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WATER USAGE CHARACTERISTICS OF CAR WASH FACILITIES IN ORTAHISAR DISTRICT OF TRABZON PROVINCE

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ABSTRACT

Introduction
Water management is on top of the agenda for all countries.

Aim of the study
The aim of this study was to determine the water usage in the car wash facilities of Ortahisar district of Trabzon province, such as the features of the water used in drinking and car washing, the disposal of wastewater and case of water interruption situation in the facilities.

Material and methods
This descriptive study was conducted in Ortahisar district of Trabzon province. The study population of the research is not fully known. All the car wash facilities in the district of

Ortahisar in Trabzon province were tried to be reached. A questionnaire consisting of questions evaluating the water use characteristics of the facilities was applied to 61 (85.9%) business owners who had accepted the interview by face to face interview method.

Results
Twenty (32.8%) fuel stations and 41 (67.2%) car care facilities participated in the survey. 49 (80.3%) of the facilities were using tap water as drinking water source. 37 (60.7%) of the facilities were using tap water as car washing water source and 28 (45.9%) of them were using well water. The median monthly water consumption of facilities using only tap water for car washing was found 43 (8.6-429.8) tons. The median number of vehicles washed per day was 16.5 (4-100). 4 of the facilities (6.6%) discharged waste water to sewerage without treatment.

Conclusions
Car washing causes considerable amount of water usage which is prominently drinking water.

Key words: Car wash, water management, Trabzon, wastewater

INTRODUCTION

Water is indispenable natural resource for survival of humanity. Decreasing water resources and increasing demand by the world population has created an awareness about the water resouces in public opinion nationally and internationally. Because of that water resources management is an high priority issue for the worlds governments (1). Since our country is also facing this issue and there are over 20 million licensed cars on our streets, using our water supplies within the social ecological and economical ethics without waste carries a great importance (2-4). Because of reasons like cleanliness and aesthetic appearance, car owners like to get their cars washed and increases the car wash facilities locations. Car wash service is one of the 60 most common professions in Turkey (5). The increase in car ownership and the car wash service locations makes the water usage of these establishments a point of interest, however amount of information about this is very limited. The research being conducted as first of its kind in the Ortahisar district of Trabzon.
The aim of this study is to investigate the water usage and waste water management of these service locations as well the problems they are facing due to water shortages.

MATERIAL AND METHODS

This descriptive study was conducted between September-October 2016 in Ortahisar district of Trabzon province. The study population of the research was not fully known. All the car wash facilities in the district of Ortahisar in Trabzon province were tried to be reached. The addresses of registered companies were taken from the chambers of commerce and those who were not registered in the chambers of commerce were tried to be contacted by asking other car wash facilities in the region.
71 car wash facilities were visited in the study 10 of them did not agree to participate to the study. A questionnaire consisting of questions evaluating the water use characteristics of the facilities was applied to 61 (85.9%) business owners by taking verbal approvals who had accepted the interview by face to face interview method.
Type of facilities, water source for drinking water, source of water used for car washing business, presence of water storage for drinking and car washing, water analysis if water is used outside the municipal network system, who made the analysis, monthly average water consumption (Indicated by ton or by the responsible operators; average water consumption specified via were calculated in ton by taking into account of unit prices of used water, waste water and taxes), the average number of vehicles washed daily, the

average number of vehiles washed daily, who washed the vehicles, how long the company has been operating, information about use of water in the business (the presence of kitchen, toilet, washbasin and water leakage in facilities), the number of employees working in total and car washing business, how the wastewater was disposed of, the state of water interruption in the drinking and driving section of the facilities, the use of drinking water in the facilities and the situation of water shortages in the car wash section were asked in the questionnaire.
Descriptive statistics; number and percentage for categorical variables, median, minimum and maximum values for numerical variables.

RESULTS

61 facilities participated in the survey. 20 (32,8%) fuel stations and 41 (67,2%) car care facilities participated in the survey. 49 (80.3%) of the facilities used tap water as drinking water source and 38 (62.3%) packed water. 1 (1,6%) of the facilities had a water tank for drinking water. 33 (54.1%) of the facilities had a kitchen, 7 (60.7%) had washbasin and 53 (86.9%) had toilets in the facilities. It had been said that there are no water leaks in the toilets and faucets. The type of car wash facilities and the descriptive data related to drinking water are presented in Table 1.

