto drivers carrying passengers

Drivers of passenger-carrying vehicles provide a service to paying customers who are entrusted to their care. Issues of particular concern to these drivers include safety and hazard awareness and accident handling.

Taxi drivers need to pay particular attention to speed control, safe vehicle maneuvers and route and traffic conditions.

In a report to the CCMTA, Ron Christie and Dan Mayhew (1999) report that, relative to the trucking industry, the bus or passenger sector is small. In Canada, in 1996 there was one-fifth the number of bus drivers as truck drivers.

In Canada, the motor carrier passenger industry can be divided into six sub-sectors:

1. Urban transit
2. Scheduled intercity
3. School transportation providers
4. Charter and sightseeing bus carrier
5. Limousine and bus services to airports and rail stations

6. Ancillary bus services

In 1997, the firm of Price Waterhouse, Management Consultants prepared the report *Human Resources Study of the Canadian Motor Carrier Passenger Industry* for HRDC focusing the study primarily on the first four sectors. This study found that many companies offer "blended" services (services in more than one sector); and school transportation includes both public and private service providers.

The report also noted that urban transit was the largest sector in 1995, based on total operating revenue reported to Revenue Canada. According to the Canadian Business Registry, the industry is well represented across Canada, though intercity service remains highly regional. Market share has been declining in favor of automobiles. The industry is a customer for a wide range of services and products from suppliers and manufacturers of capital machinery and equipment. There are nine major suppliers within the industry.

Crash severity and comparative costs

Studies have been conducted to establish the magnitude and characteristics of the commercial vehicle driver crash problem and to develop some strategies to improve the situation.

Review and analysis of Canadian and international data in a study commissioned by the Canadian Council of Motor Transport Administrators (CCMTA) suggested a number of conclusions about commercial vehicle crashes, for example:

- Commercial vehicles have lower rates of injury and property damage crashes (per distance traveled) but higher rates of fatal crashes than other vehicles.
- Commercial drivers are at fault in less than one-third of crashes involving trucks/buses and other road users – most at fault crashes involved failing to give way and loss of control.

Trucks

Concern about heavy commercial vehicle safety

Concern has been expressed about heavy commercial vehicle safety in North America and elsewhere, often in response to high profile vehicle crashes. Over the past two decades, poor vehicle maintenance and vehicle defects have played a contributory role in the crashes receiving the most media attention - runaway trucks and truck wheel separations. However, as stated by Christie and Mayhew, "Although such high profile crashes often involve vehicle defects it is important to recognize that vehicle defects actually account for only about 3% of truck and bus crash causation in Canada and comparable countries" (1999, p. 5).

High fatalities and injuries to other vehicle occupants in truck crashes

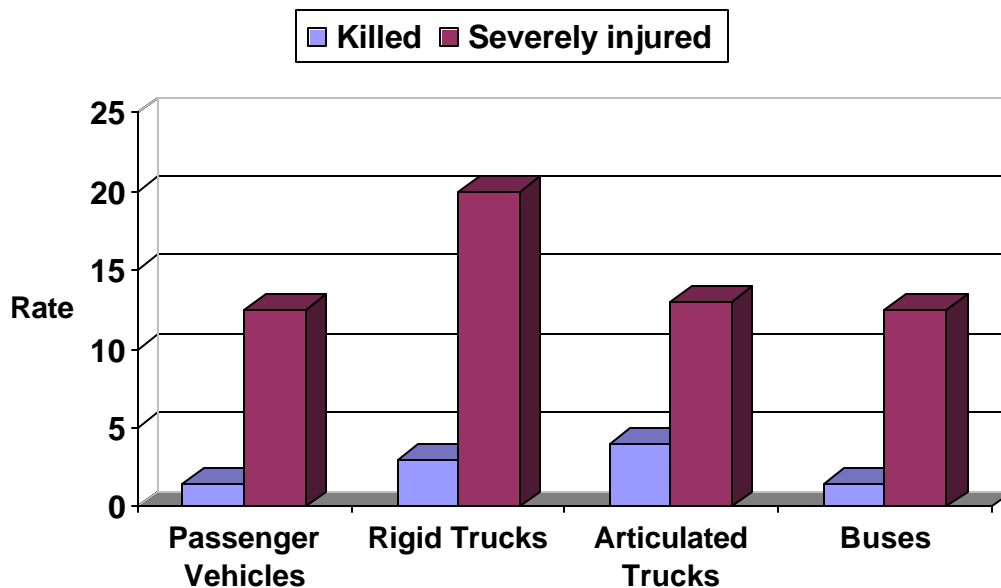
Concern has also been expressed about the increasing size/weight differential between large commercial vehicles and other vehicles because in a crash situation, occupants of the lighter vehicle are most often killed or seriously injured – and the truck driver is not. The ratio for other vehicles to truck occupants killed reportedly increased between 1975 and 1995 from 16:1 to 30:1 in the United States, and higher levels of fatalities to occupants of passenger vehicles in crashes with large trucks have also been reported in Australia and New Zealand (Christie and Mayhew, 1999, p. 6).

