# A STUDY ON PRESERVATION OF BIRDS' LIVES FROM ACCIDENTAL STRIKES ON WIND TURBINE BLADES

Balavignesh.V[1], Govindaraj.S[2], Baskar.M[3], Sakthivel.G[4], Nandhini.N[5]

[1,2,3,4] *UG Student, Department of Mechanical Engineering, Knowledge Institute of Technology, Salem.*
[5]*Assistant Professor, Department of Mechanical Engineering, Knowledge Institute of Technology, Salem.*
balavigneshvashu@gmail.com,sivarajgovinds@gmail.com,nandhinimnarayanan@gmail.com

**Abstract –** ***All endangered species of birds should be saved by us. Our government has planned to save the birds by implementing 8 techniques that serves to be better than any methods proposed so far. The main objective is to install a permanent setup that can deflect birds from the turbine clashes. This technique differs from other techniques in such a way that it involves the installation of permanent coatings that diverts the bird from striking the wind turbine blades.***

***Keyword(s)*****:** *Zinc coating, Radium 226 coating, Birds and Bats, Wind turbine blades*

## 1. INTRODUCTION

Wind energy has been rated as one of the main source of energy to generate electricity without emitting air pollutants or harmful greenhouse gases. As the wind spins a wind turbine's blade assembly, known as a rotor, a generator connected to the rotor generates electricity. Wind turbines that are in large scale generate electricity at a lower cost and higher efficiency than smaller ones. The reason is that longer rotor blades can capture the energy because of the availability of a larger cross section of the wind, known as the rotor swept area, and because taller towers generally provide access to stronger winds. The consistency of the wind is equal to the amount of electricity produced.

## 2. LITERATURE REVIEW

Birds, for instance, can directly crash into a turbine blade when they are fixated on perching or hunting and pass through its Rotor plane; they can strike its support structure; they can hit part of its tower; or they can collide with its associated transmission and distribution lines.

Early turbines were mounted on towers 60–80 feet in height and had rotors 50–60 feet in diameter that turned 60–80[(3)] revolutions per minute (rpm). Today's land based wind turbines are mounted on towers 200–260 feet in height with rotors 150–260 feet in diameter, resulting in blade tips that can reach over 425 feet above ground level. Rotor swept areas now exceed 1 acre and are expected to reach nearly 1.5 acres within the next several years. Even though the speed of rotor revolution has significantly decreased to 11–28 rpm, blade tip speeds have remained about the same; under normal operating conditions, blade tip speeds range from 138–182 mph. Wider and longer blades produce greater vortices and turbulence in their wake as they rotate, posing a potential problem for bats. Because large turbines are more efficient, most modern wind developments for a given

number of megawatts (MW; 1 MW equals 1 million watts)[1] have fewer machines with wider spacing. Still, larger turbines are being developed.

