DESIGN AND ANALYSIS OF A SWINGING JAW PLATES OF A SINGLE TOGGLE JAW CRUSHER

ABSTRACT

A jaw crusher is a kind of size reduction machine which is widely used in mineral, aggregates and metallurgy fields. The performance of jaw crusher is mainly determined by the kinematic features of the swing jaw during the crushing process. The practical kinematic characteristic of the points located along the swing jaw plate are computed and discussed. Based on the analysis of the liner movement and the crushing parameters, force distribution along the swing jaw plate is obtained. The job is helpful for a design of new prototype of this kind of machine on optimizing the frame, designing the chamber and recognizing the crushing character. The interaction between jaw plates and material particles brings the inevitable and serious wear to the jaw plates during the jaw crusher operation, which not only decreases the efficiency, but also increases the cost and the energy consumption of the jaw crusher. Obtained results from the kinematic analysis of the moving jaw and the crushing force distribution analysis, the jaw plates wear is analyzed on a macroscopic level. It is helpful to design the crusher for improved performance. Efforts to decrease energy consumed in crushing have lead to consideration of decreasing the weight of the swing plate of jaw crushers. Design of lighter weight jaw crusher will require a more precise accounting of the stress and deflections in the crushing plates than is available with traditional technique. The design of swing jaw plate is carried out by using CAD i.e., jaw plate has been solid modeled by using CATIAV5R16. FEA is applied to assembled structure of swinging jaw plate and lever to optimize the width and location of the toggle plate along the swinging lever. The different comparisons of swing jaw plates behavior, calculated with the traditional and the new FEA failure models with stiffeners, shows that 24% savings in plate weight may be possible.