Rigid indenter excitation of plates

The paper presents expressions for the point mobility of infinite plates driven by a completely rigid indenter. The problem is of general interest in connection with the excitation and transmission of structure-borne sound. The indenter is assumed to be circular, weightless, and stiff compared with the plate. A rigid indenter is assumed to provide a better approximation of the actual situation than a soft indenter would, e.g. when a hammer acts on a wooden plate. A detailed three-dimensional analysis is performed. Traditionally, the problem is solved in approximate terms by assuming a pressure distribution at the interface between the indenter and the plate. In the present study, a pressure distribution is also assumed, an optimal choice of the pressure amplitude being found by means of a variational formulation. Numerical results are presented and discussed, the discrepancy between the results obtained and the perfectly rigid indenter being examined.

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