INSTRON AWARD

Prize awarded to

Dr.-Ing. Chalid el Dsoki

for his work at the
Technische Universität Darmstadt (TUD), Germany,
Chair of System Reliability and Machine Acoustics SzM

"Reduction of the Experimental Efforts by Using Artificial Neural Networks"

The application of local concepts for fatigue life estimation or computing of elasto-plastic stresses and strains requires both cyclic stress-strain curves (SSC) and strain-life curves (SLC). Since these curves can be determined only through considerable experimental efforts and high costs, methods are desired which may estimate these curves rapidly from conventional material data, e.g. static values like yield or tensile strength. Artificial neural networks (ANN) offer a very promising approach in this context. The networks acquire knowledge using an available database by establishing relationships. These allow the estimation of the characteristic values of the SSC and the SLC using conventional material parameters as input.
Basing on this fact, Chalid el Dsoki developed a method to combine experimental tests with the ANN. This method with experimental support (ES) is integrated in the software tool "Artificial Neural Strain Life Curve ANSLC". He demonstrated that experimental tests can be combined with the ANSLC and exert a strong influence on the estimate by increasing the estimation's accuracy. Furthermore, Chalid el Dsoki showed that the estimation of the cyclic material properties based on the ANSLC and ES results in more accurate data compared to the data derived from few experimental tests solely. His method delivers a new contribution for fatigue software and provides a new base for intelligent testing software.
The mentioned work was performed by Chalid el Dsoki within the framework of a project of the Collaborative Research Centre of the TUD titled "Integral Sheet Metal Design with Higher Order Bifurcations" supported by the German Research Foundation (DFG) and in cooperation with the Fraunhofer LBF.
Instron® awards Chalid el Dsoki for his excellent PhD-Thesis on deriving a suitable method for estimating the cyclic material parameters and for the progressive idea for intelligent testing software.

Instron Structural Testing Systems
Landwehrstr.65
D – 64293 Darmstadt
Germany

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