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Evaluation of the fatigue properties of polymers and composites based on thermomechanical characterization and micro-structural measurements

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This contribution focuses on the fatigue design of elastomeric materials and short fibers composites, for several industrial domains. A first fold describes the main difficulties at stake for these two families. An experimental technique to analyze the fields of dissipated energy from thermal measurements is then described. Then, the use of this technique to supply responses to industrial expectations are detailed: validation of the design numerical chain, fast prediction of the fatigue properties for various materials and testing parameters, fast diagnosis of the fatigue performance of industrial parts. In a last section, the remaining open questions and some tracks to solve them are presented, based on three main ideas: the combination to constitutive modeling, the description of the defects' population, the characterization of the energy balance at the microstructural scale.

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