

Session

Room

FRACTURE, FATIGUE & LIFETIME PREDICTION (1)

A+B+C

Chair: Prof. Jean-Benoit Le Cam

10:30 A Study on the Influence of Mechanical Preconditioning on the Fatigue Behavior of Rubber Materials

D. Juhre & M. Krause

10:50 Influence of Thermo-Oxidative Ageing on Fatigue-Lifetime of NR

C. Neuhaus, A. Lion & M. Johlitz

11:10 Influence of Air and Seawater on Fatigue Behavior of Natural Rubber

K. Narynbek Ulu, B. Huneau, E. Verron & P.-Y. Le Gac

11:30 Effect of Antioxidants on the Fatigue Crack Growth Behavior of Filled SBR Compounds

P. Rublon & A. Favier

11:50 Evaluation of the Fatigue Properties of Elastomers Based on Thermomechanical Characterization Coupled to Micro-Structural Measurements

Y. Marco, I. Masquelier, V. Le Saux, B. Huneau & P. Charrier

KEYNOTE LECTURE

A+B+C

Chair: Prof. Jörn Ihlemann

13:20 Modelling of Fracture in Elastomers

M. Kaliske, K. Özenç, R. Fleischhauer & C. Steinke

Session

Room

FRACTURE, FATIGUE & LIFETIME PREDICTION (2)

A+B+C

Chair: Prof. Yann Marco

14:10 Contributions of Nonlinear Viscoelasticity on the Velocity Transition of the Crack Growth of Filled Elastomers

Y. Morishita, K. Tsunoda & K. Urayama

14:30 Analysis of Crack Propagation in Elastomers Based on Global and Local Characterization Methods

S. Dedova & G. Heinrich, K. Schneider & K. Brüning

14:50 Lifetime Prediction of Elastomers Based on Statistical Occurrence of Material Defects

M. Ludwig, T. Alshuth, M. El Yaagoubi & D. Juhre

FRACTURE, FATIGUE & LIFETIME PREDICTION (3)

A+B+C

Chair: Prof. Erwan Verron

15:30 Relationship Between Displacement and Force Controlled Fatigue Tests

W. V. Mars, M. Isasi, A. Arriaga & J. Plaza

15:50 A New Specimen for Fatigue Analysis of Cord-Rubber Composites

A. von Eitzen, U. Weltin, M. Flamm & T. Steinweger

16:10 Effect of Constrained Strain on Failure Behavior of Rubber Vulcanizates

Toshio Tada, Konrad Schneider, Gert Heinrich & Masaru Ishikawa

16:30 Initiation Mechanisms of Fatigue Cracks in Carbon Black Filled Natural Rubber

B. Huneau, I. Masquelier, Y. Marco, V. Le Saux, S. Noizet, C. Schiel & P. Charrier

16:50 Thermomechanical Characterization of the Basic Fatigue Mechanisms at the Inclusions' Scale

Y. Marco, I. Masquelier, V. Le Saux, B. Huneau, P. Heuillet & P. Charrier

17:10 Morphology of Damage Occurring During Decompression in a Hydrogenexposed EPDM

O. Kane Diallo, S. Castagnet, J.C. Grandidier & A. Nait-Ali

Session

Room

CONTINUUM MECHANICAL MODELS AND NUMERICAL IMPLEMENTATION (1)

A+B+C

Chair: Prof. Mikhail Istkov

08:30 Evaluating the Influence of a Multiaxial Static Preload on the Dynamic Properties of Elastomers

A. S. Lectez, E. Verron & B. Huneau

08:50 Temperature Dependency of a Viscoplastic Constitutive Model for Rubber with Reinforcing Fillers

Rickard Österlöf, Leif Kari & Henrik Wentzel

09:10 3-Dimensional Homogenization FEM Analysis of Hyperelastic Low Density Polymer Foams

R. Shimazu, H. Yasutaka, A. Nomoto & A. Matsuda

09:30 Parallel Rheological Framework to Model the Amplitude Dependence of the Dynamic Stiffness in Carbon-Black Filled Rubber

