THE ROLE AND IMPORTANCE CAR WASHES IN POLAND

This paper provides a profiles of car washes, including their main advantages and drawbacks, and describes the technical, legal and environmental requirements relating to the operation of car washes in Poland. The paper also shows how the demand for services offered by car washes has developed over the past years. In addition, the development trends of car washes are presented.

INTRODUCTION

The annually increasing numbers of motor vehicles registered in Poland result in increased demand for motor transport facilities. Filling stations, diagnostic centres and repair shops are among the most popular automotive facilities that allow the drivers to safely use their vehicles and help extend the vehicle's service life. Apart from the technical facilities that offer various services required to maintain vehicles, car washes used to wash different types of vehicles also play an important role.

In Poland, vehicle washing services are provided by various manual and automatic car washes [4,11]. They differ in the range of offered services as well as in their equipment. The development of car washes in Poland was significantly influenced by national legislation (on maintaining cleanliness and orderliness of communes) which prohibit car washing in housing estate areas and even on private properties [10]. The rapid development of the car wash market has also been possible thanks to franchising, or the opportunity to run a business under a known brand. Franchising offers an opportunity to make profits and reduces the risk of failure of our business activity.

Another important reason for the rapid development of car washes in Poland is the aforementioned constant increase in the number of registered vehicles and the drivers' better and better manners. Cleaning a car in a car wash is cheaper, easier and, first of all, environmentally safe because the detergents and the dirt are appropriately collected and filtered, whereas disposal of detergents into sewage systems is impermissible.

1. CHARACTERISTIC OF CAR WASHES IN POLAND

Car washes are technical facilities intended for washing road transport means. The washing process and the car wash building structure and equipment must be adjusted to the dimensions of the motor vehicles handled. The range of services offered by Polish car washes continues to constantly expand. It is more and more often the case that, apart from a bodywork and chassis wash, this type of facility also offers bodywork and headlight polishing and shine polishing, engine washing and drying, waxing for paint protection, vacuuming, upholstery cleaning and washing, alloy wheel cleaning and washing, soft top cleaning and maintenance, scuff and minor paint damage repair, gasket maintenance, tyre conditioning, preparing cars for sale or even interior deodorizing. The demand for car washes in Poland is growing and although there are no current data available on the number of car washes in Poland, it is estimated that there are about 200 new facilities of this type every year, mostly near super- and hypermarkets.

The split of car washes covers two main groups: washes for passenger cars and washes for trucks and buses. Passenger car washes can be classified into manual, touchless, automatic tunnel, automatic gantry, steam and waterless car washes (table 1).

