

THE INFLUENCE OF CAR WASH FACILITIES OVER THE WATER QUALITY IN CRAIOVA

IOANA CRISTIANA VILCEA

ABSTRACT.- The influence of car wash facilities over the water quality in Craiova In Craiova, as in most of cities, one of the most profitable businesses is represented by the car washes. These constructions are located all over the town, but especially at the peripheral areas, where most of them are off-hand from different materials and do not have a unitary aspect. Although, theoretically they are built according to some well drawn up projects, the reality in site does not always correspond with the endowments mentioned in technical documentations. Albeit obtaining a construction and functioning authorization for a car wash supposes, not only a project, but also certain authorizations from the Romania Water Department, Ministry of Environment, the number of car wash facility is increasing. On Râului Street, in Craiova, there can be numbered at least 13 car washes. All these huts made up of metal sheet are located on the once green space which covers a collection channel for waste waters. The waste waters mixed up with detergents and other cleaning substances resulted from the washing process are discharged directly into the sewerage system of the city. Because they have a high content of toxic substances, these waters are corrosive causing the damage of the sewerage pipe materials which, in time, start register leakages. So, part of the waters are infiltrating into the nearby soil, into the underground water layer present at a small depth (-0,80; -1 m in the marginal areas in the south and west of the city), and the rest, through the sewerage system, arrive in the Jiu river (the place where the waste waters are discharged), as the city does not have a waste water treatment plant in operation.

Key words: *car wash, waste water, sewerage system, emissary, water quality*

1. Introduction

It is almost impossible not to notice, as a pedestrian or as a driver, that in the last three years the number of cars increased a lot. One of the consequence of this phenomenon (besides the more intense air pollution, phonic pollution, the higher demand and consume for fuel) is the occurrence of car washes. This phenomenon can be noticed especially in big cities as the case of Craiova municipality.

In Craiova the official number of car washes raises to approximate 50 (according to the evidences from the Section of Water Management in Craiova).

Car washes represent a profitable business, the main pretext being that they help complying with the norms imposed by the traffic police and the ministry of environment concerning the cleaning of a vehicle that runs on a public road.

These constructions are spread all over the city, most of them being improvised by various materials which do not have a unitary appearance. Most of them are located at the periphery of the city (in the western part of Craiova), but also inside the city operating within the perimeter of the fuel stations.



Fig. 1. Location of car washes in Craiova city

2. The situation for discharging the waste waters resulted from the car washing process

Although, theoretically these constructions are built according to specific projects drawn up by specialized authorized companies, the reality in site does not always correspond to the endowments mentioned in technical documentations. Thou, obtaining a construction and functioning authorization for a car wash supposes, not only a project, but also certain authorizations from the Romania Water Department, Ministry of Environment, the number of car wash facility is increasing. A concerning fact is that in Craiova more than 1/3 car washes do not have authorization to function. Therefore, the discharge of waste water into the sewerage system is not done after a controlled process regarding the pre-water treatment, nor any water samples are taken at recommended time intervals.

According to the authorization procedures issued in 20/12/2004 by the Ministry of Environment and Water Management, for the activities with significant

Fenomene și procese hidrice de risc

impact over the environment, as units with washing stations/ waste water treatment, need to obtain an authorization for the environment, as per the provisions of chapter II, section 1 from the Law for the protection of the environment no 137/1995 and republished with the amendments and subsequent completions, according to article 9 from the procedure.

In order to respect the condition for the environment imposed by the law, a car wash must have at least the following:

1. clarifier and separation tank for impurities according to the European norms, made up of plastic or concrete;
2. the outlet into the city sewerage system must be done through a pump and not directly in order to be able to collect water samples which must be submitted to the environment department once a year;
3. the supply well must be placed to a distance of at least 15 m away from the sewerage outlet;
4. water pumps having different capacities depending of the size of the station mentioned in the technical design.

