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SUBROUTINE UserHSSBr ( GenTrq, ElecPwr, HSS_Spd, GBRatio, NumBl, ZTime, DT, DirRoot, &
                       HSSBrFrac )

    ! wrote a very simple High speed brake torque control routine. If the high speed
    ! shaft comes to a complete stop the high speed shaft brake will be engaged at
    ! full torque. Otherwise the brake will not be used. The intention is to keep the
    ! rotor stationary after an emergency shutdown, but not use the brake durring the
    ! emergency shutdown or in normal operation. (Eric Anderson)

USE                             Precision
USE                             EAControl    ! contains LOGICAL variable
EmergencyShutdown.

IMPLICIT                        NONE

   ! Passed Variables:

INTEGER(4), INTENT(IN )      :: NumBl      ! Number of blades, (-).
REAL(ReKi), INTENT(IN )      :: DT         ! Integration time step, sec.
REAL(ReKi), INTENT(IN )      :: ElecPwr ! Electrical power (account for losses), watts.
REAL(ReKi), INTENT(IN )      :: GBRatio    ! Gearbox ratio, (-).
REAL(ReKi), INTENT(IN )      :: GenTrq     ! Electrical generator torque, N-m.
REAL(ReKi), INTENT(IN )      :: HSS_Spd    ! HSS speed, rad/s.
REAL(ReKi), INTENT(OUT)      :: HSSBrFrac   ! Fraction of full braking torque: 0 (off)
<= HSSBrFrac <= 1 (full), (-).
REAL(ReKi), INTENT(IN )      :: ZTime      ! Current simulation time, sec.
CHARACTER(1024), INTENT(IN ) :: DirRoot  ! The name of the root file including the
full path to the current working directory.
REAL(ReKi), SAVE             :: brakeStartTime ! Time when HHS Brake is initiated.
LOGICAL, SAVE                :: brakeOff = .TRUE.
REAL(ReKi), PARAMETER        :: HSSBrDT = 0.6  ! Time it takes for HSS brake to reach
full deployment once deployed.

IF  ( ( EmergencyShutdown ) .AND. ( GenSpeedF < 1 ) ) THEN ! If emergency shutdown has
been initiated and generator speed is almost zero.

    IF ( brakeOff ) THEN
        brakeStartTime = ZTime
        brakeOff = .FALSE.
        WRITE(*,*)  'HSS Brake initiated at T =',ZTime,' GenSpeedF =',GenSpeedF
        HSSBrFrac = 0.0
    ELSEIF ( (ZTime-brakeStartTime) < HSSBrDT ) THEN
        HSSBrFrac = (ZTime-brakeStartTime)/HSSBrDT
    ELSE
        HSSBrFrac = 1.0 !Engage brake
    ENDIF
ELSE
    HSSBrFrac = 0.0
ENDIF

RETURN
END SUBROUTINE UserHSSBr
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