<table>
<thead>
<tr>
<th>Car washes</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual car washes</td>
<td>• offer a considerably wider range of services compared to automatic car washes; they offer vehicle exterior washing and waxing, valeting, engine cleaning, upholstery cleaning etc.,</td>
</tr>
<tr>
<td></td>
<td>• offer a more thorough and considerably paint-safer clean than other car washes do,</td>
</tr>
<tr>
<td></td>
<td>• washes of this type use a wide range of car cosmetics,</td>
</tr>
<tr>
<td></td>
<td>• the drawbacks include higher cost and longer washing time compared to other types of car wash, lower wash capacity and limited access to such washes because cars can be cleaned in manual car washes within their opening hours only.</td>
</tr>
<tr>
<td>High-pressure touchless car wash</td>
<td>• the cleaning is performed with the use of high pressure water and appropriate detergents only,</td>
</tr>
<tr>
<td></td>
<td>• a moving frame with detergent nozzles which moves along the vehicle is important equipment of this type of car wash,</td>
</tr>
<tr>
<td></td>
<td>• since such car washes are highly automated, their operation virtually requires no staff intervention,</td>
</tr>
<tr>
<td></td>
<td>• the arrangement and spray intensity of the high-pressure nozzles are controlled by sensors and by automatically controlled actuators that work following a definite programme and adjusting to the shape of the vehicle washed,</td>
</tr>
<tr>
<td></td>
<td>• the lack of direct contact between brushes or other washing elements and the car body is an essential merit of a high-pressure touchless car wash as the risk of damage to the body is eliminated.</td>
</tr>
<tr>
<td>Tunnel car washes</td>
<td>• the cleaning is performed in a specifically prepared and equipped tunnel,</td>
</tr>
<tr>
<td></td>
<td>• in this kind of car washes, the vehicle is dragged between the washing units,</td>
</tr>
<tr>
<td></td>
<td>• the main washing component is a device consisting of a few vertical brushes and a horizontal brush,</td>
</tr>
<tr>
<td></td>
<td>• an important role is also played by spoiler brushes designed for cleaning cars at the height of their threshold, and by wheel brushes,</td>
</tr>
<tr>
<td></td>
<td>• such washing tunnels also offer the possibility of installing a chassis washing stand.</td>
</tr>
<tr>
<td>Gantry car washes</td>
<td>• the cleaning is performed by a moving gantry (frame) that usually has three cleaning brushes, nozzles for application of chemicals and protective wax, plus a set of several fans,</td>
</tr>
<tr>
<td></td>
<td>• gantry car can have wheel brushes or sets of high-pressure devices for cleaning chassis with detergents containing added preservatives,</td>
</tr>
<tr>
<td></td>
<td>• such washes are characterized by high capacity and low operating costs, and can also wash vehicles 24 hours a day,</td>
</tr>
<tr>
<td></td>
<td>• the systems and devices installed in a gantry car wash adapt to the vehicle dimensions by appropriately arranging the brushes, adjusting the pressure force and task speed and order, controlling the water outflow and the nozzle air temperature, and by setting the proper dosage of detergents and preservatives,</td>
</tr>
<tr>
<td></td>
<td>• the drawback of gantry car washes is rough cleaning as the brushes cannot reach all the hollows and corners,</td>
</tr>
</tbody>
</table>
|                     | • before starting the cleaning process, it is necessary to remove aerials, windscreen wipers, racks and other exterior items.
Steam car washes

- the removal of dirt from vehicles is based on high pressure dry steam washing,
- such washing generates no waste water, saves water and is environmentally friendly,
- the steam used for washing, with humidity of ca. 5% and a temperature between 90 and 120°C is sprayed under pressure of 8–10 bars,
- the steam dissolves the dirt on the surface of the car body, even in its corners and hollows that are hard to reach,
- among the greatest advantages of this kind of car wash are: low costs of construction and subsequent operation of the facility, high washing quality, paint-safe washing, mobility, washing speed and very low water consumption,
- such car washes need no detergents,
- about 15 minutes are enough to clean a passenger car by this washing method.

Waterless car wash

- is an advanced method in car wash industry,
- it not only cleans the dirt off the car body but, first and foremost, it protects the body (for a longer time than a classical car wash does) from any dirt and the adverse impacts of the natural environment and UV radiation,
- waterless car washes always wax the cars,
- waterless washing helps save time because drivers do not need to waste it going to a stationary car wash - they can clean their car wherever it is parked,
- waterless washing is environmentally friendly because no water is consumed to wash the vehicle, instead, more effective formulations based on natural ingredients are used,
- another advantage of this type of car wash is the fact that it is safe for the car body because it does not use any aggressive chemicals or brushes.

<table>
<thead>
<tr>
<th>preference</th>
<th>manual car wash</th>
<th>automatic car wash</th>
<th>touchless car wash</th>
<th>outside car wash</th>
</tr>
</thead>
<tbody>
<tr>
<td>percentage</td>
<td>17%</td>
<td>16%</td>
<td>30%</td>
<td>37%</td>
</tr>
</tbody>
</table>

In spite of the great number of car washes in Poland, offering a variety of services, still 37% [12] of car owners do not use them, although they are required to clean their cars in designated facilities (Fig. 1). Nevertheless, the situation is projected to improve because new car washes are opened every year. This means that the interest in such services is growing, that is, more and more new clients take to the professionally equipped and prepared car washes.

