عنوان مقاله:

Energy-based low-cycle fatigue lifetime prediction models of gray and nodular cast irons for engine exhaust manifold applications

محل انتشار:

کنفرانس دو سالانه بین المللی مکانیک جامدات تجربی (سال: 1396)

تعداد صفحات اصل مقاله: 2

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خلاصه مقاله:

In the present research, a new energy-based low-cycle fatigue lifetime prediction model has been presented. Theobjective is to calculate the fatigue lifetime of gray and nodular cast irons, including GJS-500-7 and GJL-250. Such thesecast irons have been widely used in the engine exhaust manifold. The proposed model was based on the dissipated plasticstrain energy density per cycle, including two correction factors for considering the effect of the temperature and themean stress. The thermal term takes creep and oxidation effects into consideration. To calibrate the model, experimentaldata of strain-controlled isothermal low-cycle fatigue tests have been utilized. Obtained results showed an improvementin predicting the fatigue lifetime in comparison to classical approaches and also the plastic strain energy model withoutcorrection factors. Therefore, this model can be easily used for predicting the thermo-mechanical behavior of engineexhaust manifolds. In addition, the scatter-band analysis depicted that predicted lifetimes by the corrected plastic strainenergy model was within a narrow band, in comparison to other .models

کلمات کلیدی:

Low-cycle fatigue, Lifetime prediction, Energy-based model, Cast iron, Exhaust manifold