T. Dalrymple, J.A. Hurtado, I. Lapczyk & H.R. Ahmadi

09:50 The Phenomenological Behaviors of Heat Build-Up Process of Rubbers

K. Akutagawa & S. Hamatani

KEYNOTE LECTURE

A+B+C

Chair: Prof. James Busfield

10:30 Applications of Stress-Strain Models to Friction of Rubber

Alan Muhr

FRACTURE, FATIGUE & LIFETIME PREDICTION (4)

A+B+C

Chair: Dr. William Mars

11:20 Experimental Survey of Approaches to Estimate the Uniaxial Fatigue Life of Industrial Rubbers

S. Seichter, V.-M. Archodoulaki, T. Koch, W. Fidi, A. Holzner & S. Robin

11:40 A New Experimental Approach to Rubber Resistance Against Cutting by Sharp Objects

R. Stoček, O. Kratina & R. Kipscholl

Session

Room

DESIGN AND APPLICATIONS

A+B

Chair: Prof. Nere Gil-Negrete

13:20 Modelling of the Rubber Relaxation Effects on the Small-Deflections Behaviour of the Seismic Isolation System RBRL

M. Donà, G. Tecchio, M. Parolin & C. Modena, A.H. Muhr

13:40 Models for Filled Rubber in Simple Shear

E. Tubaldi, H.R. Ahmadi, A.H. Muhr & J. Kingston

14:00 FE Impact Analysis of Aluminum Wheel with Inflated Tire

S. Ishikawa & N. Nosaka

14:20 Leak Tightness of Elastomeric Seal at Low Temperature: Experimental and FEM-Simulation

B. Omnès & P. Heuillet

14:40 Design, Analysis and Use of a Rubber Diaphragm for Directional Drilling

V.A. Coveney, P.A. Kukian, D.J. Minett-Smith & D.R.H. Stroud

15:00 Jamming of Rubber Particles

D. Stratford Devalba, L. Botto & J.J.C. Busfield

MAGNETO-SENSITIVE, IONIC AND ELECTRO-ACTIVE ELASTOMERS

C

Chair: Prof. Leif Kari

15:40 Fractional Derivative Model for Magnetorheological Elastomers

I. Agirre-Olabide, M. J. Elejabarrieta & A. Lion

16:00 Optimization of Mechanical Properties of Magneto-Sensitive Elastomers by Applying Hybrid-Magnetic Fillers

M. Klüppel & S. Aloui

16:20 Study on the Electrical Breakdown of Dielectric Elastomer Actuator Materials

B. Chen, M. Kolloche, M. Stewart, M.G. Cain, J.J.C Busfield & F. Carpi

16:40 Constitutive Modeling of Magneto- and Electro-Active Rubbers by Polyconvex free Energies

M. Itskov & V. N. Khiêm

Session

Room

STRAIN INDUCED CRYSTALLIZATION

A+B

Chair: Prof. Jean-Benoit Le Cam

15:40

Crosslink, Entanglement and Strain-Induced Crystallization of NR

S. Toki, W. Sainumsai, K. Suchiva, L. Rong & B. S. Hsiao

16:00

A micromechanical Model for Dynamic Strain-Induced Crystallization in Filled Natural Rubbers

Vu Ngoc Khiêm & Mikhail Itskov

16:20

Temperature dependence of strain-induced crystallization in natural rubber

N. Candau, L. Chazeau, J.-M. Chenal, T. Biben, R. Laghmach, C. Gauthier & E. Munch

Session

Room

POSTER SESSION

Foyer

17:00

Quantification of the Filler Flocculation Process in Natural Rubber Melts

J. Kadlcak, I. Kuritka, L.B. Tunnicliffe & R. Cermak

Effect of Swelling Level on Fatigue Lifetime of Filled Nitrile Rubber

M. S. Loo, A. Andriyana, J.-B Le Cam & E. Robin

Experimental Research of the Damping Properties of Magnetosensitive Elastomers

I. Petrikova, B. Marvalova, S. Samal & X. Garmedia

Characterization of Heat Sources in the Crack Tip Zone in Stretched NR and SBR Rubbers