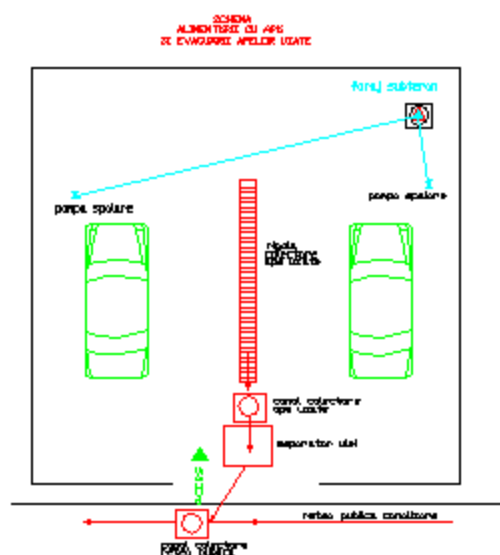


Fig. 2. Organization sketch for a car wash

On Râului Boulevard (designed as a ring road for the city), in Craiova city, can be counted at least 13 car washes, 2 of them functioning for truck maintenance.



Fig. 3. Car wash in Craiova

All these metal sheet huts or other improvised materials and located on the space, that was once a green area, and which covers a collecting channel for the waste waters coming from the city. Others are located in the yards of the properties having an opening to the main street. From the legal point of view, the minimum legal distance between the car wash and the first inhabited window is of 15 meters (on the left, right, front and behind).

Pursuant a site visit performed with the occasion of works performed in the western area of the city, I was able to notice that almost all these washing stations do not observe the norms imposed by the legislation in respect to the collection and waste water treatment before their discharge into the sewerage system. In spite all these they continue to function.

Thus, the waters mixed up with detergents and other cleaning substances resulted from to the washing process are discharged directly into the city sewerage system. As they have a high content of toxic substances, these waters are corrosive causing the deterioration of pipe materials which, in time, register waste water leakages. So, a part of these waters infiltrate into the nearby soil, into the underground water table at small depths, especially in the districts located into the former Jiu meadow, where the underground water table is found at -0,80; -1 m, and the rest, through the sewerage system, are discharged directly into the Jiu river (the emissary where all waste waters from the city are discharged, as Craiova lacks a waste water treatment plant which is now under construction).

The products and the waters coming from the car washes that are evacuated directly into the sewerage system of the city affect first of all the quality of waste waters, and lastly the quality of waters from the emissary. Now, all waste and storm water collectors in Craiova city discharge directly into the Jiu river. These waters contain high concentrations of toxic substances for the environment

Fenomene și procese hidrice de risc

and also corrosive substances for the pipes. They can affect the good operation of the sewerage system, if they do not follow a pre-treatment process before they are discharged to separate the oils, greases and coarse suspensions in settlement and separation tanks.

Into the table below are presented the main noxious substances found into the waste waters resulted from the process of car washing, their characteristics and the treatment method recommended before discharging into the emissaries or into the sewerage system.

Table 1

The main noxious substances from the water evacuated	The characteristics of the waste waters	The method for waste water treatment
Chlorine, alkaline, grease, oils, oil products, organic substances, suspension substances and other toxic substances (soap, detergents)	High turbidity, alkalinity, solid organic substances, CBO (biochemical consume of oxygen)	Separation of grease and oils, precipitation, dilution

The diminution of the negative impact over the quality of waste waters which reach into the sewerage system of the city and into the emissaries nearby, can be limited by reducing the volume of waste waters and decreasing their noxious action (i.e by using the biodegradable detergents). Also the equalization and uniformization of water flows discharged and the concentrations of detergents contained, highly contribute to the reduction of impacts to be supported by the receptor.

In the normative C.90-83 are mentioned the conditions of quality which must be observed by the waste water when they are discharged into the sewerage system concerning the: temperature; pH-ul (6,5 – 9,0); indicatives for the protection of concrete materials against the water aggression (STAS 3349-79), if we take into consideration the fact that a high number of collectors from the sewerage system in Craiova are made up of concrete pre-cast elements; suspensions (300 mg/l); CBO₅ (biochemical consume of oxygen at 5 days); CCO-Cr (chemical consume of oxygen); biodegradable anionactive synthetic detergents (active substances).

The evacuation of industrial waste waters directly into the sewerage system, pursuant to the interactions of certain substances, can cause to the formation of corrosive and coagulant compounds resulting the settlement of suspensions into the sewerage pipes. So, the waters which are discharged into the sewerage system of the city must not contain into the control section the following elements:

- the quantity, the size and the nature of the suspensions represent an active factor of erosion of pipes, cause settlements and obstruct the normal flow of waters into the pipes;

- hard suspensions carried which can create erosion areas into the collectors;
- lack oil, oils, grease and other materials in a form and quantity which can cause adherences capable to produce areas of accumulation and settlement on the walls of the collector. These substances from the water inside the sewerage network cause coagulation phenomena, therefore resulting settlements into the collectors. The settlements on different installations cause, in time, their soiling and obstruction, to the clogging of filters used for water treatment.
- Substances with chemical aggression over the materials used for the manufacturing of sewerage pipes. In time they start to register leakages of waste waters, and the waters mixed up toxic substances infiltrate into the nearby soil and reach further into the underground water table.

