

<sup>1</sup>Martin VYSOCKÝ, <sup>2</sup>Pavol LIPTAI, <sup>3</sup>Zuzana FARKAŠOVSKÁ

## ANALYSIS AND IDENTIFICATION OF NOISE SOURCES AND ACOUSTIC PARAMETERS OF ELECTROMOTOR

### ABSTRACT:

The electric motor is present in life very often used device, which is needed to study its terms of noise. In this article we analyze the reasons of electromotor vibration and species of electromotor noises. The electromotor noise is a admixture of different frequency and different intensity of noise. Control and detecting of main noise sources is important in term of product quality, safety and impact on human health. Designers make choices regarding structure, materials and components in a product. The tools they use should allow them to anticipate the effect of these choices on sound quality. This discussion recounts the role of psychoacoustics in product design and product acceptability and notes the results of that work in metrics for sound quality and consumer/ user perceptions about the product.

### KEYWORDS:

electromotor, acoustic quality, noise sources

### INTRODUCTION

On introduction this contributions is needed to say, what this is in fact acoustic quality of products and why it is important for presentation. Noise us round everywhere about, at home, in the streets, in work, in industries, transport etc. But a noise we can to find on appliance too, whether already is going about fridge, washing machine or mixer and when is more friendly for man, thereby we can to talk about higher acoustic quality of products. It doesn't need to be quite eliminated, even though is this most ideal solution, but be enough, as far as is possible identify and partly lower.

### ACOUSTIC QUALITY OF PRODUCTS

Designers make choices regarding structure, materials and components in a product. The tools they use should allow them to anticipate the effect of these choices on sound quality. This discussion recounts the role of psychoacoustics in product design and product acceptability and notes the results of that work in metrics for sound quality and consumer/ user perceptions about the product.[1]

Sounds of assistance can be displeased, but also can be luck to. Every engineer should be take note of product by managerial views, because analysis of acoustic signal, humane perception, design and coast-benefit analysis to general profit too are criterion for quality assurance of products. Responsibilities designer, whether manager is propose and try quality of

products, remove limitations still during testing products and take to high-class product on market. All these products are before application on market testing and feigned. Important factor for arbitration qualities of products is department psychoacoustics. Psychoacoustics is science or study that is dealt thereby, how given product perceive single man, and then centre his acoustic receptors on surroundings extraditing sound whether noise. Main aid of psychoacoustics is alternate testing, where people are asked to reception various sound, then is testing and there are additionally producing specific performance chart about sound. Industries use near for training experts a panel or "sensory profiles" (Figure 1.).[2]

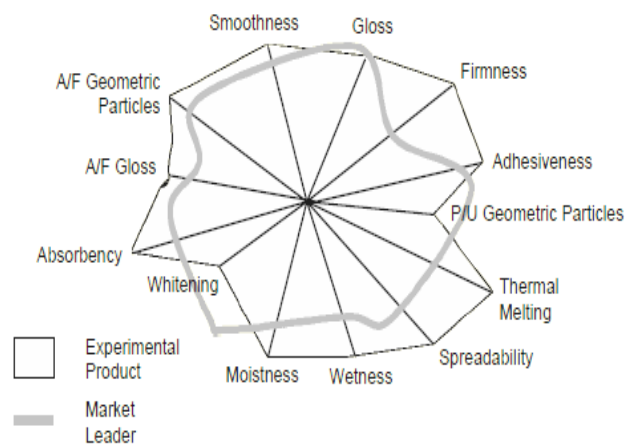


Figure 1. Sensory profiles of two skin care products [2]

### SOURCES OF NOISE ELECTROMOTOR

Electromotor we can classify as one of major source of transmission sound from appliance and it is needed more closely present of this problem. Electromotor is machine, wherein is electric energy turn on kinetic energy revolving sections of electromotor, rotor. Electromotors utilize physical phenomenon electromagnetics, but there have been motors bottom on by other electromechanical phenomenon e.g. electrostatics, piezoelectric phenomenon and below. Every electromotor is unloaded from duo basic sections - statically boot immobile sections - stator, and mobile sections (usually spinning) rotor. (Figure 2).

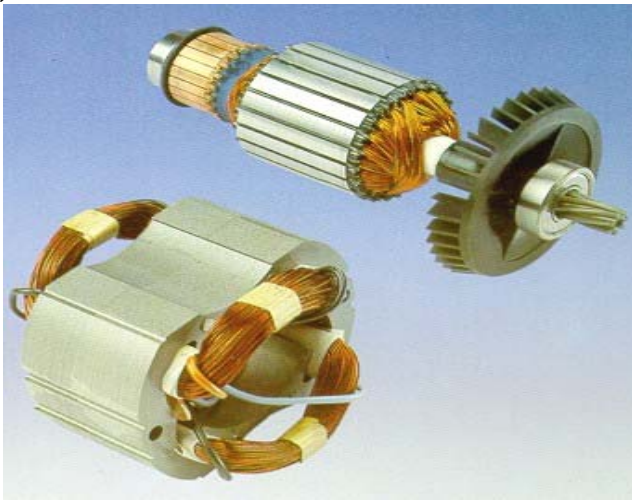


Figure 2. Electromotor of appliance

Between general sources of noise in electromotor belong:

- ❖ Unbalance of electromotor,
- ❖ Bearing of electromotor,
- ❖ Commutators,
- ❖ Aerosound (scoring on rotor).

#### a) Unbalance of electromotor

Concerning noise electromotor by his unbalance, is this narrowly linear just with vibration of rotor in electromotor, then given noise is doing single vibrations, it is unbalance rotor. We can to say, that unbalance is one from source judder.

