

Project title: Researches on the achievement of ecologic technologies based on magnetostrictively induced vibrations with a view to reduce the energy consumptions having as effect the global warming

No. of phase: 5 Software and electric equipment of magnetostrictive vibrator prototype. Information dissemination

Planned objectives:

- Design and accomplishment of the hardware structure for the prototype control
- Design and software installation for the control of the prototype
- Information dissemination

Activity description :

Activity V.1 Designing and accomplishment of the hardware structure for the prototype control

Within the framework of this activity, the variable frequency and amplitude inverter and the hardware for the prototype control, intended to supply electric energy to the magnetostrictive vibrator, was achieved.

The signal (voltage and current) shape at the power supply output is sinusoidal, with controllable frequency and amplitude.

The variable frequency and amplitude inverter consists of the following parts, constructively enclosed in only one case:

- power circuit
- control circuit
- supply circuits

The block diagram of the magnetostrictive stress relief system – experimental model consists of the following main components:

- PC-03 –Module for controlling the stress relieving process;
- Tu – voltage transducer (a.c.);
- Ti - current transducer (a.c.);
- Tv – vibration transducer (piezoelectric);
- IMB-PC/AT compatible equipment– computational equipment for user interface, carrying out the document displaying, processing, storage and issuing.

Got results: Hardware design – 1 pc.

Hardware prototype – 1 pc.

Stage of achieving the planned objective/finalization form (of the activity within the phase):

The planned objective was achieved and finalized as „Design and prototype of hardware structure”

Activity V.2 Design and installation of the control software application for the prototype

The software application related to the magnetostrictive stress relief equipment has two components:

- PC104 compatible software module

The PC104 compatible software module is implemented at the level of the equipment controlling the magnetostrictive stress relief process PC-03, with a view to measuring the

parameters which characterize the process, controlling U and F parameters in accordance with the pre-set work protocols and transferring the data to the IBM-PC/AT compatible equipment.

The PC104 compatible software module, achieved in C++, implements the functions for the acquisition of process parameters, by using the interfaces ADC 104-XA (for the acquisition of analog input quantities) and PC104-DIO&TIMER (for measuring the frequency of the voltage which supplies the magnetostrictive device)

- IBM-PC/AT (LAPTOP) compatible software module

This software module is implemented at the level of IBM-PC/AT (LAPTOP) compatible software module and carries out the user interface, communication with PC-03, with a view to acquiring the data, to displaying, storing, processing, drafting the documents and to analyzing the data.

The user interface is interactive and suggestive for the user. Information processing and displaying can be done in real time. The user interface is implemented by means of the development environment VisualC++.

The software module at the level IBM-PC/AT carries out also data transfer from PC-03; a master/slave data protocol, organized per communication packages, is implemented.

The program displays continuously the current values of the purchased analog input channels. It is offered the possibility of achieving a record of the sampled values for analog channels; these values will be stored depending on the value of the input signal frequency. The stored samples will be saved in a file which can be accessed by this program with a view to visualizing the graphs associated to these records.

Got result: - Software– 1 pc.

Stage of achieving the planned objective/finalization form (of the activity within the phase):

The planned objective was achieved and finalized as „Software application for the control of the prototype”

Activity V.3 Information dissemination

Information dissemination was achieved by means of the participation with scientific communications in:

The XIX International Conference on Electrical Machines, Rome, Italy 6-8 September, 2010, XIX ICEM, ISBN: 978-1-4244-4175-4 , Topics TPC 3 Non Conventional Machines.

“Design Aspects on the Vibration Magnetostrictive Actuators”

International conference „AEROSPATIAL 2010”, Bucharest, 20-21 October 2010, Proceedings, ISSN 2067-8622, Section 4. Materials and Structures, pp.1-6.

“Applications of the Magnetostrictive Actuators in the Aerospace Structures”

Got results : Scientific communications – 2

Stage of achieving the planned objective/finalization form (of the activity within the phase):

The planned objective was achieved and finalized as:

“Design Aspects on the Vibration Magnetostrictive Actuators”

“Applications of the Magnetostrictive Actuators in the Aerospace Structures