

Lewandowski Krzysztof

Wrocław University of Technology, Poland

Safety of delivery process in city centre, case study

Keywords

delivery process, goods movement, city centre, safety, field research

Abstract

The article presents the safety conditions of delivery to trade in the centre of city in Poland. The results are based on surveys the real 900 stores. This article analyses of reports the institution of the General Inspectorate of Road Transport. Indicated in the dependence of safe delivery of compliance with legal rules. Cause to write this article is situation on polish roads with delivery vehicles.

1. Introduction

Safety is definite as feeling without any dangerous. The safety on roads is described as a behavior of young or old driver, behavior a user's of road [7]. Safety of delivery process in literature is a problem of a responsibility of supplier company to recipient, responsibility of delivery driver to supplier company and to recipient [11], and a possibility to injured of deliver by accident, protection of delivery before robbery e.g. pizza drivers in USA [6], [10].

2. Definition a problem

Safety conditions for delivery process on polish road isn't wide described in literature. Many time we can read articles about dunked driver, behavior a user's of road, young or old. The delivery process is a part of supply chain at the last link, from last warehouse to recipient. Here due to hard conditions for delivery vehicle, problems with stopping and obstacles with accessing time to city center, without possibility to stopping delivery vehicle in safety place for carrier and for other users of road traffic we can use term urban goods movement UGM [8], [19], [20]. Urban goods movement UGM that is integrated modelling effort needed to address issues associated with congestion and air quality with respect to urban structure through land use transport interaction [20]. Goods movement is the last phase of delivery process (Figure 1).

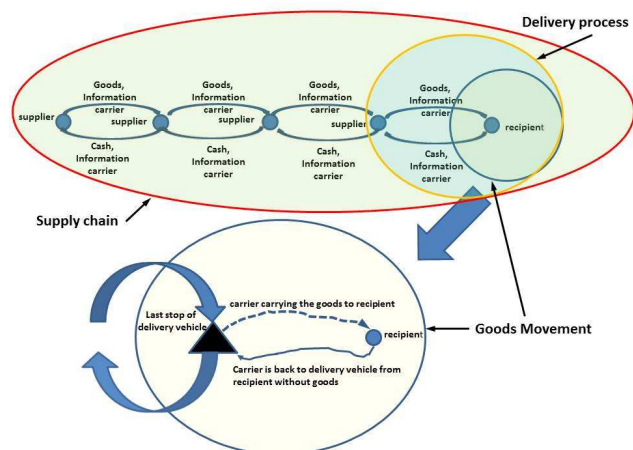


Figure 1. Place of goods movement in supply chain and delivery process (own work)

Here will be described a safety conditions in delivery process for carriers and for others user's on roads based on a field research and review a polish law.

3. Base for results

Under filed observation since 2004 to 2012 under DORED program were collected results from over 900 points (DORED synonym of Good Solutions for Delivery - pol. Dobre Rozwiązania dla Dostaw, original program of author).

The results were based on studies in six cities: Wrocław, Gdansk, Kępno, Opole and Jelenia Gora and Tourquay (UK) more than 900 points [14].

The amounts of polls over time:

Gdańsk 2006-64,
Jelenia Gora, 2011 - 54,
Kępno 2010 - 50,
Opole 2006/2007 - 54,
Torquay (UK) 2007 - 70,
Wrocław: 2004-135, 2004/2005 -127, 2006/2007 -
229, 2008 -16, 2008/2009 -72, 2010 - 34.

Analyze this data could formulated a main problems with safety in supply in center of city. That are dangerous for carrier and for other users on roads.

4. Review of Polish Law basis

Fundamental law paper about legislate of road transport in Poland is [3] (oryg. Pol Ustawa z dnia 6 września 2001 r. o transporcie drogowym. Dz.U. 2001 nr 125 poz. 1371). There is in sub-article 2 Article 3 Exclusion of application of the provisions of the Act., 2) with a maximum mass exceeding 3.5 tonnes in the road haulage and road transport of non-profit things;

(org in pol. o dopuszczalnej masie całkowitej nieprzekraczającej 3,5 tony w transporcie drogowym rzeczy oraz niezarobkowym przewozie drogowym rzeczy).

