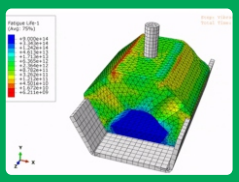
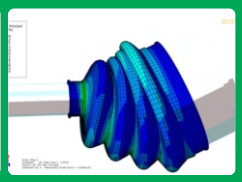
Rubber Durability India 2018

dhio center for excellence

Endurica
Get Durability Right

Endurica Expert Training Class Now happening in India

23rd - 28th July 2018
Bangalore India


Courses in India

23-07-2018, Mon, 4 hours
Registration Free

Introduction to Modern Fatigue Analysis for Elastomers

24-07-2018 Tue - 26-07-2018 Thu, 3 Days
Registration Fee Applicable

Characterizing Elastomer Fatigue Behavior for Analysis and Engineering

27-07-2018 Fri - 28-07-2018 Sat, 2 Days
Registration Fee Applicable

Application of Rubber Fatigue Analysis with Endurica CL

Dr. Will Mars
President, Endurica LLC

Dr. Will Mars is an international leader in the failure mechanics of rubber. He has received several awards for his scientific contributions and innovations, including the 2017 Rubber Division ACS Arnold Smith Special Service Award, the 2007 Sparks Thomas award of ACS Rubber Division, and the 1999 Henry Fuchs award of the SAE Fatigue Design & Evaluation committee.

Dr. Mars is the editor of the journal Rubber Chemistry & Technology, and past editor of Tire Science & Technology with 40+ peer-reviewed publications and a patent. His experiences and contributions span a topic range including material characterization, product evaluation, constitutive modeling, crack nucleation, fracture mechanics and fatigue life prediction methods.

He has more than 20 years' experience developing testing and simulation methods in the rubber industry. Dr. Mars' professional activity has focused generally on applying experimental and computational mechanics in pursuit of better -performing rubber products. He has taught graduate courses as an adjunct professor at the University of Toledo in continuum mechanics and fracture mechanics. He has been an invited lecturer in numerous international venues. Dr. Mars earned his Honors BSME with Polymer Specialization at the University of Akron, and his MS and Ph.D. degrees at the University of Toledo. Dr. Mars is the author of the Endurica fatigue life solver – the world's first commercially available simulation for fatigue analysis of rubber. As founder and president of Endurica LLC, he promotes use of the simulation software worldwide through lectures and workshops.

Contact us for more details

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Introduction to Modern Fatigue Analysis for Elastomers

23-07-2018
Monday, 4 hours

Registration Free

Location: Bangalore, India

Registration Cost: Free

Overview:

This seminar reviews issues commonly faced when pursuing fatigue performance in elastomeric products, and the problems that can be solved using modern characterization and analysis techniques. It introduces technologies, solutions and workflows that you can use to achieve your durability targets for problems involving nonlinear material behavior, and multiaxial, variable amplitude loading. The training includes a case study demonstrating the application of **Endurica CL and Endurica DT** for fatigue analysis.