J. R. Samaca Martinez, X. Balandraud, E. Toussaint, J.-B. Le Cam & D. Berghezan

The Silanization Reaction of an Organically Modified Synthetic Layered Silicate and its Use as Synergistic Filler Additive for Tire Tread Compounds

J. G. Meier, M. Martínez, D. Julve, J. Coronas, M. Menéndez, J. Ramos & J. Pérez

Experimental Investigations of Swollen Nitrile Rubber under Fatigue Loading

M. S. Loo, A. Andriyana, J.-B. Le Cam & E. Robin

High Frequency Investigation of Elastomer Properties with Glass Spheres using Ultrasonic Spectrometer

A. Maslak, A. Lang, J. Meier & T. Alshuth

Biaxial Model for the Rolling-Ball Rubber-Layer Isolation System

M. Donà & A.H. Muhr

Experimental Investigation of Anisotropy of the Mechanical Properties of Reinforced Elastomeric Nanocomposites

V.V. Shadrin, K.A. Mokhireva, L.A. Komar & A.Yu. Beljaev

Studying Dynamic of Mechanical Behaviour of Reinforced Rubbers with a Help of a Multi-Scale Approach

I. Ivaneiko, V. Toshchevnikov, K.W. Stöckelhuber, M. Saphiannikova, S. Westermann, F. Petry & G.Heinrich

Session

Room

POSTER SESSION

Foyer

17:00

Phenomenological Modelling for Viscohyperelasticity: Evolution Law Extension for Neo-Hookean Hyperelasticity

N.H.Kröger, D. Juhre

Thermo-Rheological Characterization of Polyetherurethane: Parameter Optimization and Validation

E. Ghobadi, R. Sivanapillai, J. Musialak & H. Steeb

Physically based model of strain-induced crystallization in natural rubber under uni-axial deformation

A. Gros, E. Verron, B. Huneau & M. Tosaka

Analysing the Deformation of the Packer Unit from a Blowout Preventer Using Finite Element Techniques

R. J. Windslow, A.G. Thomas & J.J.C. Busfield

Development of Integrated Design System for Rubber Components

C.S. Woo & H.S. Park

The Multilevel Method for Analyzing Heightmap Data of Nanocomposites Obtained by Atomic Force Microscopy

N.I. Uzhegova, V.N. Solodko & A.L. Svistkov

Effect of Loading Rate and Initial Density on the Mechanical Response of Polyurethane Elastomer Foams

A. Lachhab, E. Robin, J.-B. Le Cam, F. Mortier, Y. Tirel & F. Canevet

Estimating Strain Energy Release Rate During Blade Abrasion at Steady State Using Finite Element Analysis

G.C. Wu, A. Mukaiyama, A.G. Thomas & J.J.C. Busfield

Investigation of Thermal Aging Effects on the Fatigue Design of Automotive Anti-Vibration Parts

M. Broudin, V. Le Saux, Y. Marco, P. Charrier & W. Hervouet

A Novel Polymer Network Deformation Model Considers Elastomer Molecular Structure Parameters

V.N. Solodko & A.L. Svistkov

Session

Room

POSTER SESSION

Foyer

17:00

Extending the Overlay Method in Order to Capture the Variation due to Amplitude in the Frequency Dependence of the Dynamic Stiffness and Loss During Cyclic Loading of Elastomers

Z. Kareaga, T. Guraya, A. Arriaga & P-E. Austrell

Cavitation Erosion in UHMWPE: A Three-Dimensional FEM Study

B. Kattekola, M. Fivel & J.-P. Franc

Modelling of Changes in Mechanical Properties of Rubber under Cyclic Loading

J. Heczko & R. Kottner

Characterization of Rubber-Like Materials Considering the Baker-Ericksen Inequalities

F.T. Stumpf & R.J. Marczak

Effects of Strain-Induced Crystallization and Filler Reinforcement on Strain and Stress Concentrations in Elastomers at Finite Deformations

