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Introduction

Whole-body vibrations (WBV) have significant implications for human comfort and well-being, particularly in industries where individuals are exposed to prolonged periods of vibration, such as transportation, construction, and manufacturing. While several factors contribute to the perception of vibration comfort, one often overlooked aspect is the influence of vision [1]. The human visual system plays a vital role in interpreting sensory information related to motion and spatial orientation. It provides crucial visual cues that help the brain integrate sensory inputs and establish a stable frame of reference during vibrations. This article delves into the influence of vision on whole-body human vibration comfort levels, highlighting the importance of visual cues in mitigating discomfort and enhancing overall well-being. By understanding this relationship, we can design environments, vehicles, and equipment that optimize comfort and reduce the potential negative effects of vibrations [2].

Factors A ecting Human Vibration Comfort

Several factors influence how individuals perceive and experience whole-body vibrations. These factors can be broadly categorized into personal, physiological, and environmental aspects. Personal factors include age, gender, body weight, and overall fitness. Physiological factors involve individual susceptibility to motion sickness or other conditions. Environmental factors encompass noise, temperature, and lighting conditions. It is within this realm of environmental factors that the influence of vision becomes particularly relevant [3].

There are some studies where the body is considered as a single mass and the range of resonance frequencies is found according to the position of the body and the direction of vibration. When internal organs are taken into consideration, completely different results are found. The human body will have different resonance frequencies for its internal organs depending on the direction and position of the person subjected to the vibration stimulus. Several studies have been undertaken with the objective to obtain the dynamic response of human organs but some difficulties were present [4]. Such difficulties can be attributed to the fact that these studies used animals, dummies or even dead bodies instead of live people.

The Role of Vision in Vibration Comfort

Vision plays a crucial role in the human perception of motion and spatial orientation. When subjected to vibrations, visual cues provide essential information that helps the brain integrate sensory inputs and make sense of the motion [5]. The eyes track stationary objects, which allow the brain to distinguish between self-motion and external motion. This visual feedback complements the vestibular system's input and can significantly influence the overall perception of vibration comfort [6].

Visual Cues and Vibration Perception

The presence or absence of visual cues can modulate the human perception of whole-body vibrations. For example, when traveling in a vehicle, looking out the window and fixating on stable objects such as the horizon can enhance comfort levels. The brain interprets these visual cues as reference points and uses them to establish a stable frame of reference. This helps mitigate the sensations of motion and reduces discomfort [7].

On the other hand, environments with limited visual cues or confined spaces can exacerbate the perception of vibrations. In situations such as long-haul flights or driving through tunnels, where external visual references are scarce, the brain relies more heavily on vestibular inputs [8]. This heightened reliance on internal signals can amplify the sensations of motion, leading to increased discomfort.

Implications for Design and Ergonomics

Understanding the influence of vision on whole-body human vibration comfort levels has practical implications for various industries. Designers and engineers can take these insights into account eyes can be helping the subjects to be more concentrated, so making possible for them to notice the vibration of smaller intensity. However, the volunteers' results for the covered eyes could have being influenced by previous knowledge of the tests as well, as the same sample that took part previously in other tests were used for the analysis of the uncovered eyes. For most of the participants there was a decrease in the answers. No repeatability analysis was undertaken to confirm this fact. New tests shall be accomplished to confirm these hypotheses.

References

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