We discuss various qualitative properties of dynamical and stationary solutions of a singular wave equation with an inverse-square type nonlinearity. Such an equation models a simple electrostatic Micro-Electromechanical System (MEMS) device, which consists of a thin dielectric elastic membrane with boundary supported above a rigid ground plate. When a voltage is applied, the membrane deflects towards the ground plate, and a snap-through (i.e. quenching) may occur when the applied voltage exceeds a certain critical value. (Received January 19, 2011)