It means that driver or owner of delivery vehicle unless 3,5 tons don't have license to perform national road haulage in the field of passengers and the carriage of goods mediation. Any other papers don't write about this subject.

Second is law paper about public roads [1]. (Ustawa z dnia 21 marca 1985 r. o drogach publicznych. Dz.U. 1985 nr 14 poz. 60).

Third is law paper about road traffic is [2]. (Ustawa z dnia 20 czerwca 1997 r. - Prawo o ruchu drogowym. Dz.U. 1997 nr 98 poz. 602) . There in The Act of 21 March 1985 on public roads is order for art.20. 5) implementation of tasks in the field of traffic engineering.

In this area isn't any one order about looking solution for realization of delivery. In Poland delivery in city center generally are realized by vehicles with total mass un-less 3,5 tons [14]. That is field for very dangerous situation in delivery on roads.

5. Dangerous for delivery in city centre

5.1. Non expected any rules for truck vehicles by their drivers and owners.

Legal owner of delivery vehicles are obligated to respect of all law Acts in Poland. That included cases of maximal mass of vehicles, maximal axel load in vehicles, equipment of delivery vehicles, time of work of drivers, time of res for drivers, maximal time work in two weeks, months and others. In many

truck companies are special personnel to control these aspects of road transport. They use a special software, which is not cheap, and they must legalize this. Moreover legal owner of delivery vehicles are obligated to lead a statistics for General Statistical Office, declared every moths [17]. They must bear the cost of establishment of employment drivers. Many times owners of delivery vehicles are individual per-sons which declared to Tax Office that they all-time use delivery vehicle for non-profit things or own needs. In many cases drivers are employment on the contract work or written order or they declare own business for own needs. Another dangerous is health risks for carrier. At realization of delivery very of-ten they haven't any technical support: hand truck, taillift. Carrier must wearing at the hands of whole consignment. That could evoke in later time a health problems.

5.2. Overloading vehicles

Problem of overloading vehicles in Poland generates a loss for reconstruction of roads and engineering construction 6+8 bln złotych per year. For transport companies more rarely break the law of road transport at cases of axle load. General Inspection of Road transport observed decreasing numbers of overloading vehicles (*Figure 2*) [9].

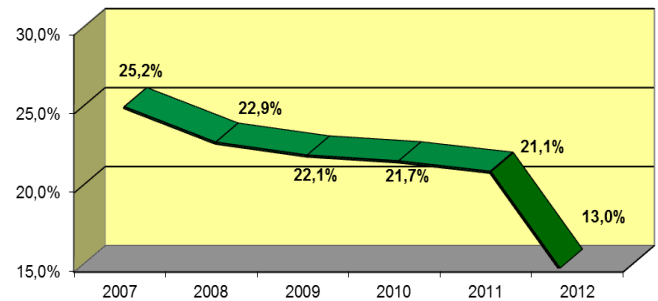


Figure 2. Change numbers of overloading vehicles, dimension, overloading axle load find under control by General Inspection of Road Transport [9].

In 2013 results are as follows [12]:

- 999 new cases initiated (for gross violations of >50% MPW);
- 772 mandates criminal;
- 37 applications for punishment to the courts;
- 19 cases were dismissed;
- 171 cases in which continued operations are carried out.

By observation of General Inspection of Road Transport total mass of delivery vehicles with maximal mas un-less 3,5 tonns, under control oscillate between 5-6 tons, and sometimes it is even more than 7 tons [9].

In region of Lower Silesia in 2012 under control in one day of 38 delivery vehicles, 32 had overloading mass. Negative record-holder had a total mass 8,2 tonnes. Road Transport Inspection admits that in many cases, overloaded trucks are unfair competition for trucks. Drivers whose cars weigh up to 3.5 tonnes must not have a license to transport and do not need to have a tachograph fitted (these devices measure the time that a driver spends behind the wheel - ed). For owners of companies for which they work, this means lower costs [17].

To protect roads and competition of legal transport companies in Poland since June 2012 in [1], are three types of penalties for overloading vehicles:

- 500 zł - the weight of the vehicle exceeds no more than about 10 percent. permissible mass,
- 2 thousand. zł - when excess amounts of 10 to 50 percent.,
- 5 thousand. zł - for severe violations.

