

Issues of administrative processing of road offences detected by weigh-in-motion high-speed automatic system and suggestions to rationalising of this administration

J. Bulíček¹, J. Kleprlík², K. Světlá³

¹University of Pardubice, Studentska 95, 53210, Pardubice, Czech Republic, E-mail: josef.bulicek@upce.cz

²University of Pardubice, Studentska 95, 53210, Pardubice, Czech Republic, E-mail: jaroslav.kleprlik@upce.cz

³Městský úřad Ricany, Odbor spravních agend a dopravy, Oddelení registru vozidel a řidiců, Komenského náměstí 1619/2, 25101, Ricany, Czech Republic, E-mail: klara.svetla@ricany.cz

Abstract

The paper is focused on administrative processing of road offences detected by the weigh-in-motion high-speed automatic (HS-WIM) system. The aim of the paper is to suggest steps rationalizing technological process of this administration. The software tool of Microsoft Project is applied in the methodological point of view. The suggestions have been evaluated by using of data from the municipal authority of Říčany u Prahy as the locality with heavy traffic in Prague agglomeration. Time of administration of an offence is possible to be reduced by about 30% by applying of these suggestions. This is possible to be applied for rationalization of work at authorities responsible for road offences.

KEY WORDS: *detection of offences; high-speed weigh-in-motion; road offences; technological process of administrative processing of road offences*

1. Introduction

Maximum permitted dimensions (height, width, length) of road vehicles, special vehicles and their car sets are defined by legal regulation of the European Union as well as of the Czech Republic. Maximum weight of vehicle and maximum weight per axle (drive as well as driven) are also limited. These limits are defined regarding parameters of roads, traffic constructions (bridges, underpasses, tunnels, railway crossings etc.) as well as regarding traffic safety.

The limits for dimensions and maximum weights of vehicles are defined by the Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic in current consolidated version [1]. This directive is valid for vehicle categories of M2, M3 (buses) and for their trailer vehicles (category of O). It is valid also for categories of N2, N3 and their trailer vehicles (trailer, semitrailer) of O3, O4 categories.

Dimension and operating weight limits for the vehicles of the category Le (marked as L in the Czech Republic) are defined by the Regulation (EU) No 168/2013 of the European Parliament and of the Council of 15 January 2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles in current consolidated version [2].

Selected parameters based in the Council Directive 96/53/EC and in the Regulation (EU) No 168/2013 of the European Parliament and of the Council are transposed in the Decree No. 209/2018 Coll. of the Ministry of Transport in the Czech Republic in current consolidated version. This decree is focused on weights, dimensions, and connectivity of vehicles [3]. The possibilities to define some limits for vehicles in different way from the Directive 96/53/EC and the Regulation (EU) No 168/2013 are applied in this decree. Some exceptions for domestic operation are defined in this way. Dimensions and weight for other vehicles and their car sets are also defined by the Decree No. 209/2018 Coll. (e.g., for tractors and tractor trailers).

The problem is that carriers and drivers do not respect defined limits and overloading of vehicles and car sets occurs. It occurs often by mass substrate transportation (e.g., sand, clay, gravel). Traffic safety is threatened by this. Roads and objects – first, bridges and overpasses are damaged by this as well. Check weighing of vehicles has been introduced by selected categories of vehicles due to such reasons.

Check weighing of vehicles is regulated by the § 38a of the Act No. 13/1997 Coll. for roads in current consolidated version [4] in the Czech Republic. It is carried out on highways, roads as well as local roads. Vehicles belonging to the categories of M2, M3, N, T, C, O, R, S, SS and the sets of these

vehicles are weighed. Specification of these categories is based on Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC in current consolidated version [5] in the European Union. There are more detailed local specifications are based on the Appendix 2 of the Decree 341/2014 Coll. for approving of technical compliance and about technical conditions for operation of vehicles on the roads in current consolidated version [6] in the Czech Republic. Maximum limits for dimensions, weights of vehicles and car sets are defined in the Decree No. 209/2018 Coll. for weights, dimension, and connectivity of vehicles in current consolidated version [3].

Check weighing of vehicles is divided into low-speed, high-speed and combined. This paper is focused on weigh-in-motion high-speed automatic (HS-WIM) system and on road offences related to exceeding of defined limits.

