

The study of functional parameter of the electric coal brushes

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Abstract – These paper present a study about the analyze of the functional parameters of the electrical coal brush. The analyze was made with an experimental device, and the results was prelucrate in MathCAD software.

Keywords: electrical coal brush, electrical brush-collector resistance

I. INTRODUCTION

A very important constructive element of the electrical machines is the electrical coal brush – colector system. The electrical, and mechanical functional parameter of this ansamble, have a large influence about the general performs of the electrical machines.

In this study are make a interconnection of the functional parameter. This parameter are the rotation moving speed, the current in the ansamble electrical coal brush – colector, the press force on the electrical coal brush, and the brush-collector resistance.

The experimental determination was made with a device consist by two parts, an mechanical parts and a electrical parts.

The mechanical parts of the divice is show in figure number 1. It was psitioned : the electrical coal-brush “P”, the electrical machine colector “IC”, presure traductore “Tp”, the pressing mechanism “SA”.

In figure number 2 it is show the electrical part of the experimental device. In this picture it is positioned the supply sistem of the electronic devide , and the direct current motor “S”, the rally electrical motor “M”, the rotation traductors “SM”, the rotation measurement device “T”, the voltmeter “V”, and the ampermeter “A”.

All system it is show in picture number 3.

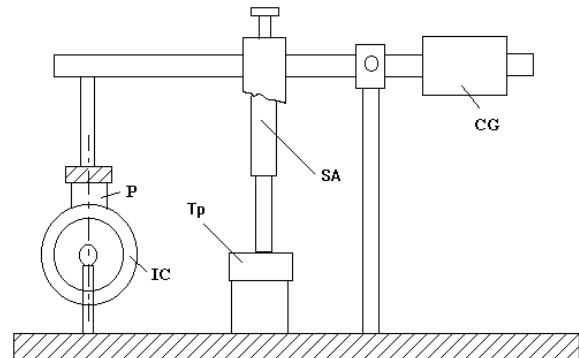


Fig.1 The mechanical part of the device

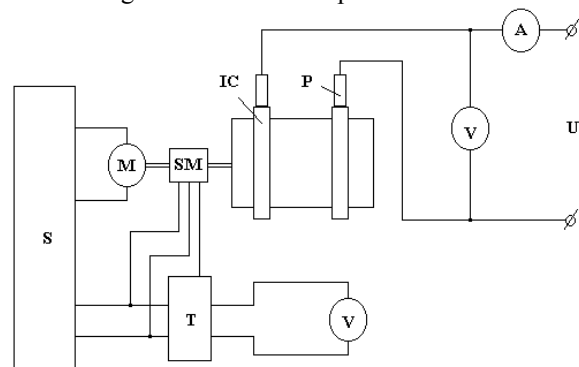


Fig.2 The electrical part of the device

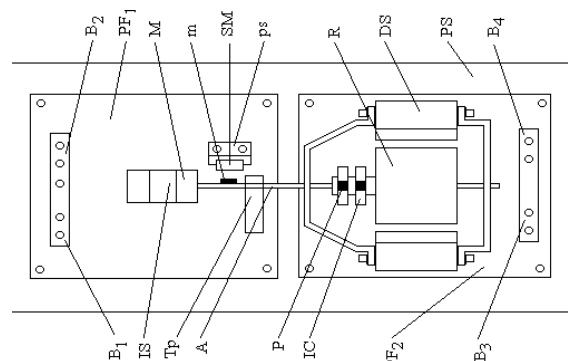


Fig.3 The experimental system

II. TEORETHICAL NOTION

The equivalent electric scheme of the ensemble of the electrical coal brush – electrical machine collector it is present in figure number 4.

