

Modelling, Simulation and Experimental Investigation of a Vibratory Roller Concrete Compaction

HUYNH CONG LON¹, NGUYEN HONG NGAN², TRAN VAN TUAN³

¹ Faculty of Mechanical Engineering, HoChiMinh City University of Technology, HoChiMinh, Viet nam

² Faculty of Mechanical Engineering, HoChiMinh City University of Technology, HoChiMinh, Viet nam ³ Faculty of

³ Construction Mechanical Engineering, National University of Civil Engineering, Hanoi, Viet Nam

Email: huynhconglon@hcmut.edu.vn

Abstract

Concrete compaction by vibration is a complex process. The interaction between properties of concrete and the dynamic parameters of the vibration roller creates a nonlinear dynamic system. The prediction about the dynamic behaviors of the roller drum influencing on the concrete layers is essential. It can be used to optimize the parameters of the roller drum. In this paper, a viscoelastic-plastic (VEP) model is used to simulate the response of vibratory rollers during the compaction of concrete surface. The VEP model takes into account the most important factors affecting the dynamic characteristics of the system. The comparisons of the simulation results with those collected during the construction of concrete pavement indicate that this model can serve as a theoretical basis for the implementation of effective concrete pavement compaction. The results also help in determining velocity, acceleration of the vibratory roller, as well as the relationship between the acting force and the displacement.

Keywords: *Concrete Compaction, Vibratory Roller, Viscoelastic, Roller drum, Parameters of Vibration Roller.*

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