Accepted Manuscript

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PII: S0142-1123(18)30293-7
DOI: https://doi.org/10.1016/j.ijfatigue.2018.07.007
Reference: JIJF 4761

To appear in: *International Journal of Fatigue*

Received Date: 24 April 2018
Accepted Date: 6 July 2018

Please cite this article as: Bianchetti, C., Delbergue, D., Bocher, P., Lévesque, M., Brochu, M., Analytical fatigue life prediction of shot peened AA 7050-T7451, *International Journal of Fatigue* (2018), doi: https://doi.org/10.1016/j.ijfatigue.2018.07.007

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ACCEPTED MANUSCRIPT

Analytical fatigue life prediction of shot peened AA 7050-T7451

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Abstract

Fatigue lives of as-polished and shot peened specimens were predicted using the original Navarro-Rios model (monotonic damage model) and a more recent version of the same model (cyclic damage model). Crack closure, residual stress relaxation, cold work and cyclic yield stress were experimentally characterized and implemented within the cyclic damage model. Two shot peening conditions were studied (S230 and Z425 shots at 8A and 100% coverage). The in-depth profiles of the relaxed residual stress and cold work were experimentally characterized and implemented within both versions of the model. Two stress amplitudes leading to high cycle fatigue (HCF) and low cycle fatigue (LCF) were studied at a stress ratio of 0.1. Predictions of the cyclic damage model were globally closer to experimental fatigue lives than those predicted by the monotonic damage model. The monotonic damage

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