

CRITERIA FOR OPENING OF TECHNICAL INSPECTION STATIONS - STUDY OF REPUBLIC OF MACEDONIA

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Abstract: *Each procedure should have to be in certain frame. That frame always has to be based on certain support. The support and the maintainability of this real research is in exact determination of the criteria for opening of vehicles technical inspection station. High imperative that is product of this paper is the connection of the legal and the technical criteria. Nowadays when each material is strictly regulated with in advance defined procedures, rules and regulations it freely could be stated that in spite of the clearness of the procedures each beginning is difficult. But the logistics in here is to give one different contribution of this field. Therefore in this paper all approaches, concepts and aspects that logistic offers will be offered about real benefit for opening of vehicles technical inspection station. This research is concerned for Republic of Macedonia where the state laws are valid, but anyway the directives of the European Union will be the frame from which we will not go out. That is from the simple reason that Republic of Macedonia is candidate for membership in this Union.*

Keywords CRITERIA, STATION FOR TECHNICAL INSPECTION STI, LOGISTICS, VEHICLES

1. Introduction

The functioning of the society and humanity, mobility of the cities, modern living conditions, should undoubtedly be followed by effective, efficient stations for technical inspection. One such system with measures, actions, legal regulation, and rules that refer to the technical inspections will be represented in this paper. The review that represents basis of this paper refers on real data about Republic of Macedonia. Therefore the procedures about defining the criteria necessary for the functioning of the stations for technical inspection will be reviewed systematically and the offered solutions that will come out of it with all benefits will be able to be recognized through the possibility of the users (owners of the motor vehicles) to provide sufficient, requested and also higher level of services.

The organization of the process about defining the criteria about the stations for the technical inspection should be priority for each state. Imperative of each state is well planned procedure and scheme according which these criteria should be applied, that are enough complex and have great influence upon the quality of the performing of this activity. From the existing technical inspection stations in Republic of Macedonia is required forming of optimally organized system in accordance with the needs of the motor vehicle's owners.

In future this system supported by relevant criteria could result in successful long term, and first of all effective policy and strategy about qualitative and precise defining of the conditions for opening of technical inspection station. While the applied measures and solutions for Republic of Macedonia would be field of realization of the concretely quoted criteria, with stressing out the legal regulations and rules that govern in Republic of Macedonia.

The influential indicators that would be represented in this paper with its positive sides will additionally influence in obtaining of uniqueness and introduction of one qualitative approach when it is a word about technical inspection stations also in Republic of Macedonia. At the same time the quoted criteria would be the institutional frame for implementation of each improved novelty in this field.

2. Personnel, Spatial and technical conditions that must be fulfilled by legal entity authorized for technical inspection stations

In accordance with the Law stipulation from the Law about vehicles, technical inspection of motor and attached vehicles could be performed by legal entity that will be authorized by the internal affairs minister. In order to get the authorization the legal entity should fulfill the conditions that refer to:

- adequate vocational personnel,
- necessary equipment and devices,
- space, and
- insurance of professional responsibility.

The personnel, spatial and technical conditions that must be fulfilled by the legal entity authorized for technical inspection of motor and attached vehicles, the same are regulated with sub law act – Book of Regulations about technical inspection of vehicles.

2.1. – Personnel conditions

According to the Book of Regulations about technical inspection of vehicles, the organization for performing of works about:

- observation and standardization of the criteria for performing of technical inspection,
- giving of expert help and instructing the skilled personnel that perform the technical inspection, and
- performing of expert supervision of technical inspection at the authorized legal entity,

is performed by a manager with completed high education with adequate profession, (Mechanical faculty – direction road transportation, Electro technical faculty, Transportation faculty – direction road transportation) and with working experience of at least three years in the field of motor vehicles.

Technical inspection of vehicles at the authorized legal entity is performed by at least two expert persons for performing of technical inspection who have:

- completed secondary vocational education of traffic, mechanical and electro technical direction.
- completed specialized education for profession controller for performing of technical inspection of motor vehicles.
- license issued by the Internal Affairs Ministry
- driving license for driving a vehicle of at least "B" category, and

- working experience of at least three years from the field of motor vehicles.

2.2. – Spatial conditions

The spatial conditions are defining the conditions that must meet the building that is used by the legal entity for performing of technical inspection of vehicles.

The same must be built of hard construction, and the technological line should be adequate for maximum allowed dimensions of vehicles of the categories for which the legal entity is authorized to perform the technical inspection of vehicles.

In the building of the station for technical inspection of vehicles should have to be found room for:

- o administrative works
- o technical inspection of vehicles
- o registration of vehicles and
- o work with parties.

