

# On the security design of transportation processes

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*Abstract:* The paper is focused on the primary issue of protection of transported cash and valuables during the transportation processes. This protection is implemented by workers of the commercial security industry. In this article are stated basic information about the organization and implementation of the transport towards the planning, and the use of defence resources. Emphasis is placed on information about the composition of transported means and their security features. Part of the article is devoted to tactical transport of cash and valuables by workers of the commercial security industry.

*Key-Words:* transportation of valuables, protection, defence, process control

## 1 Introduction

Transportation of cash and valuables (hereinafter referred to as TCV) is a set of preventive, tactical and operational activities that are part of transportation of money and valuables. It is also the transport of other shipments of specific characteristics that have important scientific, business, personal or other value to the customer.

It is usually these kinds of packages:

- cash (notes and coins),
- securities (shares, stamps, tickets etc.) and valuables (stamps),
- precious metals and alloys,
- historical findings,
- the values of collectible character (coins, stamps),
- precious stones, high value jewellery,
- plans, important documents and media (drawings, know-how, documentation, etc.),
- museums, arts and science values (paintings, sculpture),
- escorting of important persons and transporting animals,

- items of a personal nature with high emotional value. [3]

TCV is a highly specialized activity, which is important in employee selection. Among the criteria for applicants include good health and physical fitness, good mental status (coping with stress and stressful situations, quick decision making, etc), criminal integrity, requirements for managing professional training (professional defence, firearms license and subsequent shooting practice). Important features are confidentiality, honesty, strong moral behaviour, responsibility, reliability, foresight, precision, caution, communication.

One of the most important features is considered confidentiality. You cannot tolerate an employee who tells a route, the nature of the shipment etc.

## 2 Transportation of cash and valuables

### 2.1 Methods of dividing TCV

In practice use a several methods of dividing TCV:

According to the character of a shipment:

a) Protective escort of transport with client:  
This is the escort of authorized person (client himself) who is carrying cash or valuables by worker of commercial security industry. There has to be kept safety principles for protective escort of people.

b) Transport of cash and valuables:  
Transportation of cash and valuables is provided by employees of private security agencies. There has to be kept security policies for the transport of cash and valuables. Transport is done according to the client's request, usually from the clients' locations to the bank or the other way around.

The client, after consultation with an expert on safety and transportation policy, sets method of transport of cash or valuables.

According to the transport methods:

- a) Transportation by transfer:
- In the inner spaces – ideal solution is a variant where the transmission is carried out in areas without access of unconcerned persons (for example: transfer from the bank to their garages and handed over to a vehicle).
  - Transfer on the street – there are always unconcerned persons in the area. There is a risk especially of theft (from the parking to the bank).
  - The combination of stated (from a car to building, etc.).
- b) Transportation by vehicle:
- On a bike (during the rush hour, when is the risk of traffic congestion, etc.).
  - On the motorcycle (for example: during the rush hour, bad terrain).
  - By public transport (bus, train, for example: risk for another way).
  - Transport by vehicle (the most common method of transport, fast, discreet, variable).
  - Air transport (during the transport to long distance by transport company, private flight).

Depending on the environment:

- a) Transportation in a town.  
b) Transportation out of a town (between cities, less populated areas, nature).

- c) Transport according to the conditions (climate, time of day and year, and other social situations).

Each type of TCV has its own advantages and disadvantages. In planning of TCV it is important to consider which transportation is best for the type and price of the contract and also according to the requirements of the insurance company. For each of them is required different number of employees, economic complexity of the contract depends on this.

## **2.2 Plan of transportation of cash and valuables**

For correct TCV is necessary to create a transportation plan. The plan must include basic instruction, privileges and responsibilities of employees performing TCV. Also, there must be the means of transport (container, luggage, vehicle, etc.) with its equipment; individual equipment and armament of crew members; group of employees with the possibility to carry out TCV; instruction to meet individual orders (instead of loading, time, contact person, routes - variants A and B, the point of delivery, number of employees to TCV, in transportation by vehicles there has to be number of crew members a their positions; marking of dangerous places, designed class for TCV according to the amount of the shipment (depending on the insurance conditions); determination of connection of crew members with dispatching of security agency, call mark, phone numbers, procedure in the case of assault, failures, or other emergency; dislocation of Police departments during the route; important phone numbers Police, Fire Rescue, EMS etc.

## **2.3 Preparation for transportation of cash and valuables**

Detailed preparation carriage TCV is necessary. These are all measures that are made by employees of the security agency providing TCV:

- Competent employee in the position of Head of TCV, which is intended to implement the TCV, will check the functionality of the vehicle, which is designed to carry; provides transport routes; Competent employee in the position of Head of TCV, which is intended to implement the TCV, will check the functionality of the vehicle, which is designed to carry; provides transport routes; determines

the call marks and telephone numbers; determines safety equipment needed for TCV (luggage, beacon, etc.); performs instruction and guidance of other employees involved in the TCV.

