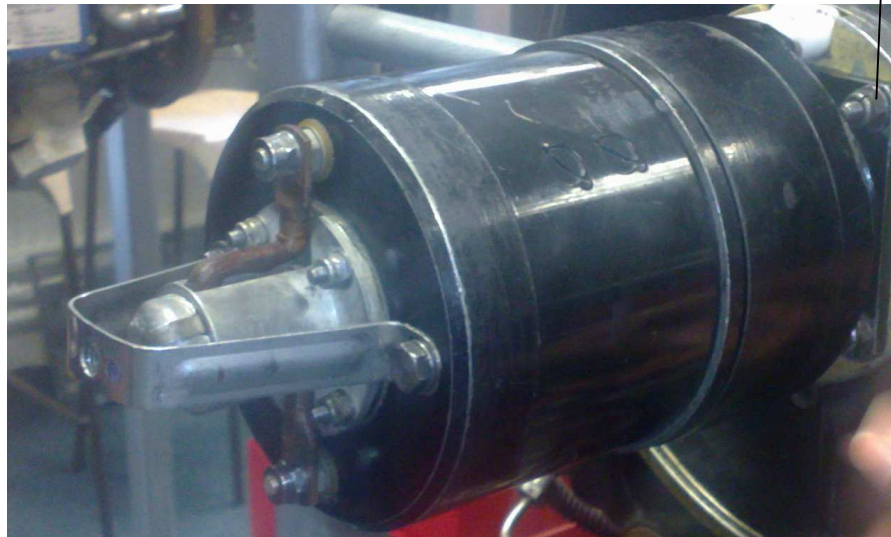


## Introduction

In this report I will be taking about the condition of the Rolls Royce helicopter jet engine starter motor and its parts for example carbon brush and its contact face, fixtures and fitting, spring tension, copper wire, commutator surface and the casing of the starter motor. The purpose of this report is to identify the faults and wear and tears inside the starter motor and to identify weather the motor is suitable for use or not because if the starter motor fails in the ram it could cause del ays and this can cause the company lots of money and to fix the starter motor it will take time so it's better to identify the faults and developing problem before something goes wrong . Also these starter motors are very important for the engines without t his starter motor it will be very difficult to start up the engine and any faults repair can cause damage to engine.

## General condition of the starter motor

### Visible signs of excess wear and tear



The condition of the starter

motor looks like it wasn't well maintained because when I took off the cover and unscrewed the Screw I show some swarf on outer thread which indicates that the screw has been over tighten or it has been subjected to lots of stress . If this is to continue the starter motor can become loose and start to vibrate and that vibration can cause damage to the engine and also the vibration can affect the centre of the starter motor which can damage the starter motor and its components. Also the screw was bend to an angle which shows that the starter motor was not fitted correctly after the last repair and this bend in the screw can push the starter motor to a side which can affect the centre of the motor and can also put more stress on the other three screws and which can cause the other screw to get damaged. If the starter motor disconnect while the helicopter flying the starter motor can be sucked in to the engine and can destroy the engine permanently and this can bring down the aircraft.

## Workshop Starter motor



When I took off the starter motor I looked at the Rotating device which connects the engine and the starter motor it looked like it was very well maintained and it looks very reliable because there wasn't any damage or wear was present in that area .

### Visible signs of over heating

When I open the starter motor there wasn't any clear signs of overheating but I spotted a burned mark on the carbon brush which suggests that the armature may have burn mark because they both contact each other at all the time . Also the excess carbon from the carbon brush was mixed with the lubricant and turned in to solid which I think is because of the heat produced in the starter motor which made it in to solid.

### Cleanliness

Inside the starter motor it wasn't clean at all because there was lots of excess carbon on surrounding components and if these carbon excess is to build up it can cause lots of friction between the brush and the armature which can create fire or it can damage the engine. Also the Dried grease inside the motor suggests that the carbon powder got mixed with the grease and became solid which can also get in to the centre of the starter motor and cause friction or can also slow down the motor.

### **The conditions of fixtures and fittings and General Condition of the brush holders:**



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The condition of the holders which is connected to the chassis of the starter motor seems secure because when I try to find any evidence of damage or loose part I didn't spot any loose parts or any small movement in the holder and the material it made of looks very strong and I didn't spot a small wear or tear on the edge of the holder, this tells me that the holder is very well maintained. But in between the brush and the holder I show some carbon excess which looks like it hasn't been cleaned or maintained properly if it were to build up it could cause the brush to get trapped inside the holder and it can stop the brush going down which can stop the power supply to the motor.

It seems like one of the brushes is not fully secure because the tension in one of the springs looks very low I think this because when I try to take out the brush I pulled the spring up and without applying the necessary force the spring came up fast which made me think is because of the low tension in the spring and also when I touch the spring it started to vibrate which also made me think is because of the low tension in the spring. But three out of four springs were very hard to lift so I came to a conclusion that one of the spring tensions was spoiled and it needs a replacement or otherwise the brush will start to vibrate or it can even lurch out of the holder and may be able to penetrate the casing.

**General conditions of brush**

Measurements of the brush height length and causes of the wear in table

| Brush        | Current length                     | Describe  | What can be done about it?   |
|--------------|------------------------------------|---|--|
| 1.RHS<br>LHS | 14mm, 25mm<br>14.5mm,<br>25mm      | RHS has been worn more than LHS so this means that brush was in a uneven position   | The brush or spring can be adjusted to make it in an even position, because the unevenness is a very small.  |
| 2.RHS<br>LHS | 13.5mm,<br>25mm<br>14.5mm,<br>25mm | RHS has worn less than LHS. The imbalance is higher in the second brush than the first.   | Change the brush because the difference in length is too high, so eventually if not changed part of the copper wire could be damaged, from friction. |
| 3.RHS<br>LHS | 14.5mm,<br>25mm<br>14.5mm,<br>25mm | By looking at the result it looks like it this brush was work as it should be.  | This brush seems to be working well because it has an even wear and it worn out less than other brushes.   |
| 4.RHS<br>LHS | 14mm, 25mm<br>14mm, 25mm           | Like I said for no. 3. There is even wear on this one. But it looks like this brush was experiencing more pressure than the no.3 brush. | May be lessening the spring tension on this brush could expand the brush life in future,   |

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None of the brush had any signs of Chipping or cracking which is a very good thing and the brushes are satisfactory but when I measure the length and the height all the brushes were different length and height which tells me that the brushes didn't wear off at same rate which could be because of the spring tension or it could be because of the gravity force acting on different angle or it could be because the spring did not applied the right pressure on the brush at right point by I mean the brush was applying pressure on a side instate of applying it on the middle of the brush. When I looked at the brush contact face I show a pattern which tells me that it had been subjected to lots of friction and also I sho w some signs of burn mark on one brush I think it's because the brush made conta ct with the armature at high pressure for too long or it could be because of the sudden contact at start up.