![Fig. 1 Poles' preferences for choice of car wash method [12]](image)

2. SELECTED DESIGN ASSUMPTIONS FOR CAR WASHES

Car washes should be designed in accordance with applicable laws and regulations. Car wash design is a complex process dependent on a number of factors [1]. Location is a strong positive factor for car wash projects. A good location of a car wash is one that suits its potential clients. It is therefore worthwhile estimating the approximate demand for this kind of services in the area at issue. Even roughly estimated demand for car wash services allows us to forecast the time, within which the project will pay for itself. Suitable locations for planned construction of a car wash [7] are:

- situated in the neighbourhood of densely populated areas like city centres, residential blocks, areas of detached houses etc.,
- situated in the vicinity of the city’s main streets, arterial roads, intersections and roundabouts as well as of buildings frequently visited by people,
- visibility and availability, or easy vehicle access, entry and exit with a possibility of making any turn.

The choice of location is also largely subject to the master plans. Therefore, one should, in the first instance, check in the Communal Office whether the plans provide for this kind of activity for that particular plot. If so, one can request for a so called outline planning permission. It is also necessary to obtain a so called environmental permit from the Environmental Protection Department of the Municipal or the Communal Office and to obtain a permit as required by Water Law Act and a waste generation permit [8,9]. Before a car wash is opened, it must be accepted by the Fire Service. The owner must also have adequate funds for the start (in case of franchising - at least 20,000 zlotys, in case of individual entrepreneurs - from ca. 200,000 to ca. 1,500,000 zlotys depending on the type of car wash).

Like any other motor transport facility, every car wash must meet the requirements for structural and civil works (when under construction) and observe a number of guidelines related to ensuring safety to everybody who use its services. Car washes must be equipped with the following devices and systems [2,3,6]:

- suitable airing/air conditioning of the whole facility, plus suitable systems (heating system, anti-icing system, antifreeze system, electrical wiring, sewage and stormwater system),
- appropriate electrical wiring protection against external factors, appropriate lighting and discharge pipes,
- watertight roof covering with a compact structure allowing for the minimal heights,
- indispensable fire-fighting equipment and an adequate number of medicine cabinets,
- appropriate signs (also on devices posing a risk to life or health),
- rules and instructions for the use of the devices,
- parking space for vehicles waiting for the service.

3. ECOLOGICAL REQUIREMENTS FOR CAR WASHES

Environmental protection is an important factor that should be taken into account as early as in the car wash design stage. In order to obtain the environmental permit that is required when planning construction of a car wash, the project owner should apply for it in the Communal Office. The application should provide a description of the project, the power and water supply sources, the sewage discharge system and the location of the facility in relation to the access road. In the next step, the project owner is required to obtain a decision stating that the construction and operation of the car wash will not cause any environmental threats and will not disturb the community. These measures are necessary in order to prevent car washes or other automotive facilities from interfering with the landscape values, generating bad odours or excessive noise [9].

In order to reduce the negative impact of the car wash’s operation on the environment, systems powered by renewable energy sources (sun, wind or water) should be used wherever possible. In the construction stage, appropriate (also in terms of ecology) construction materials should be used. The method of heating water, e.g. with the use of a hot water boiler, also matters in the car wash’s operation. The boiler’s thermal efficiency should be the best possible with the lowest possible fuel consumption. It is recommended to
use a system combining a classical fossil fuel boiler with a renewable energy source, e.g., the most commonly used solar energy collectors that significantly reduce heating cost and contribute to the environmental protection. The purpose of the collectors is to utilize sunrays to generate thermal energy that is then transmitted through a closed solar liquid cycle to the process water tank (Fig. 2).

An important pro-ecological measure taken by car washes is the reduction of water and chemical agent consumption for the car washing purposes. The right move should include construction of a waste-water treatment system by the car wash to ensure that the applicable standards for the use of the public or industrial sewage system are met. It is essential to install separators or sewage tanks if there is no access to the sewage system, and to appropriately prepare the base in order to protect soil from contamination [4]. Figure 3 shows the washing stand paving with visible drainage grates that are connected to designated drains. Thanks to this solution, the waste water gets to the waste-water treatment system, thus protecting the environment.