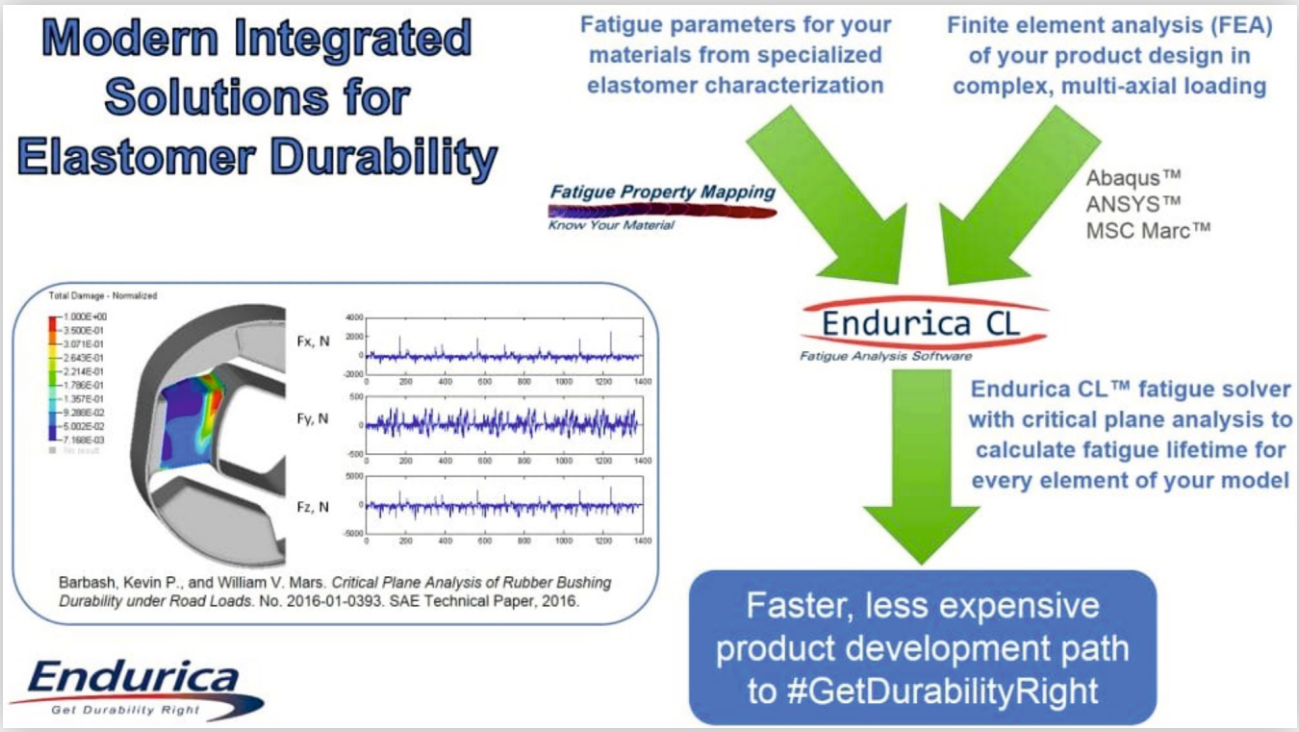
Content:

– Infamous rubber fatigue failures and what they teach us
– **Concept overviews:** Fracture Mechanics and Crack Nucleation Analysis Approaches
– **Technology overviews:** Nonlinear material models, critical plane analysis, damage accumulation under complex loading
– **Solutions:** Materials Characterization, Numerical Analysis of Fatigue from FEA
– **Workflow:** Application of Endurica CL to elastomer fatigue analysis

Endurica CL is a unique solution for computer simulation of fatigue failure in elastomers. It offers analysts a reliable and well validated method to investigate, diagnose and resolve the issues that limit product durability.

Endurica DT is a an add-on to Endurica CL that enables simulation of incrementally defined fatigue analysis problems. It offers analysts a capability to compute remaining life, to model load schedules involving many events, or even to implement a digital twin for structural health monitoring of rubber components.

Who should attend: Engineers and management involved with the selection, design, analysis, and testing of elastomer materials, components, and systems that must endure dynamic loading conditions.



Characterizing Elastomer Fatigue Behavior for Analysis and Engineering

24-07-2018 Tue - 26-07-2018 Thu
3 Days Course

Registration Fee Applicable

Location: Bangalore, India

Registration Cost Per Candidate : INR 25,000.00 + GST 18% **Group Discount Available**

Overview:

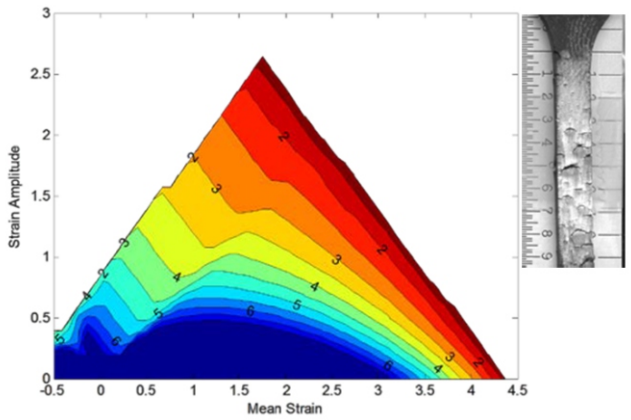
Elastomers are outstanding in their ability to repeatedly endure large deformations, and they are often applied where fatigue performance is critical. Their macromolecular structure gives rise to unique behaviors, and so appropriately specialized experimental methods are needed to characterize, analyze, and design for durability. This 3-day course will give you powerful approaches to anticipate, diagnose and solve fatigue-related issues.

