Settlement of post accident reapir costs – wrapped zone and rent a car

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Abstract. Increasingly, with the purchase of a new vehicle, users want to protect their vehicle from exploitation, but also use it to advertise their activities. While the application of the foil on a new vehicle after factory painting is much simpler, a bigger problem occurs in the event of a loss due to third party liability of the perpetrator. In relation to such a vehicle, the cost of settling the repair is much higher than in the case of an unsealed vehicle. It is related, inter alia, with the costs of renting a replacement vehicle. The period between varnishing and the possibility of re-application of the foil may constitute a significant part of the total lease. The article presents the issues related to the settlement of rental costs in relation to a wrapped vehicle after damage.

1 Introduction

Along with the increase in the number of vehicles on the roads, the risk of a road accident (accident, collision) increases. Every year the lives of approximately 1.3 million people are cut short as a result of a road traffic crash [12] and that accidents, collisions are damage world economy in a year approximately 518 Billion US Dollars [12,13] . According to the data of the Road Traffic Office of the Police Headquarters, in 2020 there were 23,540 road accidents and 382,046 collisions, while the number of claims processed was estimated at about PLN 14.5 billion because many road incidents in which damage to vehicles are classified as "insignificant" the participants' declaration is written down. The occurrence of this type of experience has a direct impact on the behavior of those involved in the incident, therefore, in order to restore the vehicle, they return the vehicle to specialized facilities. In connection with the commissioning of repair to a given entity, the principal (the aggrieved party) expects the appropriate technology, appropriate means used for it, and assigns full service of the damage to the contractor [14,15,16].

In recent years, you can notice the development of the auto-detailing industry in terms of securing the vehicle to operating conditions or the decorative one that affects the visual aspect of the entire vehicle with decorative foil[9,10]. Another possibility to use this type

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of practice is to use the surface of the car to advertise your services and increase your customer base. This form of mobile billboard advertising is also said to generate 2.5 times more attention than a static billboard [8].

The use of these types of additives is much easier in relation to the application for a new factory painted vehicle and the time it takes to get to the dealer. With car vehicle wraps, the original paintwork has the opportunity to remain free from chips, scratches and other such minor damage [6]. A much greater challenge for the service is the settlement of the costs of repairing this type of vehicle in the event of a communication damage, e.g., with the liability of the perpetrator and its entire settlement.

The article presents the main types of varnishing of vehicle elements, types of foil and an exemplary analysis of the costs of renting a replacement vehicle depending on the possibility of applying the foil after varnishing.

Fig.1. Example car used wrapped zone with change color vehicle.

2 Model of the Method

The general method for the publication is on experimental studies method. In the method we use in the study, there are some parameters which we collect from our data to help to compare with the other repair treatments to understand the expenses of repairs, how long does it take or according to parameters what kind of need you will be in e.g., replacement car, which will cost extra money.

Main issue that article interests with the help to determine correct time of application to compare with the insurance company's calculations. With the method that used in this article will help to see what kind of difference there are with theorical calculations and real time differences with repairing the vehicle for replacement cars.

For this study we use cost program Autodex to get the data to make calculations and comparisons of our parameters.

The main reason that we use this method in the article, help to obtain real repair time. After the calculation we be able to compare those parameters with other. For the repair applies there are some important things to be able [18-21].

3 Case of study – type paint and wrap (foils)

To be able to re-apply the dismantled foil, the surface of the element must meet the following requirements: it must be free of dust, grease and other contaminants that could adversely affect the adhesion of the product. Freshly varnished or painted surfaces should be left to dry for a minimum of 3 weeks, and in the case of car paints, even for 3 months. The applicability of selected varnishes or paints with self-adhesive foil should be checked

before the final application of the foil. Before sticking the foil, check whether there are any chemical reactions between the foil and the substrate [1].

3.1 Varnishing the new part

The method used for new elements that have been qualified for replacement in the repair cost estimate. Varnish is traditionally a combination of a drying oil, a resin, and a thinner or solvent [7,17]. Classified as varnishing without the use of putty / filler. On the other hand, among manufacturers, e.g., Japanese elements require priming.

