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PROGRAMS STRUCTURE OF NOW ANALYZERS

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ABSTRACT
This study gives a model of optimization of vibrodiagnostis methods which will provide minimal combination of methods for maximal possibility of detection of dynamic disorders, with full efficiency and simplicity for use and performance. The existing systems with their content and possibilities for use were processed and here is given the optimal concept of vibrodiagnostics methods which should be the base for the program structure of new analyzer The choise of minimal combination of vibrodiagnostics format wich are going to give an optimale opportunity of detection dynamical problems is made, with complete effection of use end simplicity in using. Algoritams end programs contents with are giving un opportunity to use chosen combination of format are developed.
Keywords: vibrodiagnostics metod, vibrodiagnostics format, oprimizacion, analyzers, programs structure

1. INTRODUCTION

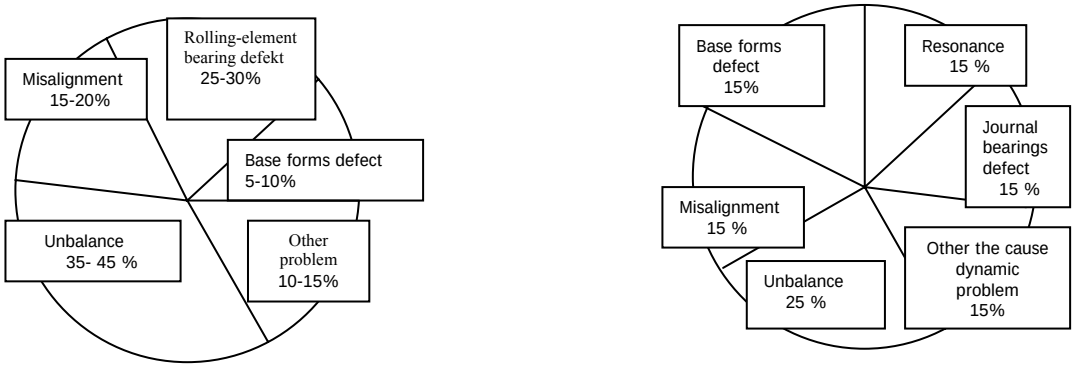
Vibration measurement and analysis have acquired special significance, because they provide a large amount of quality information with a low capital investment. Existing vibrodiagnostics metods wich are development on existing analyzers vibration of leading word companis, are researched end qualityed. Which method to choose in an individual case is determined not only by the construction of the machines to be investigated, but is mainly dependent on the expenditure commitment and the depth to which machine diagnosis will be utilized.
The function of set aim in this particular case is the selection of optimal set of formats of vibrodiagnostics that provide the maximal possibility of detection, selection and verification of dynamic problem, considering economic rationality and simplicity for use.
Beside the researches that were performed, the literature of leading world companies from this field of work is used. Here are some of them: Bruel & Kjear, Vibro; SCHENCK; Bently Nevada; SKF; SPM etc.

2. DYNAMIC PROBLEM IN MACHINES

Dynamic problem is typical for certain group of machines, depending on their power, rotation, construction, base etc. Using standard ISO 10.816 all machines are classified in 4 classes and each class of machines has its recommended and allowed level of vibration, measuring points for vibration, the way of measurement and the selection of parameters for measurement. Analyzing certain causes of dynamic problems, we can conclude that the certain causes are typical for two types of machines:
- GROUP 1
  - Machines classes I – in according ISO 10816
  - Machines classes II - in according ISO 10816

Characeristics of this group machines has owning rolling-element bearings.
- GROUP 2
  - Machines classes III - in according ISO 10816
  - Machines classes IV - in according ISO 10816

Characeristics of thise group machines has owning journal bearings
Picture 1 presents possibility of certain defect appearance in machines [2].



Picture 1. Possibility of certain defect appearance in machines Group 1 and Group 2

3. CHOSEN SET OF VIBRODIAGNOSTICS FORMAT

Vibrodiagnostics formats that are taken into consideration came from parallel analyses of appropriate equipment of leading world companies in this area and also from our long term research and development. For this selection of specific set of formats we requested minimal number of vibrodiagnostics formats which could discover the existence of certain cause for dynamic problem in machine systems [3].

Table 1. Set of vibrodiagnostics format

Set A (basic set which is a component of all other models)	**Set B**	**Set C**	**Set D**	**Set E**	**Set F**
1. Overall of vibrations 2. Frequency spectrum 3. Polar trend plot 4. Time picture of signals	1.*HFD (High Frequency detection) values*	*1. SED (Selective Envelope Detection) analysis*	*1. Bode plot* *2.Cascade spectrum plot*	*1. Smax* *2.X-Y position* *3.Orbit plot*	*1. System analysis*

4. ANALYZERS MODELS

Models of analyzers are chosen independent for two machine groups. For comparing there are some analyzers leading words company.

Table 2. Chosen models analyzers for machines Group 1

Mashines Group 1					
Type	Model I	Model II	Model III	Model IV	Model V
Composition of sets	A	A+B	A+B+C	A+B+C+E	A+B+C+E+G
Characteristic of model	Including basic set of formats. Other models including this set	Additionally including format for early detection defect of rolling-element bearing	This model has additional format for analyzing high frequency spectrum and modulation signals	This model has formats for vibration analyzing in transient	Including formats for Modal analysis.
Available equipment			**Data Collector 2526, Leonova platform**	**Microlog CMVA 60**	

