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# Safety and security in road freight operations

## Introduction

The safety and security of the logistics chain are of paramount importance for globalized economies. Transport companies, particularly those moving cargo by road, must therefore implement measures which will enable them to provide a safe, secure and competitive service. This document will consider safety and security in road freight operations from two viewpoints:

- Operational security, covering cargo transport operations and related and complementary operations designed to provide a secure service, as well as measures to deal with the risk of theft and other offences and acts of terrorism which can seriously damage operators' levels of service and cost structures.
- Road safety problems from a business perspective, to analyse the implications of road accidents for transport industry operations.

This document will examine the available theoretical and practical knowledge of road freight operations from an integrated perspective, dealing with the challenges and good practices involved in constructing safe, secure and efficient road freight operations, reducing risk factors related to accidents, theft and losses during cargo transport operations and their related complementary services. In terms of safety and security in Latin America, road freight has generally been client-led, and there has been no systematic effort to tackle those issues from the industry's perspective.

## I. Security in road transport operations

The security of the logistics chain is a vital issue for globalized economies, where the reliability of shipments is a competitive tool and therefore increasingly important for transport businesses. This article will focus particularly on road freight, where the transport of goods which are valuable and can easily be diverted to the black market makes this sector vulnerable to such offences.

The developed countries have experience in creating voluntary security guidelines for road freight operators. One interesting example is the security working group of the International Road Transport Union (IRU), which has published its Road Transport

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Introduction



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Security Guidelines<sup>1</sup> containing practical advice for cargo administrators, managers, drivers and shippers. Such efforts seek to disseminate security advice and good practices to prevent terrorist acts or common offences (such as theft of freight vehicles, attacks on drivers and the transportation of prohibited items) in order to minimize the risks typically affecting transport chains. Although the recommendations found in such documents cannot be applied directly to the situation in Latin America and the Caribbean, it should be noted that many of the measures aim to create participatory agreements for the security of transport and logistics, where government agencies responsible for transport planning and development work actively and in coordination with actors who are involved in transport or are affected by these issues (insurance companies and their clients and concession holders).

Following the aftermath of 11 September 2001, particular care has been taken in the area of security. Initially, the focus was on strengthening security systems for air and sea transport, but attention is now centred on the entire logistics chain, which of course includes all forms of land transport.

In the countries of Latin America and the Caribbean, the securing of the logistics chain takes place in a context of burgeoning institutional development, where a balance must be struck between logistics chain security and the necessary trade and transport facilitation.

- If security procedures become very rigid or complicated, logistical costs rise, damaging the competitiveness of the sector and of export economies in general.
- On the other hand, if security is loosened to avoid holding back trade flows, in the medium term this will lead to loss of access to certain international markets, mainly those with the greatest purchasing power.

The road freight industry must be aware of the need to contribute to integrated security in road transport. It should be noted that:

- Competition in a global-demand economy requires efficient logistical systems where operators constantly strive to improve quality, protection and security without endangering efficiency or sustainability.
- Security precautions in road freight operations are an essential attribute of the service for certain clients and markets; some markets can therefore be served only by operators who conduct their business within high security standards.
- Transport and trade facilitation cannot be ignored, even when security considerations are at the top of

the agenda. An appropriate balance must be struck between security and the facilitation of formalities and procedures, particularly at the border.

- Security cooperation between the public and private sectors, which can be extremely effective, should be strengthened and extended to other areas. The road freight industry, while it cannot take on the functions of the State, can and must accept its own responsibilities, establishing preventive systems which are reliable, systematic and integrated into their respective supply chains.

## II. Safety and security in road freight-related operations

Road freight operations are not conducted only on the road; transport is increasingly a service which is physically integrated at both the point of departure and the point of arrival, either with the client or the client's client, or in modal transfer infrastructures. In all these cases, there are related operations which involve risks and whose safety the road freight operator must be able to observe and manage. The operator must be able to conduct preventive actions which will help to eliminate precisely those risks and thereby provide safety guarantees to workers involved in loading and unloading operations and stowage and unstowage.