Judder are considered as very suitable operating parameter, by that is possible assess AF - audio frequency dynamic construction sequence cases. On creation of vibration in construction sections of electromotor is sharing different sorts of source vibration, mainly recollection unbalance and further mechanical clearance of mounting, resonance of construction, abnormal wear bearing or snap small shovel rotor.

Suitable cap for creation exciting vibration in the working condition machinery is half-round placing rotor and stator of electromotor (Figure 3.). Inaccuracy production rigger ganglion (rotor - bearing - stator) and his consistent working resort influence mutual dynamic eccentricity to excitement vibration. [6].

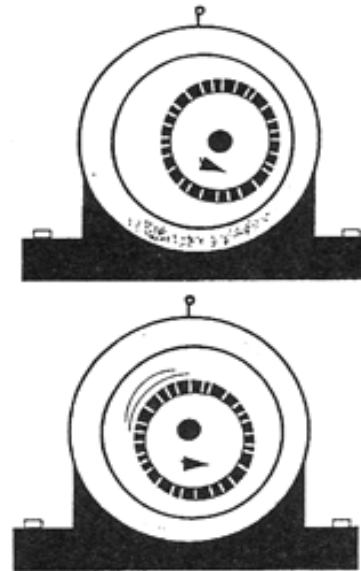


Figure 3. Drive vibrations in electromotor [6]

#### b) Bearing of electromotor

On part of electromotor in appliance are bearing, that are be instrumental to placing rotor in electromotor (Figure 4). They are next possible of cause noise of electromotor and thanks for bearing is raising life of electromotor and products or appliance too.



Figure 4. Bearing of electromotor for appliance Source: <http://www.okokchina.com>

Good and effective diagnostics is able to prevent crash and meaningly to lower repair for costs. Providing electromotor allows timely revelation "inadmissible" technical conditions bearing with exchange bearing in optimally time in several tenth euros without serious after-effects or damage prominent sections of electromotor. If electromotor isn't monitoring, is able to come about disintegration of bearing, in pursuance of st. (under working arrangements) is rotary part aggravating stator and resort to destruction winding or to deformation mechanical sections and in extremeness case to complete destruction of electromotor. [4]

#### c) Commutators

Commutators (Figure 5.) create conductive half-ring uncross isolating layer. Every commutator is connected with one end of reel and act motion of rotation included with cateterisation.

Brushes invariable one's position, and are conductivity connection with district and source. Commutator and brushes still baffle whereupon is reel turn on drowe energy. This machinery we are talking about electromotor.[5]

Good commutation lead the way assumption of correct functions commutator to dress. Below concept commutation is understand complex march in reel winding rotor, that are near turning curl grind from influence one's pole below another pole. Near this change is through the medium commutator changing direction flow in reel. Volts every commutating reel, in who is turn direction flow, arrive together toward connecting briefly over brushes and lamella of commutator. [5]



Figure 5. Commutator

d) Aerodynamic noise of electromotor

Tone noise is editing providing, when flow over blown space too. Its infliction shift of backward whirls, which are stroke on border wall and further are throwing back about additional walls. Flow further and form new maelstroms (Figure 6).

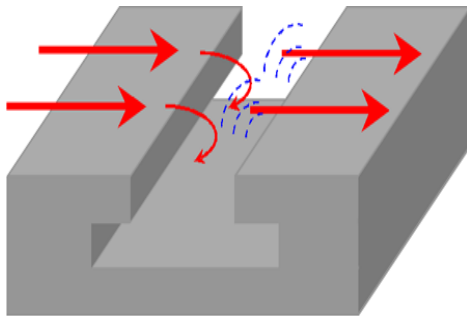


Figure 6. Flowinf of sound in hollow spaces [3]

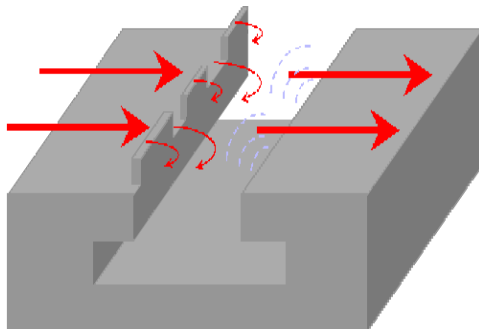


Figure 7. Measure for cut-down aerodynamic noise in hollow spaces [3]

Flowing acoustic coupling can be cut-down additional groove on front edge of sections walls (Figure 7).

As a result is turbulence with different length weight and thereby creation small constructive sound of windy. In the last analysis is concerned the same thought, in to have be near falling noise around cylindrical surface sections electromotor. [3]

**CONCLUSION**

This article apprised reader not only with acoustic quality of products and main sources of noise in electromotor for appliances too, but also abets possibilities of improvements acoustic qualities of products, then possibility noise reduction on electromotor.

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**AUTHORS & AFFILIATION**

<sup>1</sup> Martin VYSOCKÝ,

<sup>2</sup> Pavol LIPTAI,

<sup>3</sup> Zuzana FARKAŠOVSKÁ

<sup>1-3</sup> TECHNICAL UNIVERSITY IN KOŠICE, FACULTY OF MECHANICAL ENGINEERING, DEPARTMENT OF ENVIRONMENTAL STUDIES AND INFORMATION ENGINEERING, KOŠICE, SLOVAKIA



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Faculty of Engineering Hunedoara,

5, Revolutiei,

331128, Hunedoara,

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