Course Objectives

- Know the physics and factors that govern rubber's fatigue behavior
- Use accurate models and efficient procedures to characterize fatigue behavior
- Take advantage of test strategies that minimize risk and maximize productivity
- Use crack nucleation and fracture mechanics approaches effectively
- Use characterization to inform accurate fatigue calculations
- Use characterization to diagnose and solve development issues

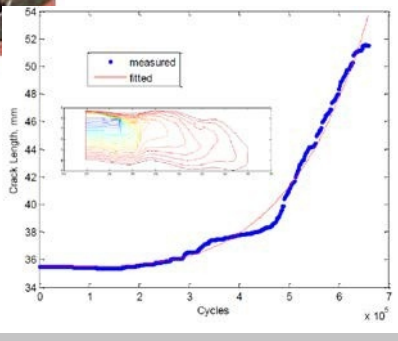
Format

The course includes lectures and hands-on exercises focused on processing and interpreting experimental measurements of fatigue behavior. Working tea and lunch included.



Haigh diagram for a natural rubber compound, showing contours of equal fatigue life.


Courtesy Axel Products



Agenda

Day 1: 9:00 am – 6:00 pm

- Elastomers as engineered materials
- Design, Analysis and Characterization for Durability with Rubber
- Stiffness, mode of control, compound optimization
- Stress-strain – molecular origins and hyperelasticity
- Stress-strain – cyclic phenomena and advanced models
- Self-heating in rubber
- Tearing energy

Day 2: 9:00 – 6:00 pm

- Characterizing strength of rubber
- The fatigue threshold
- Strategic considerations in fatigue testing
- Characterizing Fatigue behavior of individual cracks – fully relaxing cycles
- Characterizing Fatigue behavior – nonrelaxing cycles and strain crystallization
- Crack nucleation, S-N curves, Continuum Damage

Day 3: 9:00 – 4:00 pm

- Characterizing crack precursor size
- Rubber's Fatigue Design Envelope
- Aging
- Multiaxial loading and Critical Plane Analysis
- Fatigue in tension, shear, and compression
- Variable amplitude loading, Rainflow counting, and damage accumulation
- Component testing

Application of Rubber Fatigue Analysis with Endurica CL

27-07-2018 Fri - 28-07-2018 Sat
2 Days Course

Registration Fee Applicable

Location: Bangalore, India

Registration Cost Per Candidate : INR 18,000.00 + GST 18% **Group Discount Available**

Overview:

For many companies, validating the service life for an elastomeric product is the most time-consuming and expensive stage of the product development process. The physical testing requires investment in prototypes that will be destroyed and lengthy trials that execute on expensive equipment. This course shows how Endurica software can be applied to virtually evaluate fatigue performance and solve design issues at the concept stage. After this 2-day course, you will be ready to use the software to diagnose and solve fatigue issues.

Course Objectives

- Understand key ingredients of successful fatigue analysis for rubber
- Be able to select and specify material models that accurately describe elastomer stress-strain and fatigue behavior.
- Understand principles needed for accurate fatigue analysis: critical plane analysis, rainflow counting, and damage accumulation.
- Set up a Finite Element model to ensure accurate fatigue analysis.
- Use Endurica CL to solve durability issues involving multiaxial, variable amplitude loading

Format

The course includes lectures and hands-on exercises focused on processing and interpreting experimental measurements of fatigue behavior. Working tea and lunch included.