Exceedance rate of growth violations cars up to 3.5 tonnes suggest to regulate this subject. Here is hole in the regulations.

5.3. Excessive working hours of drivers

Under realization filed research of conditions of delivery in many cities in Poland in DORED program, since 2004 to 2012, were collected over 900 opinions of owners of stores and drivers of delivery vehicles. In this collection was only 7 opinions of drivers about his time of work. From these collection is looking very dangerous trends. From these 7 only 2 said that managers of logistics in their companies try to respect obligatory time of work for drivers based on Act of Road Traffic Law. In remaining cases 3 said that they in planning of personally work time is longer than 9 hours per day. 2 said that in their companies time of work isn't very often respect by managers of logistics. They has own business, and by Road Traffic Law, they are obligate to personally respect time of work. Managers of logistics, who planned them time of work, demand from them realization full planned delivery, even if total time of this plan is much longer as is in Act of Road Traffic Law. One driver said that in his company are other 5 drivers. Every day they worked since 3 a.m. to 6 p.m. In next day they must go to work, to do not lose an employment.

Under control of Police and General Inspection of Road Transport this subject isn't area of control, because if driver has own business, because by acts (The Act of Road Traffic Law, 1997) [2]. (in sub-article 2 Article 3) they don't must respect total time of work for drivers.

Here is hole in the regulations.

Some solution for these three problems is construction a cheap recorder of vehicle parameters,

as speed, time work of engine, acceleration, opening door to vehicle, etc. Prototype construction is now under test in Institute of Vehicle Transport [15].

The proposed recorder - Car black box, can be used to record data concerning the technical condition of the vehicle, the driving technique, and drivers compliance with the traffic rules and road traffic safety in the following vehicles (*Figure 3*) [15]:

- passenger cars and privileged cars – will allow the registration of the earlier indicated data and will provide evidence in case of an accident,
- Buses and taxis – apart from the recorded data, it will help to ensure the safety of the driver and passengers, will be enable the location of vehicles in the event of theft,
- trucks - provide data on the state registration of the technical enable location, will contribute to reduce the number of accidents and ensuring the safety of the driver.

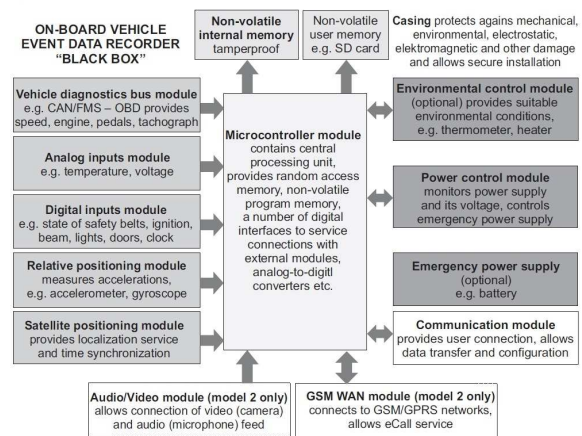


Figure 3. Event data recorder functional structure (Nowacki G., Niedzicka A., 2012).

5.4. Stopping delivery vehicles at random places

By regulations of (The Act of Road Traffic Law, 1997)[2] is implementation of tasks in the field of traffic engineering. The interpretation of Divisions of road traffic in cities for municipal clerks is a planning of steering of traffic lights, payment parking zone, and looking solutions for random situation on roads. There is no regulation to obligate owners of roads to planning a places for realization of delivery for stores in cities. In Polish law has no definition of the place for delivery, it is only lane road, parking place. Results from DORED program shown that 87% owners of stores haven't a place for realisation of delivery [14]. The place where stopped delivery vehicle is different [14]:

- From the front of store 36%,
- From the rear site of store 19%,
- On the street near store 20%,

- On the sidewalk in front of store 13%,
- In the bay near store 1%,
- Others, where is possible 11%.

