Fatigue behaviour of an elastomer under consideration of ageing effects

Christoph Neuhaus, Alexander Lion, Michael Johlitz, Paul Heuler, Matthias Barkhoff, Frank Duisen

PII: S0142-1123(17)30301-8
DOI: http://dx.doi.org/10.1016/j.ijfatigue.2017.07.010
Reference: JIJF 4406

To appear in: *International Journal of Fatigue*

Received Date: 17 May 2017
Revised Date: 10 July 2017
Accepted Date: 11 July 2017

Please cite this article as: Neuhaus, C., Lion, A., Johlitz, M., Heuler, P., Barkhoff, M., Duisen, F., Fatigue behaviour of an elastomer under consideration of ageing effects, *International Journal of Fatigue* (2017), doi: http://dx.doi.org/10.1016/j.ijfatigue.2017.07.010

Fatigue behaviour of an elastomer under consideration of ageing effects

Christoph Neuhaus[a], Alexander Lion[b], Michael Johlitz[c], Paul Heuler[d], Matthias Barkhoff[e], Frank Duisen[f]

[a]*Institute of Mechanics, Universität der Bundeswehr München*
Werner-Heisenberg-Weg 39, 85579 Neubiberg, Germany
E-Mail: christoph.neuhaus@unibw.de
[b]*Institute of Mechanics, Universität der Bundeswehr München*
Werner-Heisenberg-Weg 39, 85579 Neubiberg, Germany
E-Mail: alexander.lion@unibw.de
[c]*Institute of Mechanics, Universität der Bundeswehr München*
Werner-Heisenberg-Weg 39, 85579 Neubiberg, Germany
E-Mail: michael.johlitz@unibw.de
[d]*Audi AG Ingolstadt*
E-Mail: paul.heuler@audi.de
[e]*BOGE Elastmetall GmbH*
E-Mail: Matthias.Barkhoff@boge-rubber-plastics.com
[f]*BOGE Elastmetall GmbH*
E-Mail: Frank.Duisen@boge-rubber-plastics.com

Abstract

Due to their vibration isolation performance, elastomers are often used in industrial applications such as bearings or seals. In service, parts made of rubber are often exposed to high temperatures while undergoing dynamic mechanical loads. On the one hand, this may reduce the fatigue properties in an irreversible manner due to thermo-oxidative network degradation and reformation, which is known as chemical ageing. In a durability test at constant temperature, a rubber specimen that was already aged at elevated temperatures exhibits a different fatigue behaviour than an unaged specimen of the same material. Since this behaviour is determined by the temperature