Dynamic backcalculation with different load-time histories

This paper focused attention to the falling weight deflectometer (FWD) load-time history. For a commonly used device, it studied the pulse generation mechanism and the influence of different load histories on backcalculation results. In this connection, a semi-analytic impact theory was first introduced for realistically simulating FWD pulse generation. Then a newly developed finite-element code was presented for FWD interpretation; the code is capable of addressing dynamics, time-dependent layer properties, and quasi-nonlinear behaviour. Both new developments were demonstrated for an experimental dataset that resulted from operating an FWD with different loading configurations. It was found that backcalculated parameters are sensitive to the FWD pulse features. Consequently, it is recommended that, whenever advanced pavement characterisation is sought, experimental attention should be placed on generating diverse FWD pulse histories. Collectively, the resulting deflection histories will contain pertinent constitutive information for supporting the calibration of more complex pavement models.

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