UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Unitat de Valorització

NEW SOLUTION TO PREVENT EXCESSIVE WEAR IN GEAR USEFUL FOR WIND TURBINES

A new system to prevent the excessive wear in a tooth gear has been developed and patented. The system is specially developed to prevent the wear at the pitch and/or yaw gear tooth systems from the wind turbines but it could be used in others gears applications. Partners to further develop the system and/or to establish commercial agreements along with technical cooperation are sought.

The Challenge

The growing demand of electricity leads wind turbine industry to produce more electricity day by day. Hence, manufactures increase the dimensions of wind turbine rotors and consequently its components loads. Moreover, wind turbines reliability is still miles away from other more established energy industries, like hydraulic or nuclear power. For instance, the failure ratio for the blades and the pitch system is 13.4%, and for the yaw system is 6.7%, around 20% both systems. The excessive wear at the tooth surface of these systems is one of the major problems occurring, which inevitable conducts the manufacturer to apply costly corrective maintenance tasks. Precisely, the optimization of these operational costs together with the need to achieve a higher turbine's reliability, are among the key challenges which faces the wind power industry.

The Technology

The novel tribology solution consists of an array of micro channels which inject fresh lubricant directly at the hertz of the tooth contacts of pitch system gears.
It acts on the low power position, at degree zero of the teeth, building up a hydrodynamic grease film that prevents direct metal contact and reduces the wear process of tooth surfaces. The system can be easily implemented into new wind turbine models and it is highly adaptive, so that the system can be steadily implanted in market models.

Innovative advantages

- Optimum lubrication with micro injection
- Direct lubrication at wear point
- High lubrication control
- Inexpensive production and integration
- Implementation for all wind turbines models
- Cheap implementation at ongoing wind turbines

Current stage of development

The system has been successfully tested in a laboratory prototype with gears module higher than 10. The grease flow along the micro channels and it is correctly distributed without suffering any degradation.

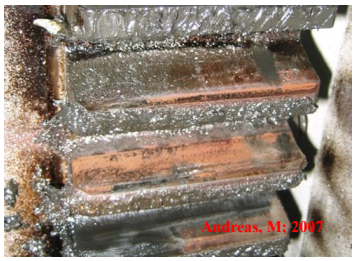
Applications and Target Market

The system has been developed to be integrated into any type of gear transmission. The system can be assembled in the teeth that suffers wear to improve the lubrication and eliminate the degradation. It is specially developed to implant at the pitch system that suffers excessive wear at the working tooth of zero degree blade position and/or in the yaw system at the working tooth of the prevailing wind direction of wind turbines.

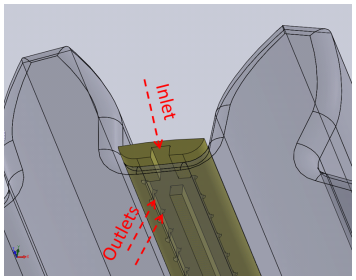
Reference number

MKT2012/0133_E

Efficient device to improve the lubrication and eliminate the degradation



The absence of lubricant produces excessive wear that bring micro iron particles and oxide



Micro channels technology is used to distribute the lubricant into gear contact area

Business Opportunity
Technology available for licensing with technical cooperation

Patent Status
US /EP patent application

Contact
Mr. Xavier Estaran Latorre
Licensing Manager
T. + 34 93 413 40 70
M. +34 626 260 596
f.xavier.estaran@upc.edu

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