4. REQUIREMENTS FOR EQUIPMENT IN CAR WASH

Car wash equipment is very important as it has a fundamental influence on the quality of the services offered. In self-service car washes, there is a centrally situated container containing process equipment (Fig. 4). Each stand has its own pump system integrated into a number of electric valves that are responsible for the execution of the particular washing programmes at the washing stand. An economical furnace is necessary to ensure hot water and supply it to the pumps. During winters, the furnace will not allow the washing stand paving to freeze. The detergent feeder structure ensures that there is always a fixed amount of washing powder dissolved in water because the chemical agent proportioning takes places only when water is supplied to the mixing tank. The water filtration system consists of between ten and twenty filters that are installed under the key car wash devices and their purpose is to protect the components from damage.

Among the many devices enabling a car wash there are so called wash pipes (Fig. 5). They may be straight, curved, with different lengths, even telescopic, made of stainless steel or galvanised. They find application both in passenger cars washes and truck washes and are used to clean chassis and to apply active foam and wax. Other devices used in car washes are water spray nozzles. The nozzles, just as wash pipes, come in different sizes and variants, according to their functions. There are flat nozzles with ceramic insert for brush-based car washes, rotating nozzles with the washing effect enhanced by 40% compared to other nozzles, nozzles with variable angle spray patterns and steam cleaning nozzles. There are also a wide range of spray-guns (Fig. 6) and varying types of brushes in car washes. Spray-guns are used in hot and cold water high-pressure car washes. Whereas, brushes are chiefly used to clean painted surfaces. LED fluorescent lamps make up a good lighting solution for car washes as they assure very low energy costs. Installed on the car wash frame, they ensure good visibility under all conditions. With this type of lighting, the car wash can work 24 hours a day.

CONCLUSIONS

There is increasing demand for car washes in Poland, with the increase predominantly due to the growing number of registered vehicles. There were nearly 5,000,000 passenger cars in 1989, whereas there are more than 19,000,000 now. The rising popularity of car washes is also due to the legislation requiring car users to wash their cars in designated automotive facilities [5,10]. The number of car washes in Poland continues to increase; it is estimated that there are currently ca. 5,000 various type car washes and several dozen new car washes start operating every year because there is still place for them on the market. There are many arguments in favour of investing in this kind of business activity, like, for example, the ever growing demand for car washing services, the possibility of expanding the range of services and the high mark-up on the washing services that translates into high profitability of the
whole undertaking. Moreover, the clients pay for the services on the spot. In many types of car wash there is no need to employ staff, so the owner does not need to incur staff-related costs. Under favourable circumstances, such an investment may pay for itself as quickly as within a year from the opening. Another advantage of a car wash project is the fact that no multimillion outlays are required. The project owner can apply for European funding support for his or her investment or can equip the car wash by leasing machines and devices. Such a project contributes to the environmental protection because the water used for washing is in great part regained and reused. Car washes also enable the application of innovative technologies in the utilization of renewable energy sources, that is solar collectors, heat pumps, rain water etc.

In spite of possible saturation of the market with car wash in cities, new facilities of this type are projected to appear in smaller and smaller towns, near super- and hypermarkets. The reason for this demand is also the fact that a professional car wash in a community raises the social norms with regard to maintaining vehicle cleanliness and gives no rise to washing cars in casual places. Every client can find a service that will suit his or her preferences because the car washes operating in Poland offer a varying range of services, different prices and different washing times.

REFERENCES
7. Rozporządzeniem Ministra Infrastruktury z dnia 12 kwietnia 2002r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie.
8. Ustawy Prawo wodne z dnia 18 lipca 2001 r. (Dz. U. z 2012 r. poz. 145, z późn. zm.)
9. Rozporządzenia Rady Ministrów z dnia 9 listopada 2004 r. w sprawie określenie rodzajów przedsięwzięć mogących znacząco oddziaływać na środowisko oraz szczegółowych uwarunkowań związanych z kwalifikowaniem przedsięwzięcia do sporządzenia raportu oddziaływania na środowisko i ostatnią zmianą z 21 sierpnia 2007 r.
10. Ustawa z 13 września 1996 r. o utrzymaniu czystości i porządku w gminach (Dz.U. z 2012 r. poz. 391, 951, z późn. zm).
11. Tygodnik Auto Świat, Nr 33/2012, p. 16.
12. Strony internetowe dotyczące myjni samochodowych.