2.3. – Technical conditions and equipment for performing of technical inspection

The technical conditions and the equipment for performing of technical inspection of vehicles are defining:

- the devices and the equipment that must be possessed by the station for technical inspections,
- the informative equipment connected in unique system that will allow application of unique program solution for automatic processing of data about the technically inspected vehicles and safe transfer of the same to the automatic recordings of the registered vehicles that is kept by the Internal Affairs Ministry.

The authorized legal entity for performing of technical inspection of vehicles, should possess the following devices and equipment: **device with rollers, device for measurement of the idle stroke of the steering wheel (angle meter), device for control of the direction and the intensity of the lights (Regloscope), Dynamometer for measurement of the force of the pressure on the pedals of the operating brake, Compressor, Meter (nonius) for measurement of the depth of the design of the pneumatics, Device for measurement of the noise that emit the vehicles (Fonometer), Device for spectral measurement of colors – Spectrophotometer and a catalogue for determining the nuance of the color of the vehicle, Meter or Metering tape, Device for measurement of emitting of smoke, Device for measurement of volume percentage of carbon monoxide, Stop watch or adequate chronometer, Indicator for check up of the evaporation point of the braking fluid, Device for control of the attachments on the electrical installation, Device for control of the highest speed of the mopeds, Device for intake of the exhaust gasses, Device for checking of the impermeability of the gas installations – gas detector, Device for checking of the correctness of the elements of the system for elastic support and the system for guidance of the wheels of the vehicle, Device for control of the geometry of the steering mechanism – directing, Measuring device for checking of the dimensions, axles span and wheels span; Device for measuring the darkness of the glasses, catalogue with homologation markings of the wheel; Device for measurement of the deceleration of the vehicles at the streets; **Two wedge-shaped pads** for the vehicle wheels; **Device** for testing of the braking system at moped and motorcycle; **Informative system** that will allow application of the simple program solution for automatic processing of data about the technical inspections of the vehicles; **CCD camera** with software for recognition of letters and numbers of registration plates, connected with the informative system; **Basic** auto mechanical tools: Skilled literature and catalogues; Rules about**

standards for the vehicles that are subject to technical inspection; manuals for handling and maintenance of the technical equipment; and also other rules that are of importance for performing of the technical inspection: **Canal** for checking of the undercarriage of the vehicle with minimal length of eight meters, width of 0.8 to 1.0 meter and depth of 1.4 to 1.8 meters with (Canal lifting device (hydraulic or pneumatic) for lifting of at least one axle of the vehicle with capacity of at least 3.5 in other words 12 t for freight vehicles and Hydraulic device for control of the gap in the steering system, guiding and supporting of the vehicle.

Beside the above quoted devices for technical inspection of the vehicles, the authorized legal entity for performing of technical inspection should have also:

1. At least two analogue manometers for measurement of pressure in the pneumatic braking system of the vehicle, with length of at least 12 meters with standard attachments;
2. Adapter with which the manometer could be attached with the standard attachments on the pneumatic braking system of the vehicle, on which is connected the pneumatic braking installation of the attached vehicle.
3. Adapter with the help of which the manometer could be connected on the steering (yellow) and feeding (red) line between the towing and the attached vehicle;
4. Manual valve for regulation of the compressed valve.

The authorized legal entity should possess adequate informative equipment connected in unique system that will allow application of unique program solution for automatic processing of data about the technically inspected vehicles and safe transfer of the same to the automatic recording of the registered vehicles that is kept by the side of the Internal Affairs Ministry. With the unique system it should be allowed:

1. scope of data about the vehicle and the owner and also number of the technical inspection in accordance with the data consisted in the driving license;
2. scope of results of measurements of the measuring devices and input of the irregularities established from the visual inspection of the vehicle through the computer system in the database;
3. preventing of change and correction of the measured values.
4. record for technical changes established at the vehicles;
5. creating of security copies of the data about the vehicle;
6. preventing of any change of the security copies;
7. searching of data according to the registration markings of the vehicle, number of the chassis, date of the performed technical inspection or number of the technical inspection;
8. statistical processing of the data about the performed technical inspections;
9. attachment of the devices for: (measurement of the smoking of the diesel engines, measurement of the exhaust gasses of the petrol engines, measurements of the mass of the vehicle by axles, measurement of the braking force on the periphery of the wheels, measurement of the speed of the motor vehicles with two wheels, measurement of the noise, control of the direction of the lights with built-in indicator about the intensity of the light, control of the direction of the wheels, and input of visually established irregularities);
10. the established and the measured values not to have possibility to be transferred to the data about other vehicle. It should be performed so that the technical inspection of the vehicle is not possible to be closed if all prescribed values that are required for single vehicle are not measured.