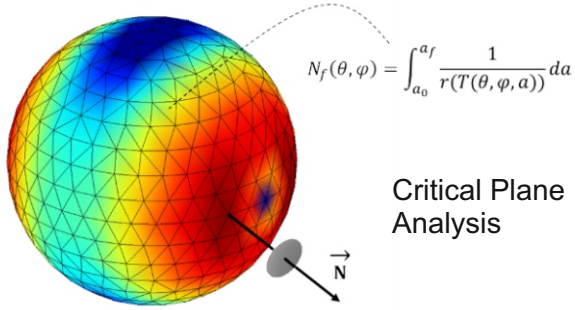
Agenda

Day 1: 9:00 am – 6:00 pm

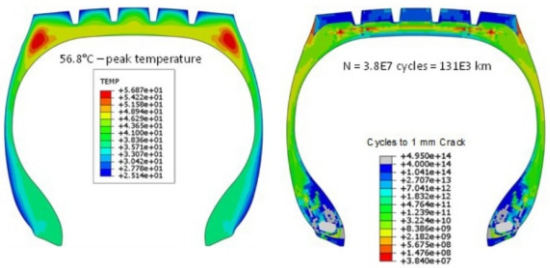
- Overview of software capabilities and workflows
- Setting up the stress-strain model
- Using material models for fatigue - fully relaxing
- Using material models for fatigue - nonrelaxing and strain crystallization
- Specifying thermal effects
- Industry Applications: bushing under a 2-channel road load signal, exhaust mount, prosthetic joint

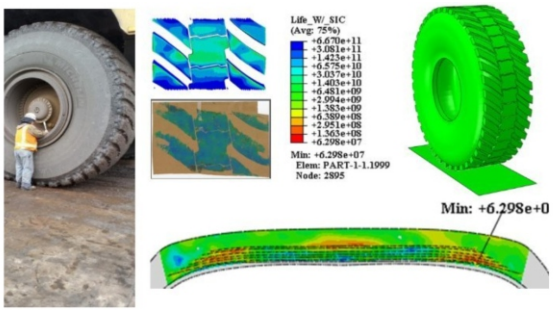
Day 2: 9:00 – 6:00 pm

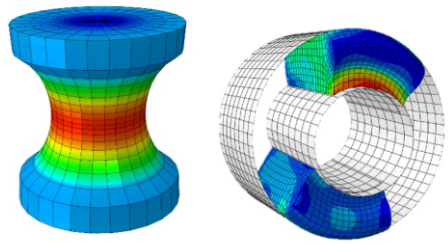
- Calibrating crack precursor size
- FEA for life prediction
- Dealing with Multiaxial loading in fatigue analysis
- Dealing with Variable amplitude loading in fatigue analysis
- Incremental damage analysis, block cycle schedules, and residual life calculations



Critical Plane Analysis







Registration Form

Name _____

Designation_____

Company Name _____

Street _____

City _____

State _____ Zip _____

Email _____

Work Phone _____

Mobile_____

Area of Research / Interest _____

Any Specific Request _____

Course Details

SL No	Course	Fee Per Person In INR	Interested to Attend ?
1	**Introduction to Modern Fatigue Analysis for Elastomers** **23-07-2018, Mon, 4 hours**	**Registration Free**	
2	**Characterizing Elastomer Fatigue Behavior for Analysis and Engineering** **24-07-2018 Tue - 26-07-2018 Thu, 3 Days**	**INR 25,000.00 + GST**	
3	**Application of Rubber Fatigue Analysis with Endurica CL** **27-07-2018 Fri - 28-07-2018 Sat, 2 Days**	**INR 18,000.00 + GST**	

Registration Details

forward the registration form along with registration fee in the form of DD/Cheque/Cash/Online Transfer, in the name of "***DHIO Research and Engineering Pvt Ltd.,***" Payable at Bangalore. **DHIO GSTN : 29AADCD7135P1Z3**

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DHIO & ENDURICA LLC Reserve the rights to accept /reject the registration of any candidate without assigning any reason

DHIO & ENDURICA LLC reserves the right to cancel a scheduled training course if the minimum class size is not met. In the event of a cancellation, DHIO & Endurica LLC will make every attempt to notify registered participants within five working days. Payment made for a canceled course will be refunded in full or applied to another scheduled training course.

Participant cancellations must be received at least 10 working days in advance. Registrations canceled by participants less than 10 working days before the training course begins are subject to a 50% cancellation charge. For cancellations occurring on the first day of a scheduled training course, and for "no shows," the full tuition fee is non-refundable.