

RECONDITIONING OF HISTORIC VEHICLES

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ABSTRACT: The restoration of classical cars consists of bringing the car to its original technical and aesthetical state, as it was designed by the manufacturer.

The first part of the paper presents a particular case, the Trabant 6001 car, which was entirely restored by me as part of an ongoing project, and a Dacia 1300 which is scheduled to be reconditioned.

The second part of the paper presents the engine ensemble and the operating principles of the two cars mentioned above.

KEYWORDS: historic vehicles, engine, transmission, brakes, suspension.

1. Introduction

The reconditioning of a Trabant 601 and that of a Dacia 1300 have many similarities in terms of the process itself. First of all, both vehicles were manufactured in the same period and similar technologies were used in building them. The first step in the reconditioning process of both the Dacia 1300 and the Trabant 601 is assessing the condition of the vehicle and identifying the parts that need to be replaced or repaired. It is important to check the engine, transmission, brakes and suspensions, as these are crucial elements for the safety of the vehicle.

2. Current stage

The entire reconditioning process began in 2019 and it started with a video clip I saw on youtube. I liked the car so I started searching for one that I could restore. Once I purchased the car (figure 1), I began working on it, putting in a lot of passion.



Fig. 1. Trabant 601

The most difficult aspect of the restoration process was to find original parts. Other than that, the mechanical and electrical repairs, the work on the mechanical and electrical issues, as well as the transmission were all done by me [1].

3. Reconditioning of Trabant 601

Trabant 601 is a very attractive car, with a distinguished design that makes it easily recognized. Additionally, for many people this car model evokes an important period of the history of the Democratic Republic of Germany and is has a significant cultural value.



Fig. 2. Trabant 601 before reconditioning



Fig. 3. Faulty engine

After approximately one year and a half of working on it, the car came to look exactly as I wanted (fig. 4).

The Trabant 601 has an Otto engine operating as a two-stroke cycle, which means that the whole sequence of events, intake, compression, power and exhaust are completed in two strokes of the piston. The engine has two cylinders, the cylinder bore is 72 mm, the piston path is 73 mm, the stroke capacity of 594,5 cm^3 , compression of 7,6 and the maximum engine output of 19,1 KW (26HP) at 4200 rot/min [2].

During the intake cycle, the mixture of fuel and air is introduced into the chamber through the admission port, while the piston moves from the upper dead center to the lower dead center. In the Trabant 601 engine, the admission is enabled by means of a system of rotating slide dampers placed on the clutch, which controls the flow of fuel and air.



Fig. 4. Trabant 601 after reconditioning

In the compression and blow-out cycle, the piston moves again from the lower dead center to the upper dead center, thus compressing the mixture of fuel and air into a small compression chamber. During this process the spark generated by the ignition system ignites the mixture causing a blow-out that pushes the piston downwards. During the blow-out cycle, the mixture of burnt fuel and air burns and an exhaust gas is released. This exhaust gas is eliminated through an evacuation system which directs the exhaust gas through a rotating valve chamber and an exhaust system.

In the evacuation cycle, the exhaust gas is eliminated from the chamber through the exhaust port while the piston travels from the upper dead center to the lower dead center. In the case of the Trabant 601 engine, the evacuation is enabled by means of a rotating valve system which controls the flow of the exhaust gas. Following the evacuation cycle, the admission cycle is resumed, bringing the mixture of fuel and air into the chamber for a new compression and blow-out cycle.



Fig. 5. The interior of the car



Fig. 6. The engine

Generally, the two-stroke engine is well-known for its force and power, but also for its highly polluting emissions. It was replaced by the four-stroke engine which is more efficient in terms of fuel consumption and which has lower levels of polluting emissions. The Dacia 1300 is equipped with a four-stroke engine which is superior in terms of technical performance.

4. Reconditioning of Dacia 1300

Born and raised with a Dacia on my threshold, like any Romanian, I chose to restore a Dacia 1300 manufactured in 1974. I began the restoration process on April 25th, 2023 and hope to finish it this summer.



Fig. 7. Dacia 1300

The car was developed on the basis of a Renault 12 model and was manufactured under license by Dacia. It was a very popular car in Romania as well as in other East European countries, being known for its reliability and accessible price.

The Dacia 1300 engine is an internal combustion engine, with four in-line cylinders and an engine displacement of 1.3 liters. The operating principle of this engine is a classical one, based on the Otto cycle. The cylinder bore is 73 mm, the piston path of 77 mm, stroke capacity of 1289 cm^3 and maximum engine output of 54 HP at 5250 rot/min [3].

Reconditioning of historic vehicles

In the *admission phase*, during the piston's first travel, the admission intake valve opens, allowing the mixture of air and fuel to enter the cylinder. This mixture is done in a carburettor which adjusts the quantity of fuel as needed. In the *compression phase* the piston moves back, compressing the mixture of air and fuel in the cylinder, while the intake valve shuts. In the *blow-up phase*, when compression reaches maximum point, a spark from the plug ignites the mixture of air and fuel, generating a controlled blow-out which pushes the piston upwards. During the *evacuation phase*, the piston moves backwards and pushes the combusted gases towards the evacuation gallery. This cycle repeats continuously, generating the necessary output to make the car move.



Fig. 8. Purchase Dacia 1300

The Dacia 1300 engine is an internal combustion engine with spark ignition and therefore can produce a maximum output of 54 HP and a maximum torque of approximately 93 Nm at a rotational speed of 3000 rotations per minute.

5. Conclusions

The most difficult process in restoring the Trabant was finding the spare parts and among these the hardest to find were the parts for the engine and for the brake system. However I eventually managed to find all the parts which were new and came from old stocks. Currently I have a stock of parts that will allow me to restore one more Trabant. What I like is go out in the car on the road and people greet me in traffic and wave at me or take photos - I feel my work is rewarded.

I intend to complete the Dacia 1300 this year and in 2024 to take part in the Sinaia elegance contest with both cars.

6. Reference

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