Visit Report

Visit start date: 19th May 2014
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Challenges:

- To create a robust and clear graphic visualization tool as a stand-alone application, which consists of several sub-challenges :
  - to create a 3D real-time animated virtual model of existing assembly used for experiments
  - effective data management and analysis utilizing the Universal File Format for portability and potential multi-purpose functionality
  - to develop an animation algorithm for parametric visualisation of analyzed phenomenon
  - to validate the current knowledge of the glass modal behaviour

Work description:

Timing of the workflow followed the original assumption with minor changes as some of the sub-problems turned out to be more complicated than originally expected. The task consecution corresponded with challenges list described above.

1. Preparation of virtual model of the assembly, its verification and import into 3D virtual space [Fig. 1].
2. Development of dynamic layer to be animated according to analysed data set representing the glass movement [Fig. 1].
3. Analysis of UFF data set and development of robust and effective data handling algorithm [Fig. 2].
4. Animation - programming of parametric animation algorithm based on real data complex values [Fig. 3].
5. Optimization of user interface, animation speed and displacement range [Fig. 3].
6. Preparation of final publishing materials.

Results:

The main goal of the project was achieved by developing the stand-alone visualisation tool. The means of modern 3D graphical presentation technologies were utilized to visualize the movement of glass under different conditions which is to be compared with future measurements and modifications.

The program allows viewing the data in adjustable 3D perspective with different scale of displacement amplification. This is very important, because the real displacement range of glass vibrations is very small and fast and thus invisible for human perception.

By utilizing the Universal File Format the portability and usability with other measurement or visualisation technologies in future is guaranteed.

The realization of presented project brought deeper understanding of technologies, effects and phenomenon connected with the research of plane modal behaviour and its application in utilizing the properties of piezoelectric materials for semi-active damping of sound and vibrations.

Future work

Specification of the next tasks:

- New measurement on optimised assembly and its comparison with old results
- The new developed visualisation tool shall be used to future modal analysis and results presentation

- Some next modification of the visualisation tool is possible, if needed, thanks to the usage of wide spread graphical technologies

Table of figures

Fig. 1:

Preparation of the model, 3D space and animated layer

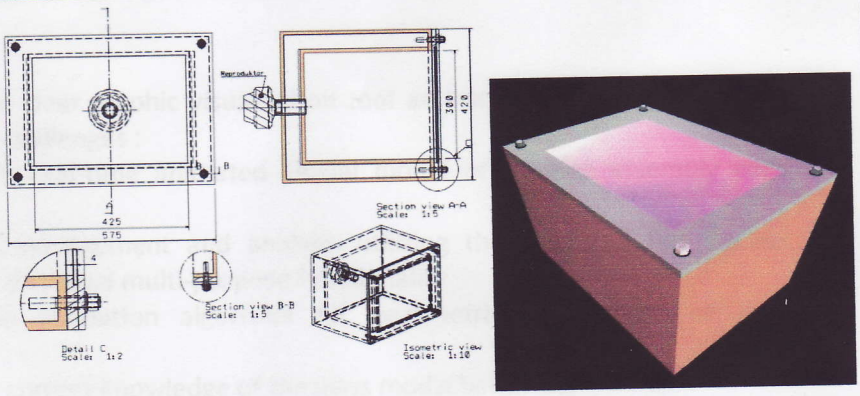


Fig. 2:

Universal file format

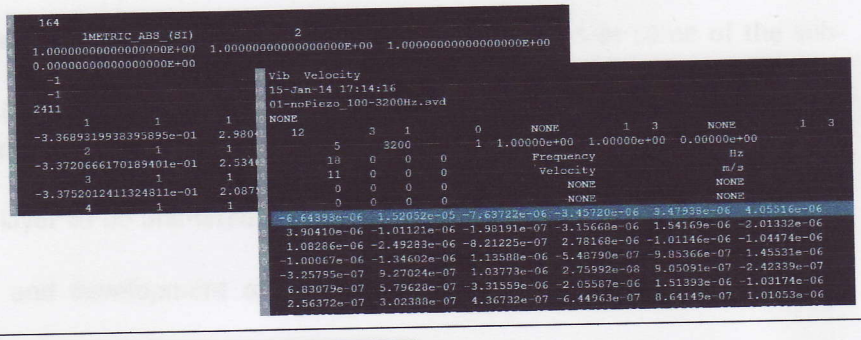
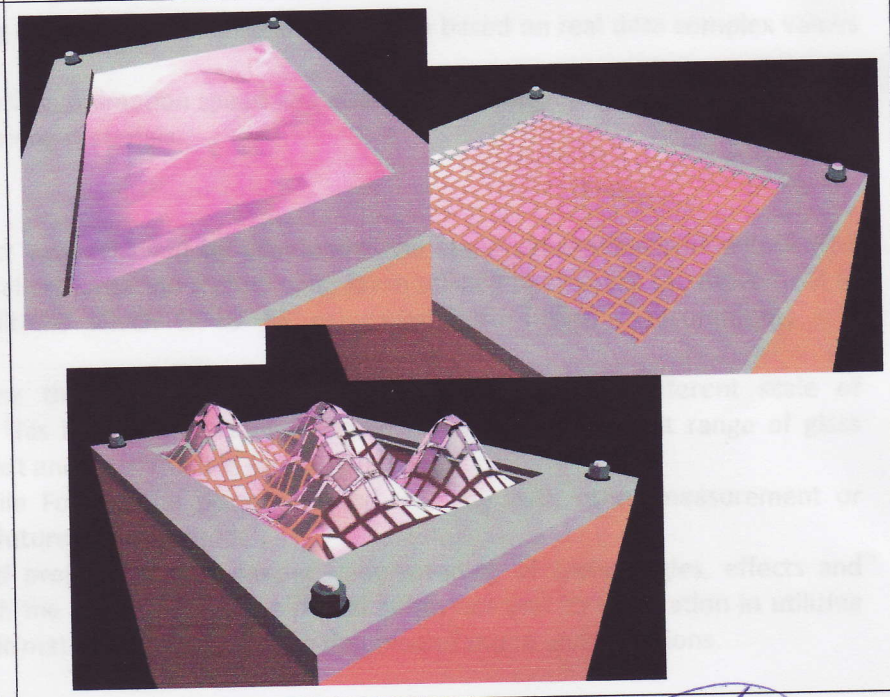


Fig. 3:

Plane vibration animation



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