2. High-speed check weighing of vehicles

High-speed check weighing of vehicles, known also as weigh-in-motion high-speed automatic (HS-WIM) system, is carried out for ensuring of safety and fluency of road traffic and for protection of roads and objects on roads against damages caused by overloading.

High-speed check weighing (dynamic weighing) is weighing of vehicles by using of high-speed scales without need to detour of vehicles out of the route. These scales are permanently mounted in the road infrastructure. It is so called HS-WIM - weigh-in-motion system allowing weighing with no need to stop the vehicles [7]. The driver is obligated to pass this check weighing. The driver may not change the route deliberately to avoid weighing. The driver may not know that weighing is in progress.

The publications in this field are often focused on technical design of scales as well as of technical process of weighing [8]. Accuracy of weighing is also taking a part [9]. There are discussed statistics about change of traffic flows after building of weighing points in Poland [10]. Drivers go around these points and this system is not as efficient there. Legal and organisational conditions for weighing are discussed very marginally [11]. It is not discussed how to use data obtained by weighing in as complex way as possible. It is not solved how to automate management of documentation in relation to technological processes of enforcement of sanctions for road offences connected with exceeding of defined weight limits. One of proposals, how this topic can be solved, is taking a part of this paper due to this.

2.1. Example of high-speed check weighing

The paper contains a specific example of high-speed check weighing on the second-class road. The owner of this road is the Central Bohemia Region (region surrounding the capital city of Prague). This region had founded the organisation named Regional Administration and Maintenance of Roads of the Central Bohemian Region (Krajská správa a údržba silnic Středočeského kraje, p.o. - KSÚS in abbreviation) in the way of Deed of Foundation. This organisation is responsible also for high-speed weighing, for regular checking of weighing point as well as for regular certification of applied scaling device CrossWIM. The certification is provided by the Czech Metrology Institute (in Czech - Český metrologický institut) and declared by “Confirmation of verification of defined measuring device”, what is valid for 1 year.

Weighing is provided automatically by using sensors built in a road. The outputs are wheel, axle and total values of individual road vehicles or sets of vehicles. Weighing is carried out for each driving lane, for 24 hours per day. The scale is equipped by an infra-detector and illumination for ensuring function also in the case of unsuitable lighting conditions (darkness). Cameras are also incorporated. Registration plates are recorded by a detail camera and vehicles by a surveillance camera. Documented road offences are sent automatically to the KSÚS organisation in an electronic form. These data are processed by trained and authorized persons only there [12]. These people print out “weighing tickets of high-speed check weighing” and send them together with photos of weighed vehicles to the administration of a municipality with extended powers (in Czech - obec s rozšířenou působností, ORP) responsible for processing of these road offences.

2.2. Recording of road offences by high-speed weighing

Exceeding of limits defined by the Decree No. 209/2018 Coll. of the Ministry of Transport in the Czech Republic in current consolidated version [3] about weights, dimensions and connectivity of vehicles has been recorded by the high-speed weighing system. The KSÚS is obligated to issue the weighing ticket of high-speed check weighing. This obligation is according to the § 38d of the Act No. 13/1997 Coll. for public roads in current consolidated version [4].

Authority of the municipality with extended powers (ORP) will take over the notification from KSÚS consisted of these documents:

- confirmation of verification of defined measuring device,
- authorisation of employees of the Department of the KSÚS to processing of weighing tickets of high-speed check weighing,
- label of measuring device - a producer of applied scale is the company CROSS Zlín a.s.,
- transfer protocol with a list of road vehicles with recorded violating the § 38d of the Act No. 13/1997 Coll., for public roads in current consolidated version [4], including weighing tickets of high-speed check weighing,
- CD-ROM with weighing tickets in electronic form and photos of vehicles is taking a part of the transfer protocol. Nowadays this is gradually replaced by the central data storage (server) accessible to authorities of the municipalities with extended powers (ORP).

The official of the Department of the sectional speed measuring and vehicle weighing at the authority of the municipality with extended powers (ORP) will perform the lustration of vehicle registration plates in the Central register of vehicles and will identify the operator of the vehicle. Following information to the vehicle, trailer or semitrailer are collected:

- vehicle type and manufacturer of the vehicle,
- count of axles,
- value of maximal technically allowed weight per axle,
- wheelbase,
- wheels and tires (including doubled ones).

When data are collected successfully, the official will add them in the software SYDO Traffic PEN. Potential exceeding of defined limits is evaluated by the system. When the offence occurred, the official will make a document about result of high-speed check weighing equipped by data of vehicle operator. This document is also a check that all preconditions for start of administrative processing of a road offence are fulfilled.