It is hard to imagine that road freight operations could be safe without an integrated approach to safety and security in an integrated manner, or without considering the entire operational cycle. Typically, road freight operations include the following related activities which demand high safety and security standards:

### (a) Access to loading areas

Whether the cargo loading or unloading operation takes place in a warehouse, storehouse, port, or industrial or commercial site or establishment, the driver must comply with the instructions given to him for appropriate movement within the facility to ensure the integrity of the goods he is transporting.

### (b) Cargo packaging, packing and labelling

Where it is necessary owing to the characteristics of the goods, these are to be delivered to the driver with appropriate packaging and labelling. Should the handling of the goods represent a risk for persons, for the integrity of the goods themselves or for the vehicle, the specific risks are to be signalled by means of marks and written signs. Likewise, all necessary measures are to be taken to ensure that the goods have not been contaminated or mixed with illicit items.

<sup>1</sup> <http://www.iru.org/index/bookshop-display-action?id=133>

### (c) Beginning of a journey following the loading or unloading

To begin a period of driving following a cargo handling operation may represent a risk factor, since the driver will experience the additional fatigue caused by the physical effort of loading or unloading, and this will lower his ability to control the vehicle. It is therefore preferable to take a break from work, depending on the physical effort made (with a minimum of 15 minutes), before commencing the journey.

### (d) Cargo stowage and unstowage

To load the vehicle is not simply to place inside it the goods to be transported; loading must be done in a way that is rational and safe. Stowage is the placing of cargo inside the vehicle, ensuring that it takes up as little space as possible and that the weight is well distributed, and securing the cargo to ensure that it does not move around when in motion, since this would be a considerable risk factor.

It is essential that the cargo is secured correctly (using items such as straps, chains, webbing and chocks), so that it cannot move or fall during transportation. This must be done carefully, to prevent workers and drivers from being harmed when handling the items used for securing, which could cause injuries to hands, legs or feet. For the packing and securing of the cargo, and also for its inspection, appropriate cargo securing equipment must be used. For its packing, securing and inspection, suitable personal protection equipment must be used, especially protective gloves and footwear.

Since the positioning and stowing of the cargo are vitally important for the safety of heavy goods vehicles, correct stowage is an essential active safety element in the movement of freight vehicles.

### (e) Manoeuvres before and during the unloading of goods

During the manoeuvre to bring the lorry alongside the unloading platform, which takes place in reverse, the driver cannot see the back of the vehicle. This can cause accidents if a worker is in that area or walks across behind the vehicle. Appropriate precautions must therefore be taken during this manoeuvre.

During the loading or unloading, the vehicle may begin moving out of control if the brakes are not applied properly. If the loading ramp is not properly supported, it may fall and hit someone or cause a worker to fall. Once the vehicle has been brought alongside the loading platform, and before loading or unloading begins, the driver must check that the vehicle is properly immobilized. If necessary, the

wheels should be chocked. He must also ensure that the loading ramp is resting correctly on the platform.

Manual handling of goods is understood to mean any movement or securing of goods (lifting, positioning, pushing, pulling, displacement), performed by one or more workers, which may put the latter at risk owing to incorrect ergonomic characteristics or conditions.

The use of mechanical means involves its own risk factors which can in many cases cause worse harm to workers than manual goods handling.

The driver does not usually perform loading or unloading using mechanical means, since this task should be performed by specialized personnel. If the driver is present in the work area to supervise the stowage, for example, he runs the risk of being struck by whichever mechanical means is in use, such as a crane or forklift truck, or by the cargo itself, if it falls or if the mechanical device is overloaded.

## III. Theft, other criminal offences, and acts of terrorism

Security precautions against theft, other criminal offences, and acts of terrorism are a matter of the highest importance for road freight companies. They are constantly at risk from such activities owing to the nature of their work, the transport of valuable goods, the difficulty of surveillance, the presence of their operations throughout the trunk road network, and media exposure and its consequences. Material harm to vehicles and cargo, risks for the physical and psychological well-being of drivers, and damage to and rising prices of services are the main effects of this problem.

