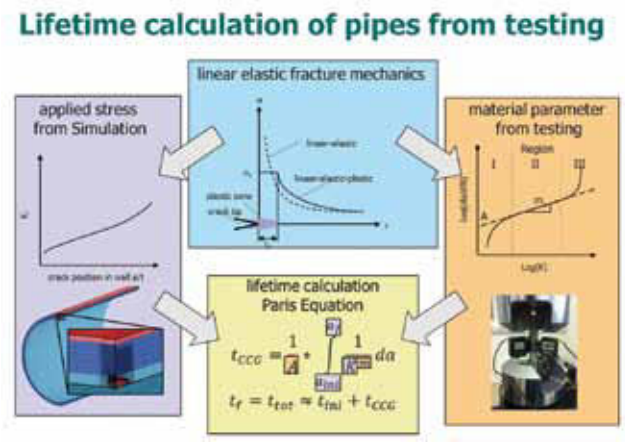
Accelerated Testing of Polypropylene Pipe Materials

Polypropylene is widely used for hot and cold water piping systems. Due to their very high toughness, new testing methods are needed to affirm lifetimes and characterize new material developments.

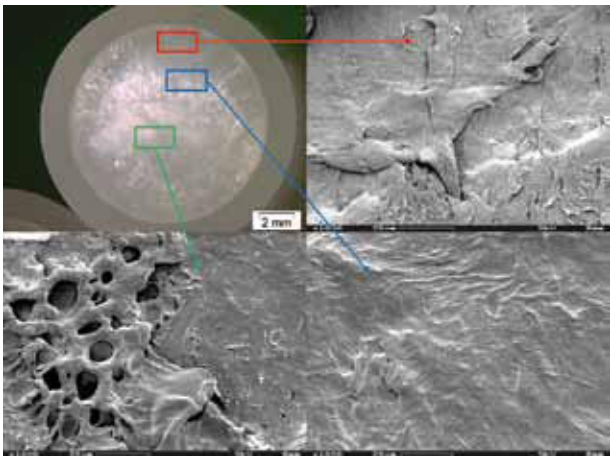


To ensure safety and feasibility, modern polymer pipes have to last at least 50 to 100 years in service. Pipe materials are traditionally tested by internal pressure tests at elevated temperatures to decrease testing times. Nevertheless, modern materials take more than one year of testing time, even at 80°C. Therefore, faster methods are required to provide feedback for material developers

The application of fracture mechanics to shorten testing times has been a hot topic over the last decades. However, the usage of fracture mechanics requires meeting several conditions, which are hard to fulfil with the materials in question.

The cyclic Cracked Round Bar (CRB)-test, which has been developed in Leoben over the last years, makes it easier to meet aforementioned requirements. By applying this test, in combination with fracture mechanics and numeric simulation of different loading scenarios, long-term material properties can be estimated. This provides a valuable tool for material developers, as well as pipe producers, trenching companies and grid operators.

The test is currently under ISO-standardization process for Polyethylene pipes (ISO DIS 18489). Due to its high promise with this material, it is now also tested as a new method for Polypropylene.



Florian Arbeiter
Materials Science and Testing of Polymers
at MUL since: 2011
florian.arbeiter@unileoben.ac.at
www.kunststofftechnik.at

Personal Data:
3rd year PhD-Student
Students Award of the Austrian Association for Gas and Water – OVGW 2013

Research Partner:
KUNSTSTOFF TECHNIK LEOBEN
WERKSTOFFKUNDE UND PRÜFUNG DER KUNSTSTOFFE
FFG
ofi
poloplast
PCCL

Research Focus:
accelerated testing of polymer pipe grade materials
application of fracture mechanics to polymers
damage and fatigue behaviour