

Gearbox Defect Detection in the Semi Autogenous Mills Using the Vibration Analysis Technique

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Abstract : Semi autogenous mills are designed for grinding or primary crushed ore, and are the most widely used in concentrators globally. Any defect occurrence in semi autogenous mills can stop the production line. A Gearbox is a significant part of a rotating machine or a mill, so, the gearbox monitoring is a necessary process to prevent the unwanted defects. When a defect happens in a gearbox bearing, this defect can be transferred to the other parts of the equipment like inner ring, outer ring, balls, and the bearing cage. Vibration analysis is one of the most effective and common ways to detect the bearing defects in the mills. Vibration signal in a mill can be made by different parts of the mill including electromotor, pinion girth gear, different rolling bearings, and tire. When a vibration signal, made by the aforementioned parts, is added to the gearbox vibration spectrum, an accurate and on time defect detection in the gearbox will be difficult. In this paper, a new method is proposed to detect the gearbox bearing defects in the semi autogenous mill on time and accurately, using the vibration signal analysis method. In this method, if the vibration values are increased in the vibration curve, the probability of defect occurrence is investigated by comparing the equipment vibration values and the standard ones. Then, all vibration frequencies are extracted from the vibration signal and the equipment defect is detected using the vibration spectrum curve. This method is implemented on the semi autogenous mills in the Golgozar mining and industrial company in Iran. The results show that the proposed method can detect the bearing looseness on time and accurately. After defect detection, the bearing is opened before the equipment failure and the predictive maintenance actions are implemented on it.

Keywords : condition monitoring, gearbox defects, predictive maintenance, vibration analysis

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