The most common reported remarks concerned the access of places to make landing operations (67% from 900 points) included: the terms (the technical condition of vehicles, time of delivery, etc. s), the difficult entry to the rear site of store, occupying the place for unloading by other unauthorized vehicles. Widespread are attentions by holders unloading sites (13% from 900 points), that Municipal Police no penalty unauthorized cars which parked on these sites and the owners of those sites must to carry out the unloading in prohibited places. Is postulated to appointment free places for delivery [14].

Municipal clerks decide to regulate road traffic, with payment parking places. Delivers who don't want to pay decide to stop delivery vehicle into a road lane under normal traffic (*Figure 4*), in bus bay blocked city communication (*Figure 5*), just before crossroad and street lights (*Figure 6*), on narrow footpaths etc. That generate a dangerous situation for other users on roads. Solution for this problem is a high penalties and still control by municipal police or controller of parking and stopping time (*Figure 7*).



Figure 4. Delivery vehicle stopped on road lane under normal traffic, Wrocław, Średzka street, Poland, talllift is down, Own work.

This situation (*Figure 4*) is dangerous for the driver and other road users. The driver may be hit by other car, may also contribute to the formation of road congestion and accidents.



Figure 5. Delivery vehicle stopped on bus bay. Wrocław, Powstańców Śląskich street, Poland. Carrier is under realization of delivery. Own work



Figure 6. Delivery vehicle stopped just before crossroad and traffic lights, Wrocław, Norwida street, Poland. Carrier is under realization of delivery. Own work.



Figure 7. Controller of stopped time on London street, Own work.

Hoverer slowly in cities begin understanding about meaning possibility of stopping for delivery vehicles for conditions of stores in cities. Without delivery store couldn't work, couldn't pay a taxes. Without

taxes from stores city is going to impoverishment. When communal government is start to regulate conditions for delivery, first regulate is time of delivery, second place for delivery, third kinds of vehicles (dimensions, mass, pollution emission) which could going into city center. In Poland is note two solution were was almost full conditions for delivery. Once in Legnica, where municipal government in 2010 decide to put three places for stopping delivery vehicles under delivery operations. They are placed on corners at west side of main market (Chojnowska, 2 places (Figure 8), Grodzka, 1 place (Figure 9)) and one is middle of north site of main market (Środkowa, 2 places (Figure 10)) [18]. Places has road sign D-20, parking place, and plate with description: For delivery vehicles under delivery time (pol. Dla pojazdów zaopatrzenia na czas dostawy).



Figure 8. Places for delivers, Legnica, main market place, Chojnowska street. On place of delivery we see parked personal vehicle. Google street view



Figure 9. Place for delivers, Legnica, main market place, Grodzka street. Google street view

In Legnica municipal government didn't decide to regulate time of delivery. Is prohibited to entry into place of main market.



Figure 10. Places for delivers, Legnica main market place, Środkowa street. Google street view

In 2009 Wodzisław Śląski municipal government decide to regulate access into place of main market [5]. Municipal clerks decide that delivery vehicles could enter into place of main market for realization delivery. Time for this operation was describe to 15 minutes.

In opinion of merchants that is too short. They spoke that: Reducing traffic in the center, and especially the prohibition of entry into the market, will lead us to ruin. Parking banned residents and entrepreneurs in front of our stores. On the market we can enter the time of loading and unloading of goods. Officials determined that it is 15 minutes. It's too short. We have to put the goods, made to measure, some things immediately measured. The effect is such that move goods from the parking lots to the stores. In opinion of municipal clerks: We want the market served mainly walkers. The 15-minute time to unload goods is contractual. Nobody will punish, if it takes longer. - The idea is that cars are not parked on the market [5].

Based on results from early results of program DORED was developed proposition of new road sign: place for delivery. Proposition of two variants the road signs were subjected reviews (Figure 11 and 12). From opinion of 82% of 150 stores better is variant 1 of road sign [14].

Respondents were asked whether would agree that one of the landing location also benefited other users. 82% said yes. Of these, 59% indicated the maximum number of concurrent users 5, 13% and 4, and only 6% to 3 and 4 to 6% Others did not answer the question. Surveyed on the proposed road sign the unloading place asked if would agree to adjust their hours deliveries to other concurrent users. 49% of them would agree to it. Only 13% said definitely not. The others did not respond to this question [14].

