Proceedings of International Conference on Technological Challenges for Better World 2019 Keynote Lecture

Review of the Levitation Mass Method (LMM) drop-ball test

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Abstract. The present status and the future prospects of the Levitation Mass Method (LMM) drop-ball test are reviewed. The LMM has been proposed and improved by the author. In the test, a spherical, body containing a cube corner prism which is arranged so that its optical center coincides with the center of gravity is dropped from an initial height to the clay under test. The velocity is measured using an optical interferometer as the function of the Doppler shift frequency which is defined as the difference between the beat frequency and the rest frequency. The position and acceleration of the spherical body is calculated by differentiating and integrating the velocity, respectively. Force acting on the spherical body is calculated as the product of the mass and the acceleration of the spherical body. Major applications of the LMM drop-ball test, such as Impact force measurement of a spherical body dropping onto a water surface, Impact force measurement of a spherical body dropping onto a polyurethane sheet, Impact force measurement of a spherical body dropping onto sand particles, are reviewed.

References

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