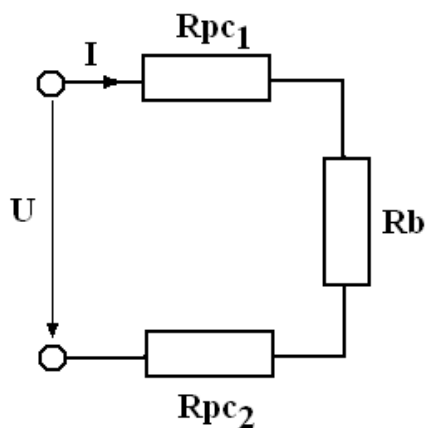


Fig. 4 The equivalent electric scheme

In this picture it was positioned the coal brush-collector electrical resistance R_{pc1} , R_{pc2} ; the electrical resistance of the coil R_b , who have 5,3 ohm value.

The measurement of the value of the current I in this electrical circuit, it was made when the supply tension is to 40Vcc. In the supposition that the value of R_{pc1} and R_{pc2} is equal it is possible to determinate the value of the electrical coal brush – collector ring resistance. The measurement it was made to three pressing force value. The results of the experimental determination it is show in the next table.

TABLE 1 Results of the experimental measurement

F [N]	n [rot/min]	I [mA]	Rpc [W]
0,656	100	20	997
0,656	200	30	664
0,656	300	30	664
1,312	100	50	397
1,312	200	40	497
1,312	300	30	664
1,312	400	20	997
1,312	500	15	1330
1,312	600	10	1997
1,576	100	50	397
1,576	200	60	330
1,576	300	40	497
1,576	400	30	664
1,576	500	20	997
1,576	600	10	1997

III. INTERPRETATION OF THE EXPERIMENTAL RESULTS

The results that was show in the table 1, it was prelucrated in MathCAD software, and it was elaborated two diagram.

The diagram $I = f(F, n)$ are shown in figure number 5.

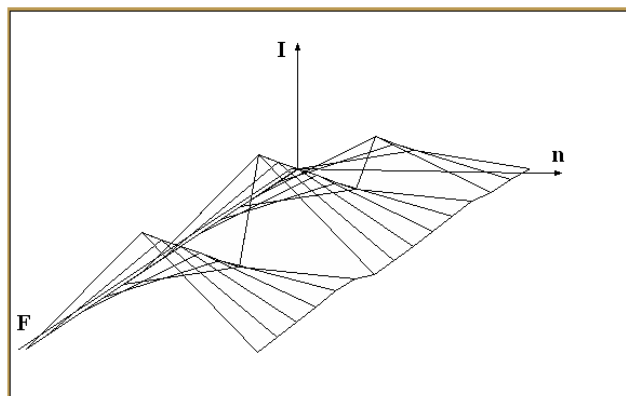


Fig.5 Diagram $I = f(F, n)$

The next diagram, shown in next figure is the diagram $R_{pc} = f(F, n)$

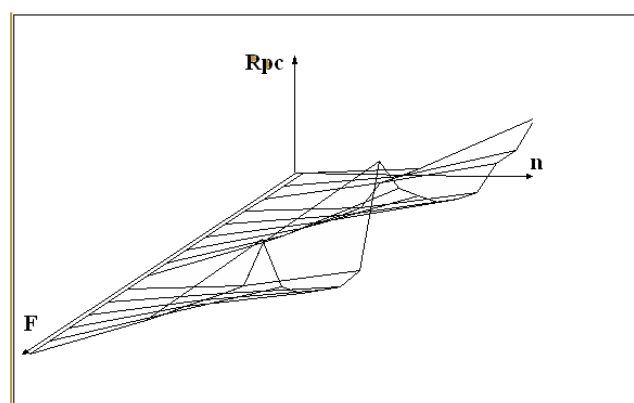


Fig.6 Diagram $R_{pc} = f(F, n)$

IV. CONCLUSIONS

From this diagram it is possible to see, that to each pressing force, it is a point were the functional parameter of the ensemble electrical coal brush - collector ring is optimal,

So that it is possible to conclusion that for each coal brush, use to one rotation speed of the electrical machine, it is necessary to have an optimal pressing force, for each supply tension.

IV. REFERENCES

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