Table 1. Type of car wash facilities and descriptive characteristics related to drinking water

Features	Number	%
Type of facilities (n = 61)		
Car wash at the fuel station	20	32.8
Car care facilities	41	67.2
Drinking water source* (n = 61)		
Tap water	49	80.3
Packed water	38	62.3
Dispenser size water	5	8.2
Well water	1	1.6
Folk fountain	1	1.6
Water tank availability for drinking water (n = 61)		
No	60	98.4
Yes	1	1.6
The presence of kitchen in facilities (n = 61)		
No	33	54.1
Yes	28	45.9
The presence of washbasin in facilities (n = 61)		
No	37	60.7
Yes	24	39.3

Presence of toilets at facilities (n = 61)		
No	8	13.1
Yes	53	86.9
Number of female cabins (n = 21)		
0	40	65.6
1	9	14.8
2	10	16.4
3	2	3.3
Number of male cabins (n = 53)		
0	8	13.1
1	35	57.4
2	14	23.0
3	2	3.3
More than 3	2	3.3
Number of pups (n = 17)		
0	44	72.1
1	4	6.6
2	9	14.8
3	3	4.9
More than 3	1	1.6
Water leakage from toilet reservoirs or faucets (n = 61)		
No	61	100.0

*More than one option marked

Thirtyseven (60.7%) of the facilities use tap water as vehicle washing water source and 28 (45.9%) well water. 39 (63.9%) of the facilities had water tank for car wash water. In the facilities, 29 (96.7%) of those who use water from a source other than tap water for vehicle washing had analyzed the water they use. 17 (81.0%) of the analysts were analyzed by the municipality. All of the facilities were washed by the staff, 12 (19.7%) were in facilities and the car wash is done by the customers themselves. The characteristics of water used for car washing and car wash in the facilities are presented in Table 2.

Table 2. Characteristics of water used for car washing and car wash in car wash facilities

Features	Number	%
Water source used in car washing* (n = 61)		
Tap water	37	60.7
Well water	28	45.9
Stream water	1	1.6
Spring water	1	1.6
Water tank availability for car wash water (n = 61)		
No	22	36.1
Yes	39	63.9
Water analysis in companies that use water from a water source other than the municipal network system in the car washing process (n = 30)		
No	1	3.3
Yes	29	96.7
Who made the analysis (n = 21)		
Municipality	17	81.0
Private company	3	14.3
Public Health Directorate	1	4.8
Who washed the vehicles* (n = 61)		
By staff	61	100.0
By consumer	12	19.7

* More than one option marked

The monthly water consumption of those using only tap water for car washing at the facilities was found to be 43 (8.6-429.8) tons. The number of median vehicles washed per day is 16.5 (4-100). The water tank for vehicle washing at the facilities is a median of 3 (0.75-30) tons. In the car washing process, analyzes are made every 3 (1-12) months on the basis of water analysis using water from a water source other than the network system. The total number of employees in the facilities was 4 (1-30), and the number of employees working in the car wash area was 2 (1-7). Monthly water consumption, some of the features related to the facility and car wash of the facilities are presented in Table 3.

Table 3. Monthly water consumption of car wash facilities, some features related to facility and car wash

Features		Median (Minimum-Maximum)
Monthly water consumption only for facilities using tap water for car washing (tons) (n = 28)		43 (8.6-429.8)
0-15 m^3	n (%)	4 (14.3)
16-50 m^3	n (%)	13 (46.4)
51-100 m^3	n (%)	4 (14.3)
More than 100 m^3	n (%)	7 (46.0)
Number of vehicles washed daily (n = 60)		16.5 (4-100)
The volume of the water tank for car washes (tons) (n = 30)		3 (0.75-30)
Median monthly period of water analysis in companies that use water from a water source other than the municipal network system in the car washing process (n = 29)		3 (1-12)
Total number of employees in operation (n = 60)		4 (1-30)
Number of employees working in the car wash area (n = 60)		2 (1-7)
For how many years the facilitiy has conducted this activity (n = 61)		5 (0.10-30)

Four (6.6%) of the facilities discharged wastewater to the sewer without treatment and 55 (90.2%) to the sewerage with treatment. Table 4 shows how the wastewater discharged from the facilities due to vehicle washing is disposed of.