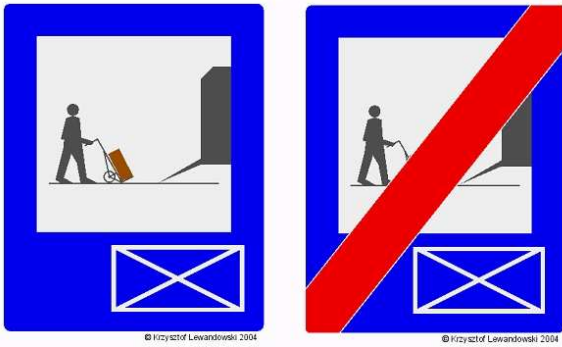


Figure 11. Proposition of road sign, place for delivery, variant 1, begin of place, end of place for delivery [14].



Figure 12. Proposition of road sign, place for delivery, variant 2, begin of place, end of place for delivery [14].

6. Conclusion

Safety conditions under delivery process we can analyse as a summary the part times of delivery or as a summary possibility of risks to happen an accident. The delivery process we can describe as:

- loading cargo to delivery vehicle in warehouse,
- transport by roads,
- delivery time when delivery vehicle is stopped and carrier go to recipient with ordered cargo, goods movement.

possibility to happen an accident under each these components is linked with regulation of safety conditions. Loading process is described by [4], Report of Labour Inspection show that number of accidents is decreased [16].

Transport conditions is described by [1], [2] and [3]. Report of (GITD (2013) [9], suggest that is still high. Conditions for delivery process haven't any regulations. So the risk if possibility to happen an accidents is strong linked with law regulation. Risk of accidents under transport is linked with compliance of law regulation with maximal speed, maximal total mass and with a regulations of road traffic. Accidents were happened under hanging lanes, direction of movement, overtaking bypass (Figure 12).

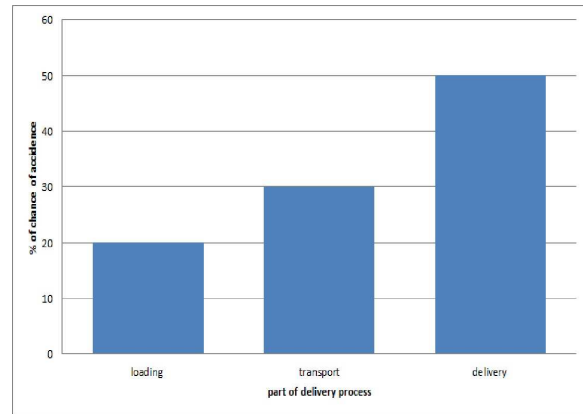


Figure 13. Possibility to happen of accident in delivery process. Own work.

Risk of accident under delivery time when delivery vehicle is stopped is linked with beginning this process: deceleration, stopping and stop. Later with stoppage delivery vehicle, parking delivery vehicle could be hit by other car, output driver and approaching a car for receive the next batch and driver may hit by other car. Because isn't law regulation for this part of delivery process is very high possibility to happened accidents. Filed observation suggest that when is high congestion, a lots of cars are drag along a city street, when delivery vehicle is stopped, is low possibility to accidents. The speed difference between the delivery vehicle and other traffic is less, all drivers in the traffic congestions go carefully and slowly. The greater risk of an accident is when traffic is running smoothly. Security of supply in the center of city depends on respecting of law by drivers and the ability of rational and logical solving traffic problem and supplies to traders in the town center. That suggest that is need to add to law regulation new parameters:

- Obligatory equipment all truck vehicles (even it is rebuilding personal car) with data recorder with recording of time of work, total mass and speed,
- Obligatory equipment of owners of stores in city center and owners of delivery vehicles in hand truck for realization of delivery,
- Obligatory input to The Act of 20 June 1997 - Road Traffic Law regulation, that road owner must decide about places for delivers with agreement of stakeholders,
- Obligatory training for municipal clerks about problems with delivery under normal road traffic in city center,
- Input to use a new road sign: Place for delivery
- High penalties for vehicles parked in the designated place for delivery.

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