

12. CONCLUSIONS AND FUTURE WORK

The paper has provided with an initial study of the problem of mechanical reliability of electronic components, focusing on vibration and shock.

In both cases, a study of the most relevant theoretical aspects has been presented. Their objective is to provide the fundamental basis to potential readers which do not have experience in the field of mechanical engineer, such as electronic designers.

As a part of this theoretical foundation an analytical model of the PCB has been obtained and validated through experimental testing. Although extremely simple, it has been proven useful when predicting the two first resonant frequency of the board. Its accuracy is probably higher, although it has been impossible to prove from the existing data. The limitations of the testing process have also been covered, especially in the instrumentation area. Accelerometers proved to be too heavy for their purpose, and it was necessary to resort to laser measurements.

Then the different analysis and solutions found in literature have been presented in an organized and methodical way, modified and interrelated when possible to best apply to the design or repair of tools and machines. The methods have been collected in two main groups: general rules to apply on every design and specific solutions for especially sensitive devices.

An example of the suggested procedure is provided. However, it needs to be confronted with the reality of industry, which will probably produce several modifications.

An important part of the paper is the outline of the future work to be done. The main needs lay in the area of the acquisition of experimental data, specially characterizing the different excitations experimented by tools or machines. Many of the techniques shown are useless unless an estimation of the excitation level is provided. It is essential to obtain an extensive experimental data base that can be used to statistically estimate suitable values.

It would be also interesting to check the validity of some of the solutions provided, since some of them does not come from literature survey (RELATIVE DEFLECTION AND BOUNDARY CONDITIONS) or because the information found have been adapted to new conditions or electronic components, such as the use of RESTRICTION IN MAXIMUM DISPLACEMENT for BGAs.

