An Investigation on Mathematical Models of Wire Rope Isolators

Vibration isolation systems using helical wire rope isolators are known to be highly effective in controlling both shock and vibration and have been used in numerous space and military applications. For damping response, the force displacement relationship of a wire rope isolator is highly nonlinear and history-dependent. For satisfactory analysis of such behavior, it is important to be able to characterize and to model the phenomenon of hysteresis accurately. Both Tinker and Bouc-Wen models that had been proposed for response studies of wire rope isolators are examined in this paper. For helical type wire-rope isolator Bouc-Wen's model, compared with Tinker's model, predicts much more intimate behavior as observed in experiment datum.