Authority of the municipality with extended powers (ORP) will establish file documentation containing:

- road offence notification,
- transfer protocol,
- weighing ticket,
- data from vehicle card, eventually from card of trailer,
- authorisation of authorized persons of the KSÚS for weighing,
- confirmation of verification of defined measuring device,
- document about result of high-speed check weighing.

The offence is then registered into the software for file documentation called ELISA by the official. The system generates proceedings number. The official can decide if the processing should start directly or if additional information (e.g., Decision about special utilization of a road) will be requested from the vehicle operator. It depends on type of vehicle or type of goods conveyed. For example, an exception was valid for transport of wood in the year of 2021. It was due to bark beetle calamity. Exceeding of weight limits defined by the Decree No. 209/2018 Coll. of the Ministry of Transport in the Czech Republic in current consolidated version [3] about weights, dimensions, and connectivity of vehicles was allowed in the way of issued permissions. Vehicle operator was asked to declare this permission to special utilization of road first in the case when transport of wood had been detected. When the vehicle operator proved this, the processing was terminated.

The "order" is issued directly in the case of provable road offences. This order is issued according to the § 90 of the Act No. 250/2016 Coll., about responsibility for offences and for processing of offences

in current consolidated version [13]. Vehicle operator is marked as guilty for this road offence according to the provision § 42b paragraph 1 point (u) of the Act No. 13/1997 Coll., about roads in current consolidated version [4]. It is due to the fact, that the operator operates a vehicle with values exceeding the limits defined by the Decree No. 209/2018 Coll. of the Ministry of Transport in the Czech Republic in current consolidated version [3] about weights, dimensions, and connectivity of vehicles.

Limits for maximal weight of (whole) vehicle as well as maximal weight per axle may not be exceeded as follows from the Decree No. 209/2018 Coll. of the Ministry of Transport in the Czech Republic in current consolidated version [3] about weights, dimensions, and connectivity of vehicles. Both conditions must be fulfilled.

Amount of the fine, due date, the account number and variable symbol used to identify the payment are listed in the “order”. This is for traceability. Administrative discretion of the official is impossible in the case of the amount of the fine. The fines are exhaustive according to the provision §43 of the paragraph of the Act No. 13/1997 Coll., about road in current consolidated version [4]. Fine is strictly defined for the offence according to the provision § 42b paragraph 1 point (u) as CZK 9,000 (ca. € 360) for each commenced tone exceeding maximal limit of weight of vehicle of set of vehicles. When the maximal limit for vehicle (of set of vehicles) weight is exceeded about less than 500 kg, the amount of fine is CZK 5,000 (ca. € 200) only. When both limits for individual vehicle weight as well as for weight of set of vehicles are exceeded, the amount of fine is defined according to maximal exceeding.

For example, higher exceeding of the limit is identified by total weight of vehicle about 3,132 kg, it means 4 commenced tonnes. The amount of fine is $4 \cdot 9,000 = \text{CZK } 36,000$ (ca. € 1,440).

„Call for driver communication” is send to vehicle operator together with the order into the operator’s data box or as a recommended letter in own hands (it the operator hasn’t a data box). The driver who was driving a vehicle or set of vehicles by high-speed check weighing must be told. Appendix to the number of proceedings related to drier’s (driving in the time of offence) identification data is taking a part of this call.

In the case that vehicle operator pleads quilty and pays the fine, the processing is terminated. Income from the fine is divided according to the provision § 43 paragraph 3 of the Act No. 13/1997 Coll., about roads in current consolidated version [4] in following way:

- 40% belongs to the owner of the road on which the weighing was proceeded. It the owner is state, income is dedicated for the State transport infrastructure fund (in Czech - Státní fond dopravní infrastruktury),
- 45% belong to the region, where the weighing was proceeded,
- 15% belongs to the authority processing the road offence.

Vehicle operator has 8 calendar days after delivery for submitting of possible opposition to the authority issuing the „order”. If the opposition is submitted in time, the „order” is cancelled. The official, who issued the “order”, will continue in processing of this road offence.