Although this type of security is to a considerable degree external to the freight operators, it is also undeniable that when it comes to the theft of cargo, fuel, tyres and the like, there is a certain percentage of offences committed by the transport firms' own personnel ("inside jobs"), and prevention and surveillance are needed in response to this problem.

Another important issue is whether or not secure parking and rest areas are available along the road network. Given the nature of this activity, and the hours of driving and rest periods which must be complied with by personnel, it is essential that the road network should feature parking and rest areas so that drivers can take their rest periods in appropriate conditions and the security of vehicles and cargoes is ensured.

Security precautions against theft, other criminal offences, and acts of terrorism, although freight operators have some



responsibility, are necessarily a matter for cooperation agreements with national, subnational and local authorities, also involving industries that have shared interests in this area, such as the insurance industry and transport infrastructure concession-holders. The success of plans to ensure security against theft, other criminal offences, and acts of terrorism in the area of road transport also offers a real opportunity to improve public-private partnerships.

#### IV. Road safety: its relationship with road freight

A great deal of research, literature and past FAL Bulletins have reflected the urgent need to tackle road safety problems in the countries, in light of the great social and economic costs they entail. In particular, road freight operators are called on to prepare structured actions to reduce their incidence on road accidents, for the following three reasons:

- **Society** Lack of road safety brought about by the increasing size of the road-freight fleet causes society as a whole to identify the active presence of freight as a high risk factor in the use of road infrastructure. This leads to increasingly stringent regulations, greater monitoring and a tendency to take civil and even criminal action against operators who fail to take sufficient care in the area of safety.
- **Cost of accidents or incidents** Failure to take a systematic approach in the area of security in freight operations entails a huge financial risk. Liability for the value of the cargo, the cost of replacing vehicles, excessively large fleets, damage to corporate image and service disruptions seriously impact the financial sustainability of operations. Those aspects, together with insurance cover for all these risks, entail a considerable additional cost, especially for those who fail to observe good standards in terms of accident rates or risks.
- **Clients' requirements** Transport is a derived-demand sector. In other words, it generally provides services to primary sectors of the economy, so it structures its services and operational focus according to its

clients' requirements. It is these requirements which cause operators to emphasize safety and security in road freight operations. This is particularly true in the requirements of those sectors of the economy which have a particularly strong emphasis on safety, such as mining. In such circumstances, safety and security become the most important characteristic of the services requested by companies when they enter into freight contracts and the operators who are truly expert in the prevention of risks in that area.

A considerable proportion of safety measures in road freight operations relate to the introduction of improved technology, modernization of fleets, improved infrastructure and human-resources training, within a professionalized business framework, capable of tackling risk prevention policies and projects.

To form a picture of the real situation of road freight and its impact on road safety in the context of systematic and consistent efforts in that respect, it is useful to consider the case of France. Between 1980 and 2006 the presence of heavy goods vehicles in accidents was divided by six, although the distance covered by those vehicles in kilometres was constantly increasing. In 2006, heavy goods vehicles made up 3.8% of the total number of vehicles involved in accidents involving bodily injury in France, and 6.5% of all road traffic. Road freight in France is a highly regulated and monitored activity carried out by professionals, and reliable information is available on all aspects of its operation. Road freight operators are among the most highly-trained road users and the most aware of their responsibilities, and generally show exemplary behaviour. The drawback of heavy goods vehicles remains the seriousness of the accidents in which they are involved. That seriousness is calculated as being 2.5 times higher than that of accidents involving only private vehicles; this is because of the differences in mass and energy involved in a collision. Some 8.9% of fatal road accidents involve one or more heavy goods vehicles (source: Observatoire national interministériel de sécurité routière (ONISR)).

Taking the broader European picture, statistics establishing the responsibility of road users in accidents are few and far between and should be treated with caution, given the multiple factors involved in accidents. A scientific study dated 2007 and entitled European Truck Accident Causation (ETAC), prepared by the Directorate General for Energy and Transport of the European Commission and the International Road Transport Union (IRU), determined that 75% of road accidents involving a heavy goods vehicle and resulting from human error were caused, not by the heavy goods vehicle driver, but by other road users. The study shows that the main causes of accidents involving

heavy goods vehicles were the human factor (85.2%), technical faults (5.3%), the state of the road (5.1%) and bad weather (4.4%).