The quality of waters from the emissary is altered by the direct discharge of waters resulted from the washing process first into the collecting channel (Craiovița Channel) which discharges directly into the Jiu river, as the city misses a waste water treatment plant. The noxious with various characteristics cause the soiling of the emissary, making it improper for other uses. For example, the floating suspensions – oil, gasoline, gas – form a compact layer on the surface of the water, causing a bad taste and smell. Also these substances obstruct the absorption of oxygen at the water surface, preventing the self-purification. They are extremely toxic for the water fauna and flora. As dangerous for the fauna and flora are also the substances containing alkaline and substances resulted from the old and damaged car batteries.

The mud is another agent which can act negatively over the water quality and good operation of the sewerage network, especially in the case of waters flowing into the street which then flow, through the street gullies, directly into the storm water collectors causing, in time, their clogging and obstruction.

3. Conclusions

In order to evacuate the waste waters coming from the car washes into the sewerage network of the city, each of these units need additional purification constructions in order to perform the normal operation of the sewerage system and for the future waste water treatment plant of the city. The waste waters contain substances which prevent the purification process and which may cause malfunction of the future waste water treatment plant.

The consequences of the alteration of the water quality and water pollution, by direct discharge of the waste waters resulted from the car washes are sanitary, biological, pedological, economic and social.

So the sanitary consequences can be observed into the pollution of the small depth underground water table (from the lower areas of the city) by

Fenomene și procese hidrice de risc

infiltrations of waste waters resulted from leakages of the old broken pipes.

The biological consequences are given by the destruction of the aquatic beings, pursuant to the pollution of the Jiu river with organic substances.

Also the pedological consequences are present as a result of this activity. Into the soil is infiltrated once with the waste water, oil products and oils which have a flow different from the one of the water, entering into the spaces between the soil size, obstructing or stopping completely the circulation of water.

The economical consequences are extremely important, because they suppose high costs for improving the quality of waters affected by the direct evacuations of non purified waste waters. Pursuant to the pollution of the Jiu river with waste waters, it becomes improper for water supply and irrigation. The costs for the treatment for the water supply are increasing. Because of this the population is supplied with drinking water brought from big distances, increasing the cost for the water supply.

Last, but not least, from the importance point of view, are the social consequences. Therefore, the waters mixed up with toxic substances which reach into the sewerage system, and further into the Jiu river, cause the alteration of the water quality also through the bad smell, resulted pursuant to the reaction of certain compounds which could have been eliminated, if the waters had been purified before the discharge.

Another inconvenient is represented by the waters with detergents which flow directly into the street. To this we can also add the aesthetic pollution (most of the car washes being only improvised constructions) and the destruction of green areas.

These facts could, at least, make the car wash owners or the rest of the citizens, who wash their cars at least once a month, to think about what are the long term consequences that this activity have on their lives.

REFERENCES

1. Negulescu M. și colab. (1987), *Epurarea apelor uzate industriale*, Vol., Edit. Tehnică, București
2. Teodorescu I., Filotti A., Chiriac V., Ceașescu V., Florescu Al. (1973), *Gospodărirea apelor*, Edit. CERES, București.
3. Normative C.90-83 concerning the conditions for the discharge of waste waters into the sewerage network of the populated cities
4. The Decree of the State Council for the establishment of the admissible limit values of the main polluting substances from the waste waters before they are being discharged. D.C.S. 414/1979
5. Directive 2000/60/EC

Riscuri și catastrofe

Victor Sorocovschi

6. Directive 76/464/EEC
7. Directive 80/68/EEC
8. Directive 91/271/EEC
9. Directive 96/61/EEC
10. Law of water no 107 from the 25th of September 1996 (updated)
11. Ordinance no 275 from the 11th of April 1997 issued by the Ministry of Waters, Forests and Environment Protection

RISCURI ȘI CATASTROFE
Vol. VIII, Nr. 6 / 2009