- Crew members before transport are required to check personal equipment; check staff ID; check of weapon and defence equipment; check of gun, civil and driving license; check of working uniform, if its used; check of connection (mobile phone, radio station); check of other personal safety and technical resources; inspection of equipment vehicle; check of security vehicle equipment (beacon, luggage safety, etc.); information signs on the transport of TCV for police; permission to enter the buildings or restricted areas; check the technical condition of the vehicle; check of motor fuel, oil, water, washer, etc.; check of lights and tires.
- Head of crew members will brief about: security arrangements for TCV; tactical principles for TCV; solving of emergency a he'll tell a driver about the selected route.

## 2.4 Means for transportation of cash and valuables

Means for transporting money and valuables of various kinds or people can be divided into protective vehicles, containers and bags. The choice will depend on the type of shipment, the financial budget for transportation and insurance conditions.

### 2.4.1 Protection of the vehicles

The vehicles are usually equipped with safety features which are extras in ordinary vehicles. We simply can talk about three levels of vehicles, while respecting their purpose (they are designed for the transport of persons, valuables or combination thereof):

- ordinary vehicles with additional equipment,
- partially armoured vehicles,
- fully armoured vehicles.

It is necessary to ensure that the vehicle is sufficiently resilient in places where damage could cause a stop of the vehicle. In Fig. 1 is hardening of a standard vehicle Cross Over.

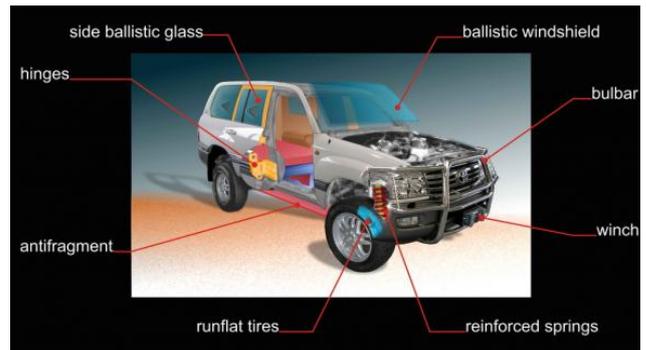


Fig. 1: *Hardening of vehicle Cross Over* [2]

Transport of cash and valuables prevails in the commercial security industry. For this purpose are mainly used Volkswagen, Mercedes - Benz, Toyota, and some others vehicles. The main characteristics of vehicles are required reliability, excellent technical condition of the vehicle, sufficient engine power, weight (for example: to break the barrier or to push the blocking vehicle) and the range of the vehicle.

In terms of ballistic resistance the main aspect is to protect the crew, especially by doors, windows, floor, roof, and major components to maintain the functionality of vehicles, in particular the engine, radiator, battery, tires. In terms of the survival of the crew and ensuring defence is a ventilation and fire protection system, the observation and recording techniques, loopholes, smoke equipment, locking systems, connection , etc.

### 2.4.2 Containers for transportation of valuables

Containers are usually designed for safe transport in a car or other means (airplanes, ships). They have strong and durable construction to damage, tamper, are usually waterproof, fireproof, etc. Nowadays they are also equipped with hinges to manipulate them, where is no direct contact with humans. [8]

Safety equipment:

- different types of locks,
- identification devices,
- devices to search,
- defence devices (sirens, smoke bombs, equipment to destruction or label content to describe the attacker).

To a lesser extent, protective containers are adapted in size, weight, shape, to transport by courier (on foot).

In protective containers are often transported:

- documents - contracts, archive,
- software and hardware - software, storage media, computers,
- valuables - money, stocks, precious metals and minerals, historical objects,
- dangerous material - chemical, biological, radioactive,
- hand weapons and their components.

The difference between safety containers and security hand luggage (for example: suitcases) bridges the safety box. Production and shape has the character of the container, but the size, weight and levels of the security put it into the hand security luggage. Safety boxes are used for the safe transport of animals, food, small technical devices, keys, information media, and for many other tasks. [8]

#### **2.4.3 Baggage for transportation of valuables**

They are primarily designed to be transported by a person who will hold them in a hand, or otherwise attached them to the body. Unlike containers and boxes (which already evoke by their design, that it is a special safety mean) the baggage are designed to act discreetly. This includes suitcases, bags, bum bags, special bags, vests, as well as others. [8]

Smaller safety luggage for transportation of valuables:

- documents,
- money,
- recording media,
- small valuables from precious metals or minerals.

Safety features:

- lockers,
- quick hand,
- sirens,
- smoke bombs,
- device to destroy or label the content of luggage.

Protective vehicles, safety containers and luggage belong to modern services, which the commercial security industry can do. Their variable construction, safety equipment, but also the defensive elements allow selecting the most appropriate method of safe transportation of people and valuables. [8]

### **3 Security problems in transportation of cash and valuables**

For proper preparation of transport it is necessary to know the security risks in order to minimize their influence. Otherwise, this may ultimately be used to commit theft, robbery, or fraud (the main threat is leak of information and cooperation of employees with offender). We can tell that our actions to prevent emergency are the main task of the security transport of valuables. [5]

The most important risks:

- Work with shipment

The risk is particularly high during the receipt, storage or transmission of shipment. Prevention is possible to ensure by a sufficient number of employees, who are involved in the transport, their quality training and detailed observation during the transport.