11. electronic certificate of the technical correctness of the vehicles that is prepared by the controller;
12. to perform control and estimation of the coordination, in other words non coordination of the vehicles with the prescribed conditions and he must not allow positive certification of the technical correctness of the vehicles, if it is find out that the vehicle is technically incorrect.

With introduction of the Book of Regulations for technical inspection of vehicles, Republic of Macedonia could be said that have succeed to satisfy one good part of the requirements of the Directive that first of all refer to the technical conditions. Left in that way undefined are a lot of very important criteria from which directly depends bringing of objective estimation about the condition of the vehicle at the technical inspection. These criteria refer to:

- maximal number of technical inspections of one station for technical inspection of vehicles in populated place or municipality,
- minimal distance from one to another station for technical inspections in and out of populated place,
- minimal necessary number of employees in the STI,
- scale of norms for evaluation of wages of the employees with possibility for its unification in accordance with the scope of work,
- equalization of the price for the technical inspection.

3. Establishing of network and criteria for the necessary number of stations for technical inspections of vehicles

For establishment of network and criteria about the necessary number of stations for technical inspections of vehicles, in other words about establishment of the conditions and the criteria for opening of new station for technical inspections (necessity and economical justification).

With establishment of unique common acts (especially of those with which uniform amounts for the compensation are prescribed, the scale of norms for work and elements for evaluation of the labor), condition for establishment of the economical justification could be created for opening of new station for technical inspection of vehicles, and with its application by the side of the already existing stations for technical inspections material preconditions are provided for normal operation of the stations for technical inspections, and also for equalization of the standards about the height of the wages of the employees in the stations for technical inspection of vehicles, in other words conditions are created for payment of approximately same wage of the employees in dependence of the height of the realized number of technical inspections, disregarding the fact in which station is employed.

3.1. Scale of norms for work

The scale of norms for work and the uniform elements for evaluation of the results of the work in the stations for technical inspections because of different kind of services that are performed in the stations for technical inspections, are reduced to uniform unit measure (PC scale of norm that represents value of spent time about technical inspection of passenger car). The scale of norms are expressed in time units (minutes) and are divided in three basic scale of norms:

- **Theoretical scale of norm**
- **Real scale of norm**
- **Calculative scale of norm**

All three scale of norms could be expressed in quantity, as a quantity of performed job assignments (or job operations) in one

time (of hour, day, month or year), or in time, as a time necessary for performing of unit of job assignment (or job operation), during which the quantity of performed assignments behave as a reciprocal values referring the time necessary to perform the unit job assignment (job operation).

3.2 Defining of real number

The **real number** of vehicles that could be technically inspected in one STI with two controllers in one shift (in accordance with the legal regulations) and **the theoretical time** necessary for one technical inspection, in accordance with the condition for **the real scale of norm**, that data refer to Republic of Macedonia (data taken from research by the authors).

$17,16 \times 0,85 = 20,18 \text{ min.}$, or **2,97 vehicles per hour** (60 : 20,18), or,

$7,5 \times 2,97 = 22,75 \text{ vehicles per day}$ (where 7,5 are working hours of the employee during the day – half an hour goes for rest and lunch), in other words:

$22,75 \times 240 = 5346 \text{ vehicles per year.}$

3.3 Calculative – Estimative number

The **calculative – Estimative number** of vehicles according to which each STI should establish the uniform compensations, to plan the work and the revenue, and to perform evaluation of the results of the work, in other words which should economically justify the work of the STI in accordance with the theoretical time and the condition for the calculative scale of norm in (data taken from research by the authors).

$17,16 \times 0,65 = 26,4 \text{ min.}$

or

2,27 vehicles per hour,

or

$7,5 \times 2,27 = 17 \text{ vehicles per day,}$
in other words

$17 \times 240 = 4086 \text{ vehicles per year.}$

From the above it could be seen that one STI with introduction of two shifts operation with 4 (four) controllers in shift, it could serve 16,000 vehicles.

In some way these data should be benchmark in establishment of criteria for opening of new station for technical inspection of vehicles that will refer to the minimal number of technical inspections of one station, in other words: (realization of the authors)

1. The capacity of the stations for technical inspections on one technological line should be established on 16,000 PC units (passenger cars) annually. PC unit represents the common part of the regular technical inspection of the passenger car, and new station could be opened:
 - On road distance bigger than 20 km from the closest station for technical inspection of vehicles.
 - On road distance bigger than 10 km to conclusive 20 km from the closest station for technical inspection of vehicles, if the average percentage of usage of the capacity of the existing STI in the place in which the closest STI is found, is bigger than 65% (measured in passenger cars).
 - In place or town in which already exist one or more stations for technical inspection of vehicles, if the average number of technical inspections in the total number of all existing stations for technical inspections in that place or town is bigger than 16,000 PC per year on one technological line.