Fig.2. Example part to change and collect new par.

3.2 Repair varnishing

The car varnish not only adds saturation and perfection to the body surface, but also protects it from corrosion and minor damages, prevents premature fading of the paint and prolongs its use [11].With this method of completing fillers,putties and primers. The elements in this treatment of the varnisher takes time. In addition, among this method can distinguish 2 types:

- with the use of up to 50% of the putty surface,
- with over 50% of the surface of the putty,

Fig.3. Example repair varnishing with the use up to 50% of the putty Surface.

Fig.4. Example varnishing element with over 50% of the surface of the putty.

3.3 Varnishing outer

It is used to obtain an optical effect in relation to the neighboring elements whose surfaces are transparent**.** The correct technology of shading in the service is sanding a given element (e.g. with 1200 grit sandpaper) wet and painting it partially with a base varnish, and then with a colorless varnish. It is worth noting that the 2nd degree of varnishing is often mistakenly used by insurance companies to repair, e.g. scratches [3].

Fig.5. Example varnishing outer – door to repair fender.

3.4 Types of foils

The method used during varnishing is one thing, while the type of foil used is another important thing. Commonly used can be distinguished [22,25]:

- **Monomeric** — used primarily for short-term advertising, suitable primarily for flat surfaces

Fig.6. Car wrapped foils monomeric

- **Polymer** — it is characterized by greater flexibility and durability compared to monomeric films, but also dedicated to advertising,

Fig.7. Example used foils polymer.

- **Poured** — used to change the colors of vehicles, the possibility of sticking "round" surfaces. [2]

Fig. 8. Example used foils poured used to change the color.

4. Research objects and parametrs reapir

Research object was Skoda Superb in pearl color when the varnish (AZT) parameter was used in cost support program – Audatex. The basis for the calculations was the left front fender.

R O B O C I Z N A	BAZA CZASOWA	10 JC = 1 RBG				
RAZEM KL 2	37 JC	X	120.00	PLN/RBG	444.00	
RAZEM KL 3	9 JC	X	120.00	PLN/RBG	108.00	
RAZEM ROBOCIZNA	.....					552.00
K O S Z T Y D O D A T K O W E						
KONS. PROFILI ZAMKN						
TOTAL CL 3	3 JC	X	120.00	PLN/RBG	36.00	
RAZEM KOSZTY DODATKOWE	.....					36.00
L A K I E R O W A N I E						
KOSZTY ROBOCIZNY					624.00	
KOSZTY MATERIAŁU					788.19	
RAZEM LAKIEROWANIE	.....					1 412.19
C Z Ę Ś C I Z A M I E N N E					1 080.49	
NORMALIA (2.0%)					21.61	
RAZEM CZĘŚCI ZAMIENNE	.....					1 102.10
K O S Z T Y N A P R A W Y BEZ VAT	.....					3 102.29
VAT 23.00 %						713.53
K O S Z T Y N A P R A W Y Z VAT	.....					3 815.82

Fig.9. Calculation summary page when changed the front left fender [4].

R O B O C I Z N A	BAZA CZASOWA	10 JC = 1 RBG				
RAZEM KL 2	19 JC	X	120.00	PLN/RBG	228.00	
RAZEM KL 3	6 JC	X	120.00	PLN/RBG	72.00	
RAZEM ROBOCIZNA	.....					300.00
K O S Z T Y D O D A T K O W E						
KONS. PROFILI ZAMKN						
TOTAL CL 3	3 JC	X	120.00	PLN/RBG	36.00	
RAZEM KOSZTY DODATKOWE	.....					36.00
L A K I E R O W A N I E						
KOSZTY ROBOCIZNY					384.00	
KOSZTY MATERIAŁU					259.67	
RAZEM LAKIEROWANIE	.....					643.67
K O S Z T Y N A P R A W Y BEZ VAT	.....					979.67
VAT 23.00 %						225.32
K O S Z T Y N A P R A W Y Z VAT	.....					1 204.99

Fig.10. Calculation summary page when used repair varnishing up to 50 % of the putty surface [4].