Crash severity for commercial vehicles

Research in Canada, Australia and the United States suggests that large trucks have a greater fatal crash risk than other vehicles (Christie and Mayhew, 1999). This is not the case for injury and property damage crashes – that is, large trucks have lower rates of involvement in these crashes than passenger cars and light trucks. The authors comment that the fact that large trucks have a higher fatal crash rate than other vehicles is likely related to two factors:

1. The size and weight difference between large trucks and passenger vehicles increases the probability of a fatality when they collide - recent Finnish research suggests that about half of the deaths in motor vehicle crashes occur when the weight of the other vehicle in a truck-car collision is over five times greater (Huttula cited in OECD, 1996)

Fatalities and Serious Injuries Per 100 million Vehicle Kilometers by Vehicle Type: Australia



Source: Christie & Mayhew, 1999, P20

- In addition, large trucks, particularly tractor-trailers, accumulate much of their travel exposure on high-speed highways so their crashes would be more severe than those involving just passenger vehicles on urban lower speed roads would.

Work by a team of researchers in Australia (Sweatman et al, 1995) also suggests that the crash risk is linked to the type of vehicle. In the table below, note that the percent of heavy vehicle crashes is generally lower for articulated vehicles than for rigid vehicles.

Average annual number of truck crashes in Australia capital cities for the years 1984-1988 (Haworth, Vulcan & Wai, 1991). (Data were not available for Brisbane)

Capital city	Truck type	Fatal crashes	Hospital admission crashes	Total serious crashes	% of state HV crashes
Sydney	Rigid	50	208	258	51
	Articulated	41	77	118	24
Melbourne	Rigid	33	256	289	72
	Articulated	18	109	127	47
Adelaide	Rigid	13	434	447	
	Articulated	10	102	112	
Perth	Rigid	8	63	71	
	Articulated	7	19	26	
Hobart	Rigid	<1	4	4	
	Articulated	<1	0	<1	
Darwin	Rigid	1	10	11	
	Articulated	2	3	4	

Source: Sweatnam, 1995, P5

Costs of Urban Heavy Vehicle Crashes

The Sweatman study also provides estimates of the costs of heavy vehicle crashes, as reported in the following passages (1995, pp. 8-10).