2. New station for technical inspection of vehicles in accordance with indent 1 and 2 could be opened under condition that in the area in which gravitates the new station for technical inspections has registered at least 4000 vehicles, number that is considered for bottom limit for economical justification for building of new station for technical inspection of vehicles. Under area toward which gravitates the new station for technical inspection of vehicles is considered the area of the municipality that is closer to the new station than to the existing STI.
3. New station for technical inspection could be opened under condition **if** the existing station or the existing stations for technical inspection in the town or the populated place, in time of six months from the appearance of the need for opening of new station for technical inspection that is find out with analysis by the expert organization, in the scope of the existing building of the station for technical inspection, does not increase the capacity, in other words does not build new technological line. The announcement of the need to increase the capacity in other words the building onto a new technological line of the owner of already existing station for technical inspections submits the existing organization.

Conclusion with stated directions

With bringing of the new legal regulations not only it should contribute for increasing of the technical correctness of the vehicles, but also will contribute for protection of the living environment. And beside the intensified criteria for announcement of technically correct vehicle, with introduction of some news referring the authorizations of the STI for performing activities that are not directly connected with the technical inspections, the users of the vehicles get certain benefits referring the satisfaction of the needs connected with certain inspections of the vehicle.

The possibility that the authorized legal entities for performing of technical inspection to perform additional activities that refer on testing of vehicles, to allow the users of vehicles fast and with reduced costs to perform testing of the gas devices for vehicle drive, to perform testing of the transparency of the darkened glasses, to perform identification and certification of the technical data, to get CEM licenses not only in one place but also widely in the Republic.

Of course that some of the criteria that refer to the technical incorrectness for some users of vehicles will have negative effect because the owners of those vehicles in order to be able to further use them in the traffic will be exposed to financial expenses.

Republic of Macedonia beside that in great measure has brought legal and sub legal rules with which almost have coordinated its regulations with those of EU, anyway remains to bring additional regulations with which completely will be coordinated with the criteria of EU.

The necessity for prescription of the mentioned criteria is imposed from the reason that the liberalization of the conditions that have to be met by the legal entity for performing of technical inspection allows condition to be opened great number of new STI of vehicles. To this easing circumstance for opening of new STI it could be added also the expectations for bigger earnings from the side of the newly opened stations for technical inspections, which will be motive and reason for opening of new STI. These reasons impose conditions for fast and uncontrolled flood of stations for

technical inspections in Republic of Macedonia during that without recognition the justification for opening or giving license for new STI. This thing will contribute to obtain on quantity of STI but not also to quality of the technical inspections. This state is opposite of the strains and efforts of the society so as to reduce the traffic accidents caused by the factor "vehicle".

In the absence of the above quoted criteria, in absence of strict mechanisms for control over the work of the stations for technical inspection of vehicles and the intention in shortest time term to return the invested means for building and equipping of the new stations for technical inspection of vehicles, since the appearance of the first newly opened station for technical inspection, disloyal competition will be created.

The disloyal competition will be expressed through: reduction of the price for the service technical inspection, "letting go" of technically incorrect vehicles, manipulation with the payment of the height of certain compensations necessary for the registration of the vehicle, manipulation with presentation of the number of performed technical inspections e.t.c.

Giving of approval for work of a new STI without real analysis about the necessity and the justification for opening of new STI could cause great difficulties in operation not only to the already existing STI, but also to the newly opened STI. This specially could negatively reflect in the municipalities with insufficient number of vehicles for technical inspections, and to STI that are on close distance to already existing one in one settlement. The reason for that will be the reduction of the scope of work at already existing stations for technical inspection of vehicles, and also not having guarantee that those scope of work that the new STI will attain, will be sufficient to fulfill the expectations for great earnings, and also return of the investments.

The book of regulations for technical inspection of vehicles predicts recording of the procedure for technical inspection and also the results taken from the control of the technical correctness of the vehicle. This condition gives hope in future to prevent the disloyal competence and allow legality in working of the STI.

During that in order to issue approval for new STI the real necessity for opening of new STI must be analyzed, based on these criteria. In the everyday strains for reduction of the traffic accidents and reduction of the victims of the traffic accidents, it should be considered first of all on the quality not on the quantity.

These concluding realizations are taken on the base of real scientific researches and statements by the authors.

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