C – 18

Main task of a wind turbine is to convent wind energy to electricity. Wind turbine must face itself into the wind, while protecting itself from the violence of winds which may occur at speeds greater than the rated wind speed. It has to be guaranteed to happen automatically.

Large wind turbines may have computer driven control systems. Small wind turbines need simple passive controls where possible. Tilt-up method is one simple way to control

small-scale wind turbines. Wind rotor is pivoted in vertical plane and it could tilt upward due to own drag force. Tilt up systems can exhibit strange gyroscopic movement under turbulent conditions.

Wind rotor, the rotating part of wind turbine, has a certain angular momentum, when rotating. When wind rotor is tilting upward or inclining to the wind, the direction of angular momentum also varies. Then a torque is applied on the wind turbine due to the changes is angular momentum of the wind rotor. Then, the motions are corresponding to the gyroscopic effect of rotor by the applied torque on it.

At one point wind speed or wind direction is suddenly changed under turbulent condition. Series of motions of wind turbine can be happened intermittently. Gyroscopic torque depends on change of angular momentum rotor. To avoid the cyclic motion, under turbulent conditions, one must be control the rate of changing of angular momentum rotor by using an energy absorption device for (EG) shock absorber, and must reduce the moment of inertia of the rotor. (1) Catastrophic failure may occur when the cyclic motion takes continuously.