Table 4. Types of wastewater disposal due to vehicle washing at car wash facilities

Features	Number	%
How the wastewater from the washing facilities was disposed of (n = 61)		
It goes to the sewer with treatment	55	90.2
It goes to the sewer without any treatment	4	6.6
It goes to the sea with treatment	1	1.6
It goes to the stream with treatment	1	1.6

The occurrence of water interruption in the facilities was presented in Table 5.

Table 5. Status of water interruption in car wash operations

Features	Number	%
Water shortages with drinking water in facility (n = 32)		
No	10	31.3
1-2 times a year	13	40.6
3-5 times a year	9	28.1
Water shortages in the car wash section during operation (n = 37)		
No	14	37.8
1-2 times a year	8	21.6
3-5 times a year	12	32.4
6-12 times a year	2	5.4
More than 1 per month	1	2.7

DISCUSSION

Car wash facilities constitute 67.2% of the enterprises participating in the survey we conducted in the province of Ortahisar, Trabzon province and this indicates that small-scale businesses that do car wash jobs often do not have many workers and often have little financial gain. Water resources should be managed effectively in response to today's demands and needs of future generations. The management should include the planned development, conservation, use and allocation of water sources, taking into account the environmental, social and economic factors that constitute the cornerstones of sustainable development (6). In our study, it is seen that 60.7% of the facilities use the water in the car washing process from the network system that can be drinkable.

Today, the top priority of water sources management is to answer the increasing water needs with limited water resources. Constant increase in demand for water, progressively diminishing of available resources, suitable management of water is essential for efficient use of water sources (4). The facilities using only network water in the study were asked monthly average water consumption to learn how much water they consumed. The average water consumption of the facilitiess was 43 tons. All of the participating facilities (100.0%) stated that there were no leaks from the faucets used in their facilities. This situation shows the value that facilities give to the water which is their most important resource.

There is no water tank in 36.1% of facilities for car washing. This may cause loss of business in the event of water interruptions, disruption of service and financial loses.

In all of the facilities in our work cars are washing by staff of the facilities. But in 19.7% facilities cars are also washing by customers. People who do not have enough experience in car washing can cause the use of water to increase.

6.6% of facilities were discharging waste water to sewage without any treatment. The waste water from the car wash contains harmful pollutants such as high amount of cleaning chemistry, oil hydraulic fluid, paint residues and waste metals. If these waste water not properly purificated it could lead to increase environmental pollution, inhibit microbial activity, degradation of environmental balance, contamination of ground water, destruction of earth and serial public health problems (7). Waste water can primarily be used to agricultural irrigation and park garden irrigation, industrial cooling and artificially feed

ground water (8). However, the rules, practices and strategic project implementations regulating the reuse of waste water in the municipalities in Turkey are insufficient and there are also still incomplete and inadequate plans and practices in the majority of municipalities regarding car wash, wastewater and environmental impacts (7).
68.7% of the fascilities have drinking water shortage and 62.2% have the car washing department water shortage in the last one year. Dilaver et all in their study of cafe restaurants in the same city reported that 81.3% of businesses previously had a water shortage at any time. In the same study, the average number of water cuts in that cafes and restaurants have encountered in the last year is 5.5 (9).

CONCLUSIONS

The majority of facilities (60.7%) supply the water from the network system when they wash car. The facilities which use water from the water supply network monthly water consumption median is 43 (8.6-429.8) tons. In some of the facilities (6.6%) the wastewater from the car wash is going to sewage without any purification.
In water use the quantity of water shows difference as well as quality of water. The use of potable water in the industry is controversial. As we are a country with water restrictions, alternative methods should be developed. It is necessary to record the water used by the facilities, to prevent the excess water use by the controls, to take necessary precautions to purify the waste water.

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