Table 3. Chosen models analyzers for machines Group 2

Machines Group 2					
Type	Model I	Model VI	Model VII	Model VIII	Model IX
Composition of sets	A	A+D	A+D+E	A+D+E+F	A+C+D+E+F+G
Characteristic of model	Including basic set of formats. Other models including this set	Additionally including Bodes format for analyzing resonance processes	This model has formats for vibration analyzing in transient	Additionally including formats for dual analysis of rotors vibration	Additionally including formats for analysis spectrum of high frequency vibrations and modal analysis
Available equipment				COMPASS, M800A	VIBROPORT 41, PULSE Analyzers

4. OPTIMAL OF VIBRODIAGNOSTICS MODEL

During research, we came to conclusion that optimal model could be seen when using four valuable functions [3]:

1. Identifying the cause of dynamic problem, z=0,5
2. Simplicity for use and performance, z=0,2
3. Early detection cause of dynamic problem, z=0,2
4. Economic aspect, z=0,1

$$Values\ of\ aim\ function = \sum_{i=1}^{4} z_i * V_i \qquad (1)$$

where:
Vi – value of certain function
zi – certain level of importance

Table 4.Values of aim function for machines Gr. 1

Analyzers models	Values of aim function
Model I	**78,75**
Model II	**84,00**
Model III	**82,65**
Model IV	**79,05**
Model V	**70,45**

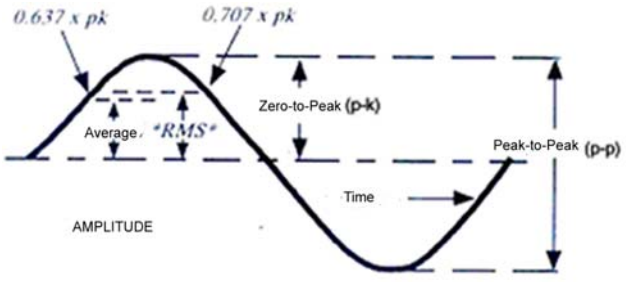
Table 5.Values of aim function for machi. Gr.2

Analyzers models	Values of aim function
Model I	**82,00**
Model VI	**80,85**
Model VII	**77,90**
Model VIII	**75,40**
Model IX	**68,42**

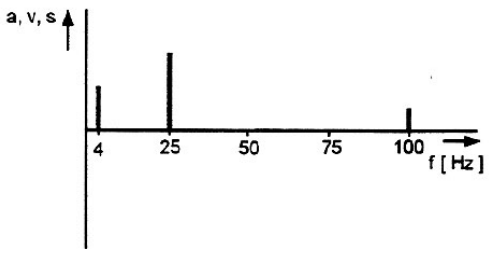
5. PROGRAMS STRUCTURE OF NOW ANALYZERS

Programs structure of now analyzers including optimal set of vibrodiagnostics formats.

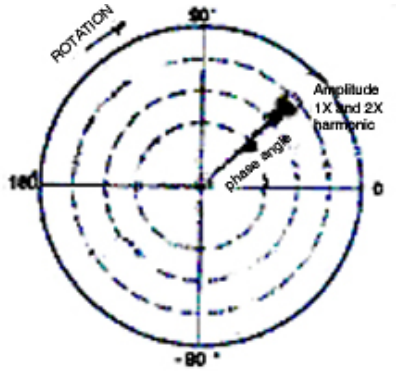
5.1. Basic vibrodiagnostics format



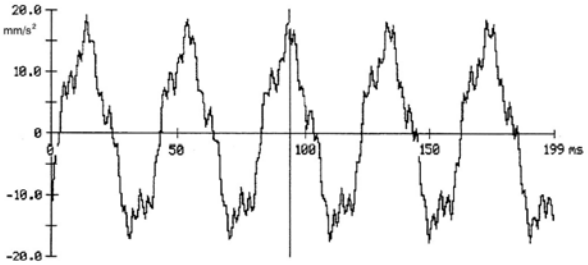
Picture 2. Overall of vibrations



Picture 3. Frequency spectrum



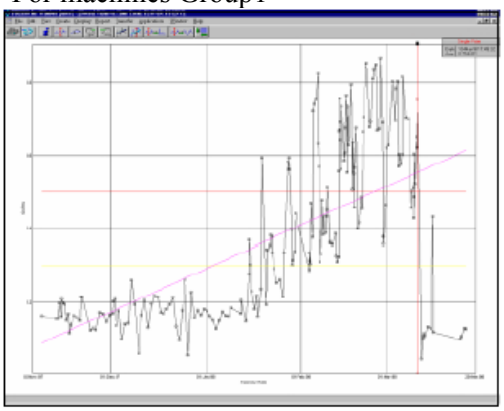
Picture 4. Polar plot



Picture 5. Time diagram of signals

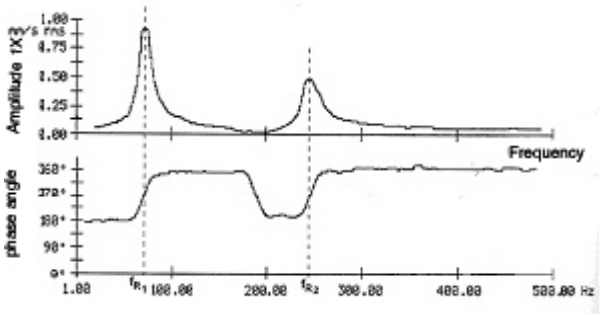
5.2. Additional formats

-For machines Group1



Picture 6. HFD values

- For machines Group 2



Picture 7. Bode plot

6. CONCLUCION

The research is based upon hypothesis that it is possible to select minimal set of measurement and analytic methods of vibrodiagnostics, which will provide maximal possibility of detection and prevention of causes in dynamic problem with complete efficiency and simplicity in use and performance.

In these paper proposed optimal model can be programs structure of new analyzers. Further optimization of chosen set could go in direction of choosing the optimal parameters for specific vibrodiagnostics formats.

7. REFERENCES

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