COST OF URBAN HEAVY VEHICLE CRASHES

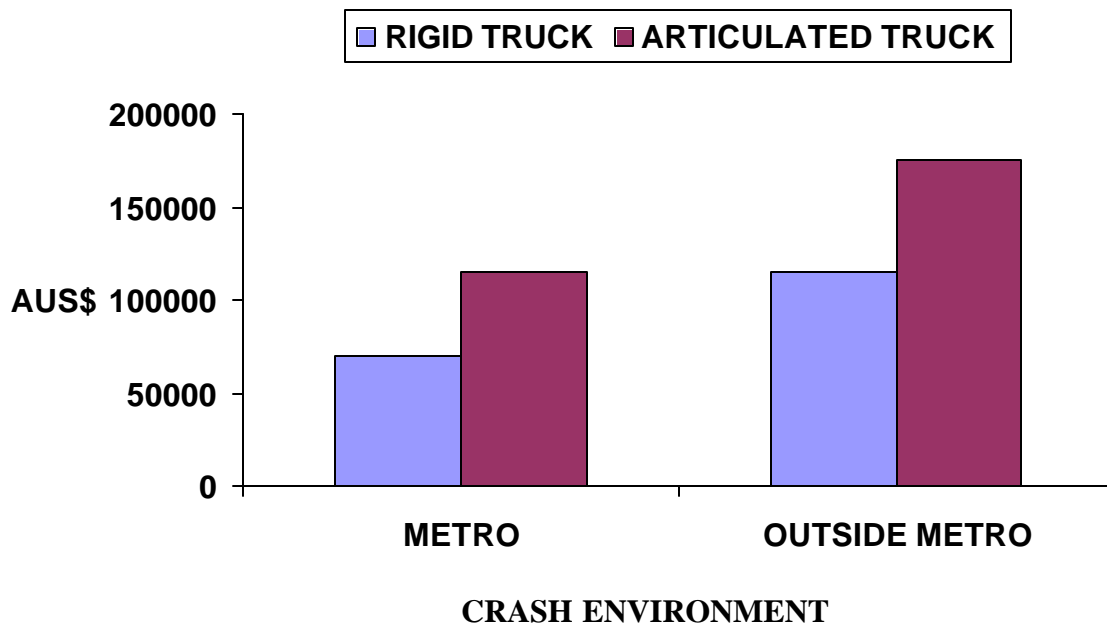
The cost of urban heavy vehicle crashes are not confined to injuries to truck drivers and vehicle damage. Dionne, Desjardins, Laberge-Nadeau and Maag (1993) note that for each truck driver killed in Canada an average of at least four other Canadian road users are killed in the same crashes. Retting (1993) reports that in the United States each year more than 500 non-motorists are fatally injured as a result of collisions with large trucks (ie., those greater than 4.5 tonnes (10,000 pounds) GVM). Most of those killed are pedestrians.

While heavy vehicle crashes frequently have severe personal consequences for other road users in particular and society in general, few studies have estimated economic costs

which those individuals involved and the community as a whole, must bear. One such study, conducted by Cairney (1991), estimated separately the following costs stemming from both rigid and articulated truck crashes in Australian rural and urban areas:

- Average costs of deaths and injures
- Average vehicle repair costs
- Average cargo losses/average vehicle replacement costs

In the figure below, New South Wales data were employed to determine the average number of fatalities, hospital admissions and other injuries resulting from crashes involving trucks. Estimates from the Bureau of Transport and Communications Economics (updated for inflation) were then used to estimate the average cost of human casualties per crash.



*New South Wales casualty costs for rigid and articulated trucks
By crash environment (Cairney, 1991).*

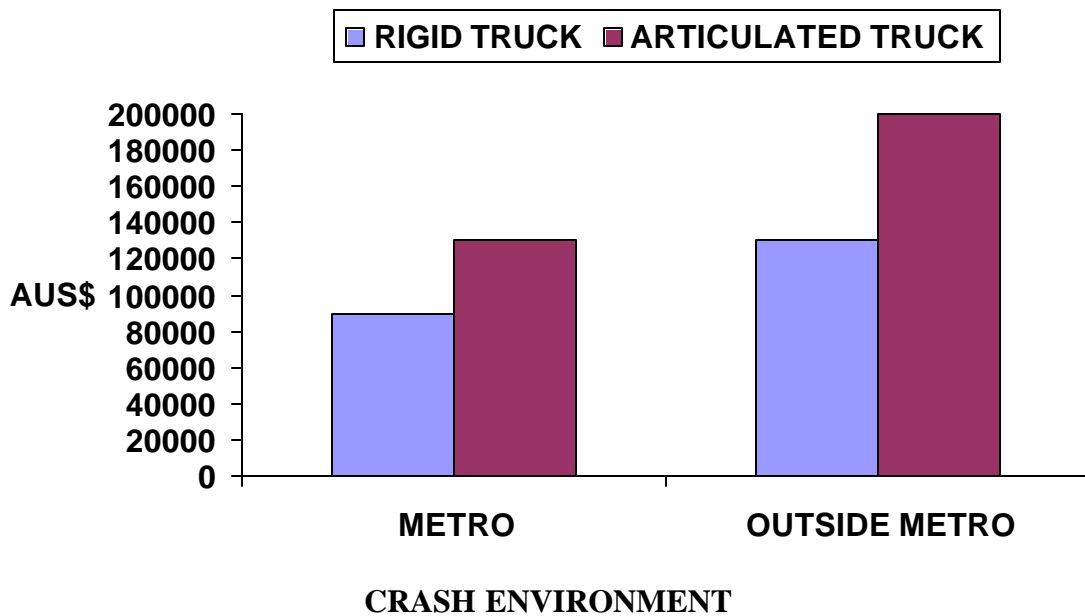
A leading vehicle insurer provided data on payments for approximately 1500 truck crashes, broken down by type of event. It was estimated that rigid truck repairs necessitated by either metropolitan or non-metropolitan crashes, and repairs to articulated trucks involved in metropolitan crashes, valued, on average, \$9,732. In comparison, repairs to articulated trucks involved in non-metropolitan crashes cost, on average, \$23,500.

