

# Dynamic Response of Footing Resting on a Layered Soil System

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## **Abstract**

Dynamic response of foundations depend on several factors such as the shape and size of the foundation, the depth of embedment of the foundation, static and dynamic force levels and the type and extent of soil below the foundation. This paper presents an investigation of the dynamic behavior of foundations resting on two- and three-layered soil systems. A number of model block vibration tests are carried out on differently-prepared, layered beds using a Lazan-type mechanical oscillator. A steel footing of 0.3m, x 0.3m x 0.025m size is used as a model footing. Two types of two-layered beds (a soft layer over a stiff layer and vice versa) and two types of three-layered beds (a soft layer between two stiff layers and a stiff layer between two soft layers) are prepared using sand and sawdust. From the experimental investigations, it is observed that both position and thickness of the layer significantly influence the dynamic response of the foundations. Dynamic response of the foundations on different layered systems is also obtained by elastic, half-space theory representing the layered system by an equivalent homogeneous half-space and then compared with the response obtained from the experimental investigation. Comparisons showed encouraging agreement between the test results that obtained from the analysis.

**Keywords:** Footing, resonance, shear modulus, soil-layering, stiffness, vibration.