H. Khajehsaeid & S. Reese

Calculation Methods and Fields of Use of Multilayered Rubber-Metal Packages

S.N. Polukoshko & V.F. Gonca

Dielectric Elastomer Actuators for Colour Changing Devices

H. Zahabi, M. Bennett, J. J. C. Busfield & F. Carpi

Modelling of Magneto-Mechanical Coupling in COMSOL Multiphysics

B. Marvalova & I. Petrikova

Factors Affecting Fatigue Life of Cord Reinforced Rubber and the Stress Distribution Modelling under Static and Dynamic Conditions

Y. Tao, E. Bilotti, A. G. Thomas, J. J. C. Busfield, C. Hayes & Ch. A. Stevens

Session

Room

CONTINUUM MECHANICAL MODELS AND NUMERICAL IMPLEMENTATION (2)

A+B+C

Chair: Prof. Michael Kaliske

08:30

Modeling Nonlinear Viscoelastic Behavior of Elastomers Using a Micromechanically Motivated Rate-Dependent Approach for Relaxation Times Involved in Integral-Based Models

H. Khajehsaeid

08:50

A Colloidal Elastomer Model

M. Welsch

09:10

Some Remarks about Numerical Integration of Microsphere Models

Erwan Verron

09:30

Volumetric Compression of HNBR and FKM Elastomers

A. Ilse, B.H. Skallerud & A.H. Clausen

09:50

Magnetic Response of Aligned Nickel Coated Carbon Fibres in a PDMS Matrix

D.C. Stanier, S. Rahatekar & J. Ciambella

KEYNOTE LECTURE

A+B+C

Chair: Prof. Erwan Verron

10:30

Revisiting the Mechanisms Involved in Rubber Deformation Using Experimental Thermomechanics

J.-B. Le Cam, J. R. Samaca Martinez, X. Balandraud, E. Toussaint & J. Caillard

Session

Room

THERMAL EFFECTS

A+B+C

Chair: Dr. Michael Johlitz

11:20 Simulation of an AEM Rubber at the Transition Temperature and Above for Sealing Applications

J. Lejeune, C. Brung, N. Arnault & M. Barry Maizeroi

11:40 On the Constitutive Representation of Polymer Crystallisation in Continuum Mechanics

A. Lion & M. Johlitz

12:00 On the Use of a Full Haigh Diagram for Lifetime Prediction of Rubber Parts

C. Champy, V. Le Saux, Y. Marco, P. Charrier & W. Hervouet

AGEING

A+B

Chair: Prof. Jörn Ihlemann

13:30 Experimental Investigation on the Consumption of Oxygen and its Diffusion into Elastomers During the Process of Ageing

A. Herzig, M. Johlitz & A. Lion

13:50 Experimental Characterization of the Ageing Resistance of Elastomers

K. Reincke, M. Schoßig, S. Poser, B. Langer, S. Döhler, U. Heuert, W. Frank & W. Grellmann

14:10 Chemical Ageing of Polymers – Experiments and Modelling

B. Musil, M. Johlitz & A. Lion

14:30 Weathering of NR/CR Based Rubber Vulcanizates: Investigation of Network Structure using Pulse-NMR and Temperature Scanning Stress Relaxation (TSSR) Techniques

F. A. Nobari, M. Şen, B. Karaağaç & V. Deniz

14:50 A Dynamic Network Model to Simulate Chemical Aging Processes in Elastomers

C. Naumann & J. Ihlemann

Session

Room

SWELLING, FRICTION & ABRASSION

C

Chair: Prof. James Busfield

13:30 Prediction of Equilibrium Swelling of Filled Elastomers Undergoing Deformations

A. Andriyana, S.Y. Ch'ng, V. Brulliard, E. Verron & S. Le Corre

13:50 A Swelling Study of Process-Induced and Deformation-Induced Anisotropy of Filled Rubbers

V. A. Fernandes & D. S. A. De Focatiis

14:10 Steady State Rolling Simulation for Rubber with Inelastic Properties

M. A. Garcia & M. Kaliske, J. Wang & G. Bhashyam

14:30 Multiscale Rubber Friction Homogenization for Rough Surfaces

K. Falk & M. Kaliske

14:50 A New Fatigue Wear Simulation Method for Road Tyre Wear

F. Abraham & T. Alshuth

AGEING & ADHESION

A+B

Chair: Prof. Frank Abraham

15:30 Application of a Micro-Structure Based Model to Thermally Aged Filler Reinforced Elastomer Compounds

