Advance Braking System for Vertical Wind Turbine

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Abstract— The eddy-current is created by the relative motion between a magnet and a metal (or alloy) conductor. The current induces the reverse magnetic field and results in the deceleration of motion. The proposed mechanism implements this phenomenon in developing a braking system. The potential applications of the braking system can be decelerating system to increase the safety of an elevator or any guided rail transportation system. To provide scientific investigation for industrial application of magnetic braking, this study presents four systematic engineering design scenarios to design a braking system. The constant magnetic field is the simple stand easiest design to implement. The optimal magnetic field distribution is obtained by minimizing the deceleration effort. The piecewise-constant magnetic field distribution offers a compromise between performance and magnetic field requirements. The advantages of the section-wise guide rail are tolerable deceleration; and simple design requirement and manufacturing processes. In the study, an experimental braking system using constant magnetic field is build to demonstrate the design procedure.

Keywords: Eddy Current Generation, Piece of Magnet, Braking Force, Deceleration

I. INTRODUCTION

Foucault Bae J. S. (2004) found that when magnetic flux linked with a metallic conductor changes, induced Currents are set up in the conductor in the form of closed loops. These currents look like eddies or whirl pools and likewise are known as eddy currents. When a time-varying magnetic flux passes through a conductive material, eddy currents are generated in the conductor. These eddy currents circulate inside the conductor generating a magnetic field of opposite polarity as the applied magnetic field.Bae J. S. (2004) the interaction of the two magnetic fields causes a force that resists the change in magnetic flux. However, due to the internal resistance of the conductive material, the eddy currents will be dissipated into heat and the force will die out. As theeddy currents are dissipated, energy is removed from the system, thus producing a damping effect. There are several different methods of inducing a time- varying magneticfield, and from each method arises the potential for a different type of damping system.Therefore, the research into eddy current and magnetic damping mechanisms has led toa diverse range of dampers. The majority of the eddy current damping has taken place inthe area of magnetic braking that has received significant interest is the use of eddy current dampers for the suppression of structural vibrations. However, much of this research is not concentrated in one area, but has been applied to a variety of different structural systems in a number of distinct ways. We observe that the R/G ratio stays within a narrow band of values for skin pixels, whereas it is much more variable for non-skin pixels. Therefore, we could use this ratioto decide whether a pixel is likely to belong to the hand region or not. In particular, we empirically observe that the Most of the braking systems utilize friction forces to transform the kinetic energy of a moving body into heat that is dissipated by the brakingpads. The over use of friction-type braking systems causes the temperature of the brakingpads to rise, reducing the effectiveness of the system. There relative motion between themagnet and the metal (or alloy) conductor produces an eddy current that induces a reverse magnetic field and results in deceleration

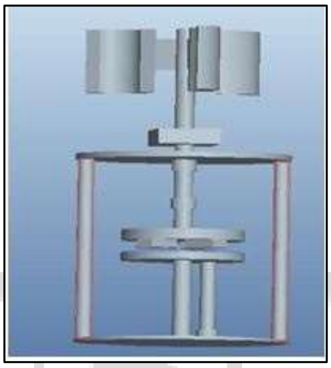

Fig. 1: Project Setup Drawing

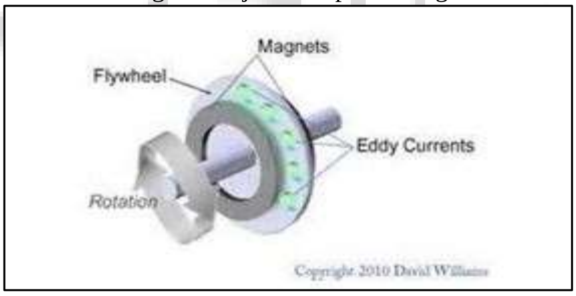

Fig. 2: Working Principle Mechanism

II. OBJECTIVES

1) To eliminate wear.
2) To Reduced human effort for break assistance.
3) Easy braking control.
4) To required zero electricity for breaking.

III. METHODOLOGY

The method is to carried out for entire project as follows

1) The wind Turbine having rpm depends upon the intensity of wind so studythe maximum wind intensity.
2) To study the maximum forces acting on wind turbine by making prototype model.
3) Design the disc of magnet for required braking force.
4) By analysis of wind turbine for different speed to see the required brakingForce for respective speed.

5) Set the optimum speed beyond which the braking action need to avoid damage.
6) An Experimental setup has to develop for wind turbine for effective braking.

IV. Conclusion

We conclude that when gap between two plates goes on increasing then braking force betweenthat two plates also reduces and hence the speed of wind turbine shaft increases. So we can avoid the failure of turbine at high speed by maintaining suitable gap between plates according to the speed requirement and available wind intensity atthat point.

Refrances

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