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VERTICAL AXIS WIND TURBINE DRIVE TRAIN TRANSIENT DYNAMICS

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ABSTRACT

Start-up of a vertical axis wind turbine causes transient torque oscillations in the drive train with peak torques which may be over two and one-half times the rated torque of the turbine. These peak torques are of sufficient magnitude to possibly damage the drive train; safe and reliable operation requires that mechanical components be overdesigned to carry the peak torques caused by transient events. A computer code, based on a lumped parameter model of the drive train, has been developed and tested for the Low Cost 17-Meter turbine; the results show excellent agreement with field data. The code has subsequently been used to predict the effect of a slip clutch on transient torque oscillations. It has been demonstrated that a slip clutch located between the motor and brake can reduce peak torques by thirty eight percent.

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