Analysis of the Influence of Initiating Inclusions on Fatigue Life of Plasma Nitrided Steels

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The analysis of non-metallic initiating inclusions in fatigue live field is studied. The testing material for experiments is CSN 41 5340 steel (corresponds to 41CrAlMo7-10 or 1.8509). This steel is suitable for plasma nitriding process. The samples were heat treated and subsequently plasma nitrided, then subjected to the fatigue bending rotation tests. According to the principle of the tests are the conditions set to constant speed and decreasd load to 10^7 cycles if does not the fatigue fracture of the sample happens. The thickness of the diffusional nitride layer has been won using the microhardness measuring from the surface to the core of the samples. Using the fractographic analysis the nucleation point of fatigue crack has been evaluated. In the case of initiating inclusions the size and the chemical composition was measured. Comparing the won data to the plasma nitriding proces new results have been obtained.

Keywords: Fatigue live, inclusion, plasma nitriding

Acknowledgement

The paper was prepared with the support of the Project for the Development of the Organization of the Dep. of Mechanical Engineering, UoD "Promoting Research, Science and Inovation in the Field of Engineering".

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Paper number: M201518