- Leak of information

The information that has to be protected include the price, type of shipment, transport route, transit time, method of implementation, the technical equipment, crew members. There are several options how information can leak: intentionally or recklessly, for example - violation of safety regulations. Prevention is strict compliance with safety regulations in the company.

- Cooperation between offenders and the staff

The statistics of robberies will tell that cooperation between offenders with the staff of security agencies is common. Offender or offenders, have a significant advantage in the form of availability of the necessary information. The most common causes are personal profit or a pressure from the offenders (blackmailing, kidnapping of a loved one). Prevention is the emphasis on the selection of new employees, evaluating non-standard actions and behaviour of employees.

- Technical malfunction

The most serious problems are: malfunction vehicle / vehicles, defect of luggage / boxes / containers, glitch of communication technology, failure of defence means. Prevention is keeping these means in a perfect technical condition, control of these resources, availability of alternative resources.

- Health complications

Health complications of a member of the crew may endanger transportation. This risk can be minimized by regular health checks.

- Traffic accident

Cause of the traffic accident can be accidental or intentional. Safety is possible to increase by the

participation of exploration vehicle, proper assessment of the situation, by the driver's foresight and by his determination.

- Traffic situation

The risks include the deceleration of the vehicle, vehicle stop or threat to the vehicle. The most common causes are: rush hour, closing the route, train of vehicles and traffic accidents. Prevention is the detailed preparation of the route and involvement of another (exploration) vehicle.

- Impacts of climatic effects

These include storms (risk of disproved trees), snow (ice, snow cover on the road, etc.), and floods. The level of safety can be enhanced by checking the current situation and involvement of another (exploration) vehicle.

Knowledge of the potential risks is essential to ensure safe transportation TCV. This minimizes the possibility of surprise and the possibility of unexpected situations during the transport. The most important is thorough, professional and conscientious preparation of the transport. Appropriate is involvement of an exploration vehicle, which can detect in advance a situation on the route. If there is an unexpected change in the route, it is possible to change it and reduce the danger by that.

## 4 Ensuring security

For each contract it is necessary to ensure maximum safety. The first step is to select the most suitable mode of transport and type of equipment (security bag, container, trunk, etc.). The next step is to determine the number of employees ensuring TCV. It is obvious that the more employees, then it is safer. But then the economic complexity of the contract will increase and it is not always achievable.

### 4.1 Tactics during transport by transfer

Transportation by transfer is less secure variant of TCV. It can be made from one employee to four (higher number is ineffective). The table below shows how the division of functions by the number of employees is.

Number of employees performing TCV	Performed position
1	All - Commander of the transportation, defender, courier

2	Commander of the transportation
	Courier
3	Commander of the transportation
	Defender
	Courier
4	Commander of the transportation
	Defender
	Defender
	Courier

Table 1: *Function of employees during the transport by transfer*

In the private sector is the usual transfer the shipment by two employees. Courier goes ahead and commander of Transportation, which also acts as a defender, it's on the right side diagonally behind him. In the case of the attack, the courier tries to leave the place as quickly as possible and transfer the consignment to a safer place.

During transport by three employees the formation is such that the commander of transport is on the right side diagonally behind of courier and defender is on the left side diagonally before courier. According to the direction of the attack one of them eliminates the attack (the one closer to the attacker) and the other leads a courier to a safer place.

During transport by four employees is the second defender on the right side diagonally before courier. There is already difficult to maintain formation during transport in outdoor areas (street).

### 4.2 Tactics during transport by vehicle

This is a safer option of TCV when it is necessary to ensure appropriate safety vehicle. As said before, we have three types of security vehicles. Again, a suitable one is selected according to the type and price of shipment and by insurance requirements. Transport can be performed with one to four employees.

Table 2: *Function of employees during the transport by vehicle*

An important step is to assess how many vehicles will be used transport. It can be performed with one to four (more is inefficient). The vehicle can be transport, protective or exploratory. Great importance has exploratory vehicle, which starts at the earliest route in advance to see if the route is safe and if there aren't traffic accidents or traffic closures. The selected time when the exploratory vehicle leaves depends on traffic density, length of transport routes, etc.

Ensure security of the transport is one of the most important steps in performance of the contract. Safety depends on the many aspects that must be taken into consideration. How many employees we can deploy what equipment they have, etc. It is necessary to examine all details of the risks and what is best step to prepare for them.

## 5 Conclusion

Transportation of cash and valuables is one of the main tasks in the commercial security industry. Employees of private security agencies often carry cash, valuables and other items which have some value for the client. In these days is the most common way of transporting a car thanks to its availability, speed and independence. Except the car there is the transport ensured by luggage and safety containers. All shipping is then scheduled mainly in terms of insurance conditions, financial options of client, number of people, number of vehicles, as well as in terms of routes and their variants.

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Number of employees performing TCV	Performed position
1	All - Commander of the transportation, defender, driver, courier
2	Commander of the transportation, defender, Driver
	Courier
3	Commander of the transportation and defender
	Driver
	Courier
4	Commander of the transportation
	Defender
	Driver
	Courier

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