Universidade do Minho

Escola de Engenharia

Progress Report 1

Teacher: Alexandre Silva

Group nº 3 – UC Projeto Aeroespacial

Ana Ribeiro – PG51668
André Costa – PG52563
Hugo Novais – PG53860
Rodrigo Cruz – PG52567

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1 Introduction

During the past couple weeks, our team dedicated time to cleaning all the components of our engine, focusing particularly on the removal of oil residues. This cleaning process ensured the removal of accumulated oil and allowed us to conduct a detailed assessment of each part's condition.

Simultaneously, we created an inventory cataloging every component, recording its current state. Through this process, we were able to identify which parts are still in prime condition and suitable for continued use and components showing signs of deterioration or mechanical stress, indicating the need for timely replacement to prevent potential breakdowns or performance issues.

Overall, this approach to engine maintenance has empowered us with a clear understanding of our equipment's condition, allowing us to make informed decisions regarding necessary repairs and replacements.

2 System description

Our engine consists of 38 parts divided into 28 categories, which can be seen in our inventory. During the cataloging of the engine components, we noticed that the parts needed deep cleaning.

Nonetheless, we noticed that the ball bearings were heavily worn out and would most likely need replacing. Additionally, the piston, cylinder and connection rod were not functioning as expected, so we would probably need to replace them as well.

Number	Description	Ref.	Quantity	Status
1	PROP NUT	NA001	1	USABLE
2	PROP WASHER	HW008	1	USABLE
3	PROP DRIVE	DG4612	1	USABLE
4	TAPER DRIVE WASHER	DC4611	1	USABLE
5	BALL BEARING S	B006	1	REPLACE
6	CARB RETAINING BOLT	SP2110	1	USABLE
7	CRANKCASE	CK4607	1	USABLE
8	BALL BEARING L	B007A	1	REPLACE
9	CRANKSHAFT	CS4608	1	USABLE
10	GASKET SET	L001	1	USABLE
11	BACKPLATE	RB4609	1	USABLE
12	SCREWS S	S017	4	USABLE
13	CONNECTING ROD	CR4606	1	REPLACE
14	PISTON/CYLINDER	CP4604/5	1	REPLACE
15	PIN ASSEMBLY	P006	1	REPLACE
16	GASKET SET 2	HW4603	1	USABLE
17	CYLINDER HEAD	CH4601	1	USABLE
18	SCREWS L	S001T	6	USABLE
19	GASKET SET 3	HW004	1	USABLE
20	SCREWS L 2	S018	2	USABLE
21	GASKET SET 4	HW010	2	USABLE
22	SILENCER	MF003A	1	USABLE
23	MAIN NEEDLE VALVE	MN4626	1	USABLE
24	GASKET SET 5	HW007	1	USABLE
25	POPPET VALVE	MNP002	1	USABLE
26	GASKET SET 6	HW010	1	USABLE
27	FUEL NIPPLE	OS2124A	1	USABLE
28	CARBURATOR	CM4613-1	1	USABLE

3 List of requirements and restrictions

As part of the Hangar 9 Solo restoration project, our team takes on the mission of bringing the aircraft's engine back to life. Our focus lies in inspecting, diagnosing, and repairing the engine to its full operational capacity. This involves in-depth analysis of its current state, identifying any worn-out components, and sourcing or creating replacements to ensure optimal performance and safety.

Our main mission is to restore the RC plane "Hangar 9 Solo" to its original operational condition. This challenge not only requires the repair and replacement of damaged components but also demands a meticulous process of analysis, assembly, and testing. Additionally, we aim to demonstrate the successful flight operation of the aircraft at the end of the project, highlighting our commitment to excellence and precision at every stage of the recovery process.

During the cleaning, we realized that ball bearing S and ball bearing L [number 5 and 8] would need to be replaced, as well as the piston, cylinder, and connecting rod [number 13 and 14], due to the fact that the piston gets stuck at the top dead center, making it difficult to complete a full cycle.

The ball bearings have already been replaced, but we will have to wait for the rest of the components before we can proceed with the assembly of the engine.

4 Main Concerns

Our main concern at the moment is the piston, cylinder sleeve, and connecting rod, as these components need to be imported, which could impact on our schedule.

While speaking to an engineer in LAC last Saturday, we found out that the cylinder sleeve is conic, which means that the run-in period of the motor will not be as short as expected, that may delay some of the following tasks we expected to do after assembling and tunning the engine.

5 Progress Made

While waiting for the new parts to arrive, we modeled and 3D-printed an engine support. This will allow us to tune and test it without needing the entire structure of the airplane.