Of course, the realities of road freight in the countries of Latin America and the Caribbean are not comparable with those in the developing countries. The main gap between the two relates to levels of formality and professionalization in the industry and among the freight operators. The consequences of this structural gap are, first, a lack of reliable information needed in order to measure and describe the real impact of freight on road safety and, second, a very large obstacle to the implementation of public and private policies and programmes to deal with the challenge of reducing the accident rate.

Drivers, vehicles and infrastructure are the essential components interacting in any road accident. Manufacturers of industrial vehicles and road engineers are constantly innovating in the area of risk reduction techniques. These efforts will be in vain, however, if financing is not available for the massive adoption of these techniques and if they are not accompanied by actions to influence human behaviour and organizational development, which have the ultimate responsibility for the introduction and use of new techniques.

For road freight operators, the driver is necessarily the most strategic professional in the enterprise. Many things depend on him: how well the service is delivered, the costs of the operation, the durability of the vehicle (the firm's main asset) and the safety and security of the service. The importance of the driver's role is fully understood in the developed countries. The driver is required to have a special heavy goods licence, which can be obtained only under certain strict conditions.

From the viewpoint of safety in road freight operations, the professionalization of the driver's position is essential. This requires the following:

- Improved initial training to professionalize the driver's job and expand his specific knowledge of road safety and the role of the driver.
- Monitoring the health of the drivers of heavy goods vehicles. Given the nature of their work, their state of health is vital for road safety.
- Continuous training programmes to update and reinforce drivers' awareness of road safety, including critical analysis of accidents and dangerous situations.
- Regulation and effective monitoring of maximum driving times for both waged drivers and self-employed owner-drivers. Humans have limited physiological capacities in terms of maintaining the

level of concentration necessary for a high-risk activity such as driving on the public highway.

- Monitoring of the driver's performance. Technologies and equipment are available to enable the fleet manager or the public authorities to monitor the vehicle's speed on the road (tachygraphs, electronic motors, GPS) so that reliable information is available to monitor speeding and driving time and detect any dangerous driving.
- Prevention and detection of the consumption of alcohol and illicit drugs

The management of professional drivers must be at the core of any safety policy or programme in road freight operations. This represents a major challenge for fleet managers in the developing countries. The road freight industry in the developing world is characterized by excessively scattered operators, oversupply of services and considerable segments of the industry operating informally and with little regulatory enforcement. This situation has led to a labour market for drivers based on highly variable wage levels and payment according to driving time, encouraging the driver to boost his earnings by pushing himself beyond the legal limit and beyond his physical capacity. This increases the risk of accidents, and can even cause the driver to become a habitual drug user in order to sustain this way of living.

Since safety measures have been integrated into the actual design of heavy goods vehicles, there is no need for any additional equipment. From an integrated safety viewpoint, all the advanced technological developments produced by multinational corporations have been incorporated into vehicles. These developments include equipment designed to prevent accidents (active safety) or to mitigate the impact of an unavoidable accident (passive safety). Furthermore, communications technologies contribute to preventive safety measures, detecting potential accident-producing situations and warning the driver as early as possible, and to tertiary safety measures such as post-accident alerts and facilitation of rescue operations.

Advanced driving safety technology seeks to complement and extend the driver's abilities and, in practical terms, to make up for human failures or blind spots, and also to provide better driving conditions in order to improve the driver's attentiveness. The following are some leading-edge technological developments which are being incorporated into the design of goods vehicles.

### Active or primary safety

**Braking and slowing** In the vital area of braking, pneumatic-release disc brakes combined with anti-lock braking systems (ABS) have become very widespread.

They are now integrated into the Electronic Braking System (EBS), which adapts vehicle braking wheel by wheel according to road grip conditions. These are complemented by retarders in the transmission, exhaust brakes and powerful engine braking systems.

