Consider a container filled with particles that is tapped periodically at the bottom. By assuming a simple Hertzian interaction force among particles and walls, one can describe the motion of the particles using Newton’s 2nd law. The large system of ordinary differential equations obtained is only amenable to rather superficial dynamical analysis. More information can be gleaned from associated approximate partial differential equations (PDEs) describing wave-like behavior in the evolving particle configuration, obtained from either the long-wavelength limit or a method devised by Blackmore, Samulyak and Rosato. The details of this approach are described starting with a one-dimensional column of particles. It is shown how these PDEs provide information on such dynamical properties as density and phenomena such as jamming. Extensions of this approach to two- and three-dimensions are briefly described.