R O B O C I Z N A	BAZA CZASOWA	10 JC = 1 RBG				
RAZEM KL 2	37 JC	X	120.00	PLN/RBG	444.00	
RAZEM KL 3	26 JC	X	120.00	PLN/RBG	312.00	
RAZEM ROBOCIZNA	.....					756.00
K O S Z T Y D O D A T K O W E						
KONS. PROFILI ZAMKN						
TOTAL CL 3	3 JC	X	120.00	PLN/RBG	36.00	
RAZEM KOSZTY DODATKOWE	.....					36.00
L A K I E R O W A N I E						
KOSZTY ROBOCIZNY					696.00	
KOSZTY MATERIAŁU					736.56	
RAZEM LAKIEROWANIE	.....					1 432.56
K O S Z T Y N A P R A W Y BEZ VAT	.....					2 224.56
VAT 23.00 %						511.65
K O S Z T Y N A P R A W Y Z VAT	.....					2 736.21

Fig.11. Calculation summary page when used repair varnishing over 50 % and outer [4].

5. Analysis time repair

The table below shows the calculation of the actual vehicle repair time, including the minimum time necessary to re-apply the decorative foil. Many times, for the calculation of the full rental period, the technological repair time (TRT) is incorrectly replaced instead of the actual repair time (ART). Object is Skoda Superb wrapped foil Oracal Seria 970 Premium.

Table 1. Time impact of the scope of repair.

Time / Job	TRT	ART	Break Time	Wrapp Time	Ready Car	All Time (TRT)	All Time (ART)
Change Fender	10,1 h 1,8 days	3 days	3 week 21 days	1 days	After 3 days	5,8 ~ 6 days	28 days
Varnishing < 50 % Fender	6 h 1,1 days	3 days	3 week 21 days	1 days	After 3 days	5,1 ~ 5 days	28 days
Reapir & Varnishing > 50 % Fender	12,4 h 2,2 days	4 days	3 week 21 days	1 days	After 3 days	6,2 ~ 6 days	29 days

The table above shows the dependence of the calculations between the repair time and the qualification related to work in the field of repair (painting). Many times in practice, when referring to the rental of a replacement vehicle, only adopt Technology Repair Time companies adopt it resulting from a calculation that has no reference to the real one. Despite the fact that the service completes the main work, the vehicle is not ready to apply the foil due to the need to end chemical reactions in the paint material. The time when the vehicle is not used is from 3 weeks to 3 months according to the data of the foil manufacturer [1]. Such large discrepancies in repair time have a significant impact on the overall costs because the cost of the replacement car should be accounted for from the Actual Repair Time - including the exclusion of the vehicle, which must wait for a sticker, but cannot be used. Below are the costs of renting a replacement vehicle depending on TRT and ART. The rate of 135 PLN per day [5].

Table 2. Example cost rent a car in TRT or ART (change fender).

Time	Cost [PLN]
All Time Technology Repair Time	810
All Time Actual Repair Time	3780

The above clearly indicates the differences between the correct calculation of the costs of a replacement vehicle and the (wrongly) practiced during the calculations considered by insurance companies. Failure to adhere to the actual repair times leads to unnecessary litigation, which results in additional expenses charged on the total repair costs.

6. Conclusion

Among the claims settled, it is possible to see more and more vehicles with the aspect of wrapping (for decorative purposes, company advertising). A significant calculation of the cost of the entire repair is not only the main scope, but also related costs, e.g. those that may result from the need to rent a replacement vehicle. When calculating these costs, the actual repair time should be taken into account, which is the only reflection of a properly performed repair in terms of the recommendations of the vehicle manufacturer, the importer of paint materials and the film manufacturer. In order to have a more precise time between the end of painting and the possibility of applying the foil, it is necessary to conduct research on the relationship between these aspects. In the available cards, the technical producers of films indicate a significant discrepancy from 3 weeks to 3 months. The issues presented by the author draws attention to the necessary research in the field of the impact of the foil on the varnish coating in order to determine the correct time of application of the foil depending on the type of varnishing and foil used.

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