**Dynamic Trajectory Control** The movement of vehicles can now be controlled electronically through either the suspension or the front wheels, using a system which maintains the vehicle's trajectory on curves where the grip is poor; this also prevents jackknifing in articulated ("tractor-trailer") lorries.

**Ergonomics and assisted driving** The ergonomic design of the driver's position, sound and heat insulation, heating and ventilation, and the suspension of the driver's cab all provide good working conditions for the driver, improving safety by helping them to concentrate on the road. There are now assisted driving systems: assisted hill-starting, cruise control, speed regulators and automatic gearboxes, which make the driver's work easier and reduce fatigue.

### Passive or secondary safety

Passive safety developments seek to mitigate the impact of an accident. There are two types of secondary safety. One is based on systems which act directly on the user (such as safety belts, airbags, eliminating dangerous features in the driver's cab); the other is integrated into the actual design of the vehicle, seeking to protect other road users (front, rear and side under-run guards on lorries, for example).

### The future: dialogue and interaction

Current developments seek to create interaction and "dialogue" among the vehicles using the roads, and not only among vehicles but also between vehicles and infrastructure. This area of development includes radar systems which detect the presence of the vehicle ahead, adjust the speed accordingly and if necessary, apply the brakes in order to maintain a safe distance. The driver is constantly informed of situations which arise and can retake control at any time using the accelerator or brakes. Another development relates to staying in lane by means of automatic steering (electric steering), where the vehicle is equipped with a system which detects the lane markings on either side and can estimate the curvature of the road, to determine the trajectory and correct it by means of the steering. The driver can retake complete control of the vehicle at any time, and an alarm will alert him if there is a malfunction (a momentary lack of lane markings, for example).

## V. Recommendations

The road freight industry must be fully aware of the need to contribute to integrated safety in road transport, although the role of States and their authorities play a vital part by providing infrastructure and ensuring safety and security in general. The determination and active participation of the road transport sector are essential for the success of any measure designed to improve safety. It should also be remembered that there is no such thing as zero risk and total safety can never be guaranteed; but from a broad perspective in respect of road transport safety, it can be stated that:

- A formalized and professionalized structure for the road transport industry is essential for the implementation of safety plans and programmes to improve standards in that area in Latin America and the Caribbean.
- Initial and continuing training of drivers in the field of safe driving is central to progress in safety aspects. This concerns both transport operators and national authorities.
- Cooperation on safety and security between the public and private sectors can be extremely effective; it should therefore be strengthened. The road freight industry cannot take on the functions of the State but it can and must accept its own responsibilities by establishing formal and systematic prevention systems, with the driver at the centre of its safety strategy.
- Safety policies must be based on information. Rational and effective measures to improve safety can only be based on reliable and comprehensible information on accidents and criminal offences.

The safety of road freight operations, together with prevention policies, must be considered integrally, including all the processes in which road transport is involved; this means including processes involving consigners and consignees and modal transfer operations.

The following are some areas in which the transport and logistics industry should take action:

- Deficiencies should be rectified in a timely and efficient manner.
- The industry must take responsibility for the standards and best practices identified through safety risk management.
- Quality control programmes should incorporate the procedures and inspections necessary for safety risk management.



- Resources must be made available to monitor particular performances and safety standards in day-to-day operations. This aspect should be included in the responsibilities of supervisors and managers.

Lastly, the cost of safety measures in transport and logistics can be significant, and governments' attitudes to their funding vary widely from one country to another. Protecting citizens from terrorist attacks and other criminal acts is essentially the responsibility of States, and they are also responsible for funding preventive measures. There

is, however, no consensus as to the funding mechanisms which should be used, and which may be:

- *Centralized*, where security is mainly State-funded; or
- *Decentralized*, where security is paid for by the operators of transport services or infrastructure, and the cost is finally passed on to the users of the service through additional taxes or charges.

The world community needs to show greater transparency and define shared principles for setting rules and for financing security measures, in order to avoid distortions.