Vehicle operator is obligated to communicate, who was driving a vehicle at the time the offence was identified, in 10 days after delivery of the “Call for driver communication”. If the operator does not, the official send the “Call for driver communication” once again. The amount of fine can be maximally CZK 50,000 (ca. € 2,000) for the offence to not communicate the driver. In this case the official will conduct 2 proceedings - one with vehicle operator (who submitted an opposition) and the second with specific driver.

Vehicle operator can have an opportunity to access to the documentation file and to suggest adding of evidence according to the Act No. 500/2004 Coll., administrative procedure in current consolidated version [14]. Vehicle operator is appealed by the official to get acquainted with the file in defined time limit of 10 calendar days. In the case that vehicle operator or his attorney will not use this time limit, the decision on the offence will be issued according to the provision § 42b paragraph 1 point (u) of the Act No. 13/1997 Coll., about roads in current consolidated version [4]. It is related to the fact that this vehicle operator operates a vehicle exceeding the limits defined according to a special legal act - the Decree No. 209/2018 Coll. of the Ministry of Transport in the Czech Republic in current consolidated version [3] about weights, dimensions, and connectivity of vehicles. The operator should submit an appeal against this decision in 15 calendar days to the authority issued the decision.

The official starts administrative processing and the “order” for a road offence according to the provision § 42a paragraph 4 point (c) of the Act No. 13/1997 Coll., about roads in current consolidated version [4] will be send to a driver. The fine with maximal amount of CZK 30,000 (ca. € 1,200) will be

imposed by the “order” according to the provision § 42a paragraph 8 point (k) of the Act No. 13/1997 Coll., about roads in current consolidated version [4]. The driver has time limit of 8 calendar days after delivery of the “order” to submit an opposition to the authority, which issued the „order”. If the opposition is submitted in time, the “order” is cancelled. The official, who issued the “order”, will continue in processing of this road offence. The driver is appealed by the official to get acquainted with the file in defined time limit of 10 calendar days. In the case that the driver or his attorney will not use this time limit, the decision on the offence will be issued according to the provision § 42a paragraph 1 point (u) of the Act No. 13/1997 Coll., about roads in current consolidated version [4]. It is related to the fact that the driver was driving vehicle or set of vehicles non-compliant with limits or conditions defined by the Act about route transport operation. The driver should submit an appeal against this decision in 15 calendar days to the authority issued the decision.

There are 4 variants of a technological process for solution of selected road offence:

- vehicle operator and drivers agree with committing a road offence,
- vehicle operator agrees with offence, but the “Call for driver communication” was disobeyed,
- vehicle operator disagrees with offence and will declare “Decision about special utilization of a road”,
- **vehicle operator as well as driver do not agree with an offence.**

One of these technological processes is discussed in detail in this paper due to limited extend of the paper. This discussion is focused on the process when vehicle operator as well as driver do not agree with the offence, see Fig. 1a. On the other hand, this process is the most complex, so that the other processes should be modified in derived way if needed. The software Microsoft Project was applied for elaboration.

2.3. State-of-art way of road offence processing by high-speed weighing - vehicle operator and driver do not agree with the offence

The case when vehicle operator as well as driver do not agree with a road offence identified by high-speed check weighing is common. Technological process, when both subjects will use their right and when they submit an opposition against the “order”, is displayed in the Fig. 1a. There is visible that the processing continues with both subjects individually and in a parallel way in the Fig. 1a. The process of administrative processing is based on the Act No. 500/2004 Coll., administrative procedure in current consolidated version [14]. The “Decision about commission of a road offence” is issued in both cases. Vehicle operator as well as driver do not agree with decision once again and they appeal against the decision. The complete documentation file is sent to the appeal body - to regional authority according to the location of responsible municipality with extended powers (ORP). The municipality of Říčany (20 km to the South-East from the city centre of the capital Prague) and Central Bohemia Region as the appeal body are taking part in case study mentioned in this paper.

Delivery of documents is based on the act No. 500/2004 Coll., administrative procedure in current consolidated version [14]. In the case, when a data box is at disposal, an official must use delivery of documents into the data box. Vehicle operators usually have data boxes. When they are legal entities, it is obligatory for them. Vehicle driver is usually an individual and the individuals usually do not have a data box. It is not obligatory for individuals, but it is also possible to have it. When a driver has data box, the documents are delivered in this electronic way as well. If not, the documents are delivered as a recommended letter in own hands to address stored in the Information system of evidence of inhabitants. Original version of documentation file is delivered to the appeal authority in an envelope with delivery note.

notifications, postponements, explanations, decisions, resolutions, printing of addresses on letter envelopes etc.),

- process-based controlled processing of road offences with detailed overview about progress in processing of individual cases,
- register of offences and possibility to search any combination of items stored in register,
- demonstrable processing of offences,
- automated processing - automatic operations with integrated systems, controlling of state of offence processing, tracking of defined deadlines,
- integration with a system for administration of financial claims - automatic administration, checking of payment, identification of unusual statuses and cases,
- integration with a system for documentation files named ELISA - automated administration of documentation file, storage of documents in an electronic form, dispatches of documents.