## 3. METHODOLOGY

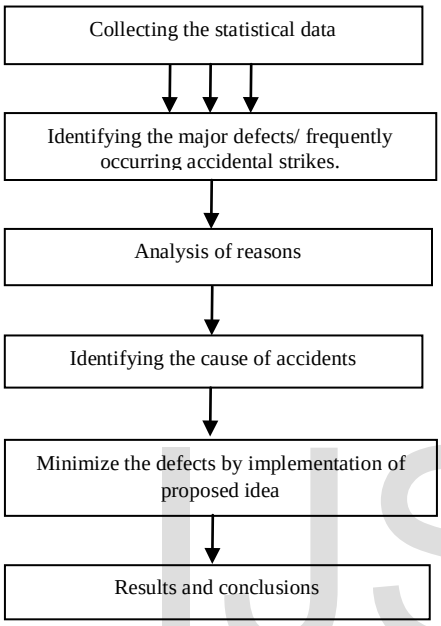



*Fig 3.1: Methodology*

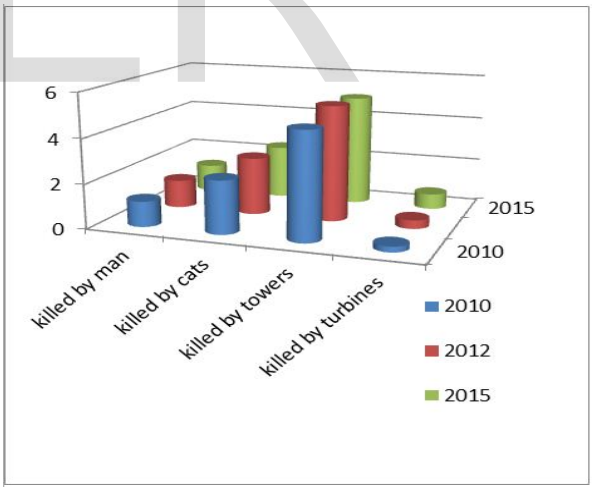
*Fig 3. 2: Wind Turbine with coating*

### 3.1 Analysis of death rate of birds and bats

| Sl. no | | 2010 | 2012 | 2015 |
|---|---|---|---|---|
| 1. | Killed by man | 1.15 | 1.27 | 1.23 |
| 2. | Killed by cat | 2.4 | 2.6 | 2.4 |
| 3. | Killed by towers | 4.8 | 5.2 | 5 |
| 4. | Killed by turbines | 0.246 | 0.387 | 0.689 |

***Table: 3.1 Death rates of birds in percentage***

The table shows that the death rate of the birds is increased day to day, thus decreasing the total number of birds present throughout the world.




***Graph 3.1: Death rates of birds in percentage***

The rate of killing varies with respect to the factor based on various factors. The maximum death rate is caused by the taller towers that are placed everywhere in the cities.

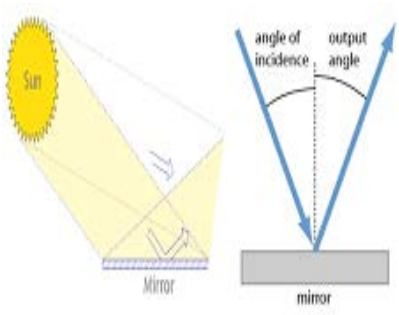



*Fig 3.3 : Reflective nature of the mirror*

The reflectivity of any mirror is the percentage of the optical power which is reflected from its polished surface.

The reflection phase is the phase shift of reflected light, i.e., the phase change obtained when comparing light directly before and directly after the reflection.

***Fig 3.4: Different colors of Radium available***

Radium is chosen because of its silvery, lustrous, soft, and intensely radioactive nature. Radium imparts the fire with a carmine red color. One gram of Ra-226 undergoes 3.7 x $10^{10}$disintegrations per second. A single gram of radium-226 will produce 0.000l milliliters of radon a day Radium emits alpha, beta, and gamma rays and when mixed with beryllium produce neutrons.

## 4. RESULTS

In comparison to other methods, this method is more efficient to implement in the wind turbines. It serves to be effective idea to save the birds' life from wind turbines. The main advantage of this method over others is that, it does not require any tracking system. This can be installed in any wind turbine blade with low cost and more durability.

## 5. DISCUSSIONS

The birds and bats are secured when the Radium-226 is intimates the birds to reflect by the light. It is possible to coat in turbine blades to reduce the death rate of bats, birds, etc., In the previous method they are using extra device to install in near to the turbine but we are suggest to paint the turbines by the blades of turbine in the wind mill. It is easy to implicate in to the working method. The previous methods are just a process to detect the birds but this method is to indicate & reflects by the radiation of sunlight. And also its chemical properties are more desirable for longer duration when compared to others materials. The corrosion resistant nature of radium-226 and zinc enables this coating to withstand all climatic conditions.

## 6. CONCLUSION

This method saves the birds life because of its sufficient to intimate the birds to serve themselves by the indication of radium & zinc towards the birds. Government is going to install windmills in 500 places over in different states for generating a power source to our country. With a 7,517-km coasting, the total onshore wind potential in India is estimated to produce around 65,000 MW.So we can utilize this idea to implementation on the upcoming installation of a power project in "INDIA".

## REFERENCES

(1) American Bird Conservancy. 2011. Bird Deaths from Wind Farms to Continue Under New Federal Voluntary Indu72-81stry Guidelines

(2) Luis Barrios and Alejandro Rodriguez. 2004. Behavioural and environmental correlates of soaring bird mortality at on-shore wind turbines. Journal of Applied Ecology, 41: 72-81

(3) Andrew D. Krueger. 2007. Valuing public preferences for offshore wind power: a choice experiment approach. ProQuest Publishing. 172 pages

(4) James F.Manwell, Jon G.McGowan, Anthony L.Rogers. 2009. Wind Energy Explained: Theory, Design and Application (Google eBook) John Wiley and Sons, . 689 pages

(5) National Research Council (U.S.). Committee on Environmental Impacts of Wind-Energy Projects. 2007. 376 pages. National Academies Press (U.S.) Google eBook

(6) Lourdes Rugge, Carl G. Thelander, K. Shawn Smallwood. 2000. Bird Risk Behaviors and Fatalities at the Altamont Pass Wind Resource Area: Period of Performance, March 1998-December 2000 (Google eBook) Diane Publishing