J. Plagge & M. Klüppel

15:50 Lifetime Prediction of EP and NBR Rubber Seal by Thermo-Viscoelastic Model

K. Kobayashi, T. Isozaki, A. Matsuda, Y. Mizutani & Y. Hori

16:10 Fracture Behavior and Thermo-Oxidative Ageing of EPDM

C. Kartout, A. Cristiano-Tassi, G. Marque & C. Creton

16:30 Lifetime Estimation of NR under Thermal and Mechanical Loads

S. Ernst, U. Weltin & M. Flamm

16:50 Adhesion of Rubber – Modelling of an Adhesion Pendulum

S. Nitzsche & M. Kröger

Session

Room

HYPERELASTICITY

C

Chair: Prof. Alexander Lion

15:30	Development of Anisotropic Hyperelastic Model Considering Stress Softening
	<i>A. Matsuda</i>
15:50	Volume Decomposition for a Robust, Mechanics-Based, Hyperelastic Foam Model
	<i>M.W. Lewis & P. Rangaswamy</i>
16:10	Precise Measurement Technique of Stress-Strain Relationship for Rubber Using In-Plane Biaxial Tensile Tester
	<i>M. Fujikawa, N. Maeda, J. Yamabe, Y. Kodama & M. Koishi</i>
16:30	Performance Evaluation of Various Hyperelastic Constitutive Models of Rubbers
	<i>N. Maeda, M. Fujikawa, C. Makabe, J. Yamabe, Y. Kodama & M. Koishi</i>
16:50	Free Retraction of Natural Rubber
	<i>L.B. Tunnicliffe, A.G. Thomas & J.J.C. Busfield</i>
17:10	Thermo-Mechanical Characterization of Silicone Foams
	<i>P. Rangaswamy, N. A. Smith, C. M. Cady & M. W. Lewis</i>

Session

Room

MULLINS EFFECT

A+B+C

Chair: Dr. Shigeyuki Toki

08:40

Modelling the Dynamic Behaviour of an Automotive Bush with a Viscoplastic-Elastoplastic Model

J. Gough, H.R. Ahmadi, A.J. Harris, J.G.R. Kingston, R. Wear, A. Kilgour & T.C. Seng

09:00

Rebound Energy Approach to Evaluate Rubber Unloading-Reloading Process for Industrial Products with Residual Strain

R. K. Luo & W. J. Mortel

09:20

Modeling of Mullins Effect by Generalizing the Uniaxial Theory of a Strain Amplification Factor

S. Gelke, M. Freund, J. Ihlemann & R. Klauke

09:40

Thermal and Calorific Effects Accompanying the Stress Softening

J. R. Samaca Martinez, J.-B. Le Cam, X. Balandraud, E. Toussaint & J. Caillard

Session

Room

MICRO-MECHANICAL APPROACHES

A+B+C

Chair: Prof. Manfred Klüppel

10:20 Identification of Simulation Model of Polyurethane Foam by Means of Optimization Algorithm

D. Cirkl & T. Hrus

10:40 Simulation of Mullins Effect and Relaxation Due to Self-Organization Processes in Filled Rubber

H. Wulf & J. Ihlemann

11:00 Evaluating the Simulation of Ideal Filler Reinforced Elastomers Using a Full Field Modelling Approach

D. Sodhani, B. Stier & S. Reese

11:20 Finite element simulation of inelastic and viscoelastic effects using a Micro-Structure Based Model for Filled Elastomers

R. Raghunath, M. Klüppel & D. Juhre

11:40 A Micro-Mechanical Model for Non-Linear Inelastic Behavior of Double Network Hydrogels

İ. D. Külcü, M. Itskov & R. Dargazany

12:00 Application of Chain Length Statistics to Modeling of Rubber Elasticity and Anisotropic Softening

M. Itskov

12:20 Towards Constitutive Equation for Non-Linear Mechanics of PDMS-Nanosilica

D. Colombo, S. Cantournet, F. Lequeux, H. Montes & K. Le Gorju