Next process will be influenced by an approach of vehicle operator to a road offence. Proposed software tool will track defined deadlines and in the case that the deadline has passed, a “notification” will be displayed (pointed out). Individual forms and templates (order, “Call for driver communication”, decision, resolution) will be created and updated in regular time periods according to valid legal acts.

The whole technological process will be automated.

The processing should be shortened from 74 to 54 days by implementation of the proposal (see chapter 2.4.) as it follows from the Fig. 1b. Please, let compare it to the Fig. 1a. The parts of processing (lines in the Fig. 1a, 1b) able to be shortened are marked by yellow colour. Time saving is ca. 20 days.

3. Conclusions

The publications in the field of high-speed check weighing of road vehicles (weigh-in-motion) are usually focused on technical aspects of applied scales and weighing processes. Accuracy of measured weights is also often occurred topic. Automating of administration of documents about weighing in relation to technological processes by enforcement of sanctions related to road offences connected to exceeding of defined limits. Analysis of technological process by administrative processing of such road offences is taking part of this paper due to this reason. Data coming from measuring of processing times at the authority of municipality with extended powers in Říčany were applied for evaluation of state-of-art and proposed solutions. There are 4 variants how the road offence can be administrated. The most frequent and the most complex variant when vehicle operator and driver do not agree with a road offence is presented. The duration of processing is 74 days by state-of-art way. It can be shortened to 54 days by using modified procedure proposed and presented in this paper. Time saving is 20 days by this case of road offence.

References

1. Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic in current consolidated version
2. Regulation (EU) No 168/2013 of the European Parliament and of the Council of 15 January 2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles in current consolidated version.
3. Vyhláška Ministerstva dopravy č. 209/2018 Sb., o hmotnostech, rozměrech a spojitelnosti vozidel, ve znění pozdějších předpisů. (in Czech).
4. Zákon č. 13/1997 Sb., o pozemních komunikacích, ve znění pozdějších předpisů. (in Czech).
5. Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC in current consolidated version
6. Vyhláška č. 341/2014 Sb., o schvalování technické způsobilosti a o technických podmínkách provozu vozidel na pozemních komunikacích, ve znění pozdějších předpisů. (in Czech).
7. CROSS Zlín, OPTIWIM IS [online cit.: 2022-02-02]. Available from: <https://www.optiwim.com/index.html>
8. **Isaev, KV.; Romanov, PK.** 2015. An Efficient Universal Algorithm for Identification and Weighing of Moving Wheeled Vehicles, MEASUREMENT TECHNIQUES: 1131-1136, eISSN: 1573-8906, DOI: 10.1007/s11018-015-0591-8.
9. **Jacob, B.; Cottineau, LM.** 2016. Weigh-in-motion for direct enforcement of overloaded commercial vehicles. TRANSPORT RESEARCH ARENA TRA2016: 1413-1422, ISSN 2352-1465, DOI:

10.1016/j.trpro.2016.05.214.

10. **Rygula, A.; Brzozowski, K.** 2020. Limitations of the effectiveness of Weigh in Motion systems. OPEN ENGINEERING: 183-196, DOI: 10.1515/eng-2020-0020.
11. **Wisnicki, B.; Wolnowska, A.** 2011. The systems of automatic weight control of vehicles in the road and rail transport in Poland, LOGFORUM, 25-33, eISSN: 1734-459X.
12. **Světla, K.** 2021. Řešení přestupů na úseku silniční dopravy na obecním úřadě obce s rozšířenou působností, kvalifikační práce, Pardubice 2021. (in Czech).
13. Zákon č. 250/2016 Sb., o odpovědnosti za přestupky a řízení o nich, ve znění pozdějších předpisů. (in Czech).
14. Zákon č. 500/2004 Sb., správní řád, ve znění pozdějších předpisů. (in Czech).