Due to a lack of data average costs of cargo loss were difficult to estimate. However, for the 23 usable cases Cairney (1991) estimates that the average loss of cargo was valued at

\$3,442. A typical time for repairs was then selected on the basis of industry experience, and the cost of hiring a smaller vehicle taken as the estimate of replacement costs. This was \$2,700 in the case of a rigid truck and \$6,200 in the case of an articulated truck.

The figure below shows the sum of the above expenses. While the cost of an urban truck crash was estimated to be less than that of a rural truck crash, the cost of an urban crash is still considerable. The estimated cost of a rigid truck crash in the metropolitan area totaled \$90,000 whereas the estimated cost of an articulated truck crash in the metropolitan area totaled \$130,000.

Average costs of rigid and articulated truck crashes involving casualties by crash environment – New South Wales (Cairney, 1991)



Assuming that there are 1000 urban casualty truck crashes per year throughout Australia and that they are divided among rigid and articulated trucks in the ratio found in Table 2.1 (3:1), the cost of urban casualty crashes involving trucks is estimated at \$100m per year.

This limited amount of research indicates that not only are urban truck crashes a significant and expensive problem but, considering the likely relative exposure rates of rigid and articulated trucks in urban areas, articulated vehicles are involved to a surprising extent. The following sections of this literature review elaborate upon causal variables associated with such crashes. Following that is a discussion of contemporary countermeasure proposals designed to reduce the costs, both personal and economic, described above.

Buses

The study information for buses from Quebec and Australia suggests that their risks of serious and fatal injury are similar to passenger vehicles (Christie and Mayhew, 1999, p. 20). The Quebec estimates suggest, however, that buses, particularly non-school buses, have an elevated risk of minor injury in crashes.

The explanation for the higher minor injury rate for non-school buses likely reflects the fact that when these vehicles are involved in any type of crash or even just a sudden stop to avoid a crash, many passengers could incur minor injured – e.g., a bruised arm, a sprained ankle...If injury rates are based on occupant kilometers traveled, the rates for school and non-school buses are considerably lower than the rate for automobiles.

Person Injured Per 10 million kilometers by Injury Severity and Vehicle Type: Quebec, 1997

<u>Vehicle Type</u>	<u>Injury Severity</u>			<u>Total</u>
	<u>Fatal</u>	<u>Serious</u>	<u>Minor</u>	
Cars/light truck	0.1	0.7	5.4	6.3
Heavy trucks/tractor-trailers	0.3	1.0	5.4	6.7
School buses	0.2	1.1	9.1	10.4
Non-school buses	1.5	2.0	18.3	21.8

Source: Christie & Mayhew, 1999, P20

Fleet drivers

In 2000, the United Kingdom introduced an initiative to train 2.1 million company car drivers (TIMES/February 28, 2000). This initiative was introduced because although fewer than one in ten cars is company-owned, a quarter of fatal road accidents involve drivers of company cars and two thirds of company vehicles are involved in accidents each year.

Role of other road users

A multi-facteted approach is required to reduce the number and severity of crashes involving trucks. For example, Retter (1993) suggested the following strategies to reduce the number of crashes that occur at intersections:

- Road design - pedestrians and trucks could be better separated at intersections by time and space. For example the white painted stop lines for motor vehicles could be set back from the crosswalk.
- Truck driver practices – in urban areas, truck drivers could be instructed to stop far enough back from pedestrian crossing areas to provide a clear view of pedestrians.
- Signals – where there are likely to be substantial numbers of older pedestrians, the timing of pedestrian signals could be adjusted to accommodate the needs of older adults.
- Truck design – greater emphasis could be placed on designing the truck cab to maximize the driver’s field of view forward of the vehicle, and to minimize the effects of offtracking.

