Development of vibration testing method for bone-conduction device

Chan-Jung Kim(cjkim@pknu.ac.kr)[1], Gee-Soo Lee[2], Ki-Hyun Kim[3]
Moo-Yeon Lee[4]
[1]Pukyong National University, [2]Yongsan University, [3]Silla University, [4]Dong-A University

Abstract

The bone-conduction device is a useful mechanism to deliver sound information through solid bone structure in human body instead of a microphone-type conventional device and many application has been developed in several industry such as medicine and sports. The principle mechanical components of bone-conduction device are uniaxial exciter and its support mount module and reasonable evaluation testing method is consistently required during device developments. The direct evaluation with humans is one of subjective method to identify its performance but the testing results may be changed according to the jury's personal characteristics. The alternatives is objective testing method with measured data from the device itself and the important factor is how to consider the human effect under proper approximation. The human effect can be represented with the impedance of human skeleton and those condition may be different with each person. In this paper, the objective testing method of bone-conduction device was proposed with impedance measurement of uniaxial exciter using both the force information and the velocity one. In particular, the impedance of human skeleton was considered using additional testing jig with mechanical components, spring and damper. The proposed testing method was compared with current method without considering human effect and the accuracy of proposed testing method was discussed with both of evaluation results.

Keywords: *Bone-conduction device, Human impedance, Uniaxial testing method, Design of mount module*

References

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[2] R. Dauman, Bone conduction: An explanation for this phenomenon comprising complex mechanism, European Annals of Otorhinolaryngology, Head and Neck Diseases, 130(4), pp.209-213, 2013

Biography

Chan-Jung, Kim received Ph. D. degree from Seoul National University in 2011. He was senior researcher at Korea Automotive Technology Institute over 12 years (2003-2015). Since 2015, he has been joined as the faculty of Pukyong National University, where he is associate professor of Mechanical Design Engineering. His research interests are in the area of the vibration fatigue, noise and vibration issue of mechanical systems.