KUNSTSTOFF TECHNIK LEOBEN

MATERIALS SCIENCE AND TESTING OF POLYMERS
Otto Glöckel-Straße 2 | A-8700 Leoben | wpk@unileoben.ac.at | www.kunststofftechnik.at

THE BOX

Gerald Pilz

Mechanical characterization of high performance thermal decoupling units for building envelops

The efficiency of thermal insulating envelops in the building sector is strongly dominated by external structural units such as balconies, which are connected to the internal floor construction. In this concern, a proper load-transmitting unit consisting of high-performance glass fiber reinforced polymer components (GFRP) with significantly reduced thermal conductivity was developed (s. Fig. 1).

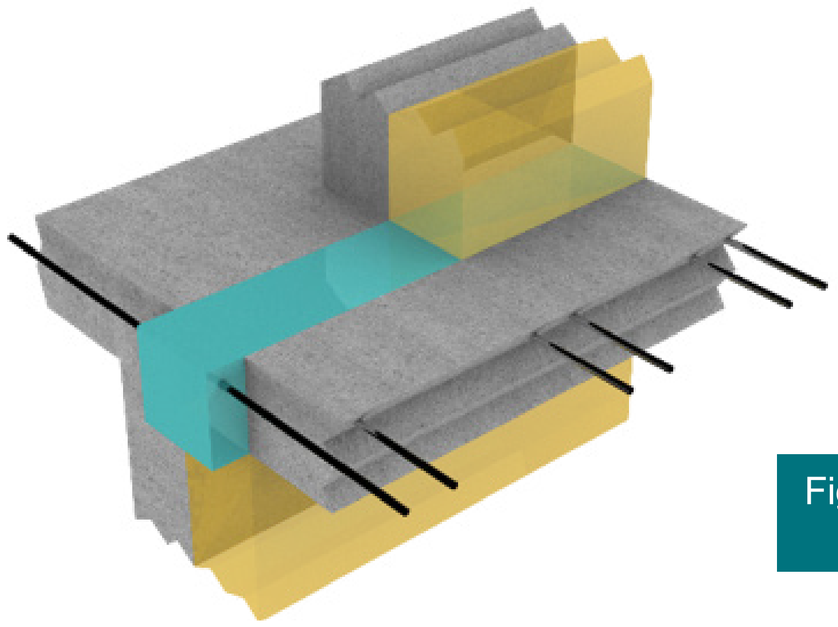

Fig. 1: Construction concept

For service relevant creep characterization, stress rate accelerated creep rupture tests (SRCR) provide a very time efficient method for the long-term estimation of the ultimate failure strength (s. testing arrangement in Fig. 2).

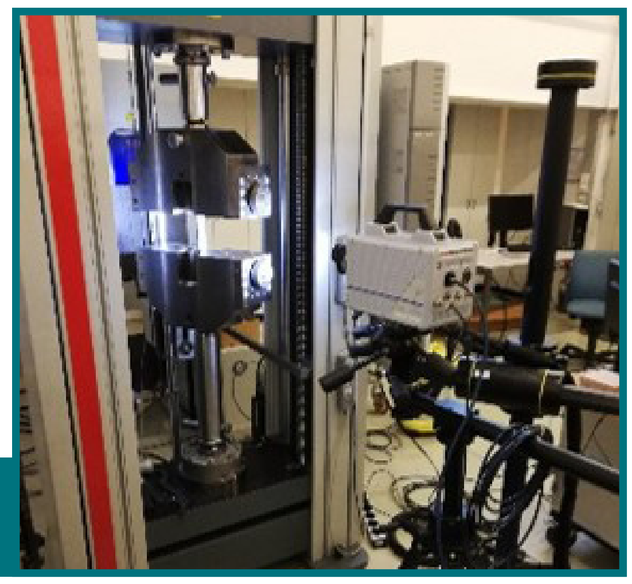

Fig. 2: Setup for mechanical testing

Starting at an initial stress level, various, defined stress rates are applied until failure. Finally, the extrapolation of the resulting failure times to a virtual stress rate of zero provides the corresponding creep rupture time (s. schematic Fig. 3).

Since the failure behavior for the present GFRP components is brittle, this creep testing method is expected to be a reliable procedure for the estimation of service related creep rupture strength.

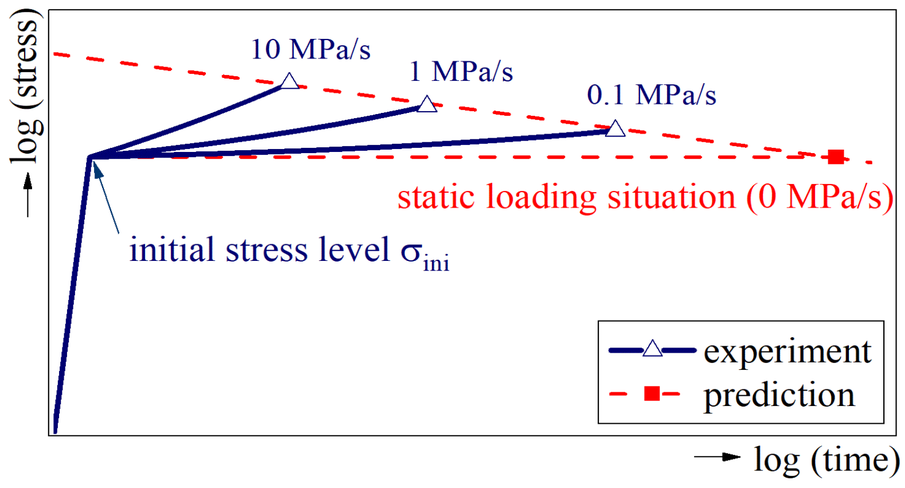

Fig. 3: Loading scheme for SRCR testing[1]

GERALD PILZ
Materials Science and Testing of Polymers
gerald.pilz@unileoben.ac.at

RESEARCH FOCUS: Mechanical and thermo-mechanical characterization of plastics for structural applications

PROJECT: THE BOX - Next Generation Thermal Break Technology
PROJECT PARTNERS: FEN Sustain Systems GmbH, AVI Alpenländische Veredelungs-Industrie Ges. m.b.H., Secar Technologie GmbH, UIBK Technische Versuchs- und Forschungsanstalt der Universität Innsbruck
FUNDING: „Stadt der Zukunft“ Austrian Research Promotion Agency (FFG)

REFERENCE: [1] S. Gloggnitzer „Beschleunigte Prüfmethoden zur Charakterisierung des langfristigen Materialverhaltens kontinuierlich glasfaserverstärkter Verbundwerkstoffe unter statischer Last“, Dissertation, Leoben, 2019.