However, Retter and others have emphasized that the responsibility for crashes involving trucks is shared by other road users, and recommend education programs be directed to other road users. As stated by Christie and Mayhew (1999, p. 23),

In this regard, analyses of causation and culpability in regard to crashes involving trucks and buses in Australia, Canada, USA, Scandinavia and New Zealand show a common and durable pattern. The other vehicle drivers or road users are responsible for about twice as many crashes involving commercial vehicles than commercial drivers....In summary, although large trucks have higher fatal crash rates and buses have higher minor injury crash than passenger vehicles, trucks and buses are involved in relatively few casualty crashes in Canada and *even fewer are the fault of the truck or bus driver.* (italics added).

Education program strategies include sessions in formal training classes, radio and television advertisements, and print materials. The text in an ICBC information flyer that explains to the general public how to share the road with trucks is an example of latter type of educational material.

Sharing the road with trucks

Understanding some of the challenges and limitations involved in maneuvering a truck will help you share the road safely.

Blind spots

- Trucks have more blind spots than cars and their blind spots are larger.
- Keep your distance so the driver can see you in the rear or side mirrors.
- Avoid travelling in the blind spots for any length of time.

Passing

- If you cut in front of a truck too soon after passing and then slow down, you force the truck driver to quickly brake and gear down. This can be

dangerous when a truck is hauling a heavy load, making them unable to stop quickly.

- Be sure you can see the headlights of the truck before re-entering the lane. Once you have passed, maintain your speed.

Wide turns

- To safely negotiate a right turn, trucks may swing wide to the left before turning right.
- Stay well behind. Do not squeeze between the truck and the right curb.
- The truck has the right of way in this situation.

Backing up

- If a truck is backing into a loading bay, temporarily blocking the roadway, resist the urge to pass behind the truck. You'll enter one of the truck's blind spots and risk getting hit.

Rolling back

- On an incline a truck may roll back as the driver takes his foot off the brake to accelerate. Leave plenty of room when coming to a stop behind a truck.

Slides

Slide 1

Professional drivers carry:

- goods and animals (trucks)
- Passengers (buses, taxis and limousines)

Slide 2

Professional driver responsibilities

ALL: Other road users

Commercial vehicle truck drivers

- responsibility for goods
- vehicle condition
- other duties

Bus, taxi, limousine

- Carrying passengers

Police officers

- Set a good example

Slide 3

Industry information to inform decision-making:

Definition of terms

Size of industry

- Employment levels
- Contribution to GNP

Trends in job openings

Job titles/descriptions

Number employed in jobs

Job requirements

Unionization

Slide 4

Canadian truck driver profile

- Middle-aged
- Male
- Labourer or farm worker first
- Skill depends on industry

Owner operator profile

- Driver first
- Older
- More experienced
- Less formal education

Source: HRDC

Slide 5

Technological Changes Forcing Industry Change

- Computerization of offices
- Computerization of vehicles
- Communications and satellite tracking
- Electronic data interchange

Source: HRDC

Slide 6

Professional auto drivers

- Bus
- Taxi
- Limousine
- Company fleets

Slide 7

Concerns about heavy vehicle safety

- High profile accidents
- Size/weight differential

Source: Christie & Mayhew, 1999

Slide 8

Crash severity for trucks

- Higher fatality crash rate
 - Size/weight differential
 - More exposure on high-speed highways
- More fatalities for rigid than articulated vehicles

Slide 9

Insert: Fatalities and Serious Injuries per 100....

Source CCMTA

Slide 10

Insert: Table 2.1 Average annual number of...

Source: FORS

Slide 11

*Insert: Fig. 2.4: Average costs of rigid and
Crash Environment....*

Source: FORS

Slide 12

Insert: Person injured per 10 million...

Source: CCMTA

Slide 13

Sharing the road with trucks:

- Understanding some of the challenges and limitations involved in maneuvering a truck helps other share the road safely with trucks (being a thinking driver)

Source: ICBC

Slide 14

Challenging truck maneuvers

- Blind spots
- Passing
- Wide turns
- Backing up

Source: ICBC