

Rubber Compounding for Durability

Are you challenged to make your rubber products last longer? Rubber compounds are complex mixtures of polymers, reinforcing fillers, oils / plasticizers, curatives, stabilizers, and other additives that are combined in relatively quick mixing processes. Durability is impacted by all these ingredients, their interactions, and the quality of the mixing. This one-day course will teach compounding strategies to improve the strength and lifetime of rubber components. This specialized training will benefit materials engineers, compounders, rubber chemists, product development engineers, R&D scientists, and rubber lab managers at manufacturers of tires and rubber parts and companies that supply raw materials.

Course Objectives

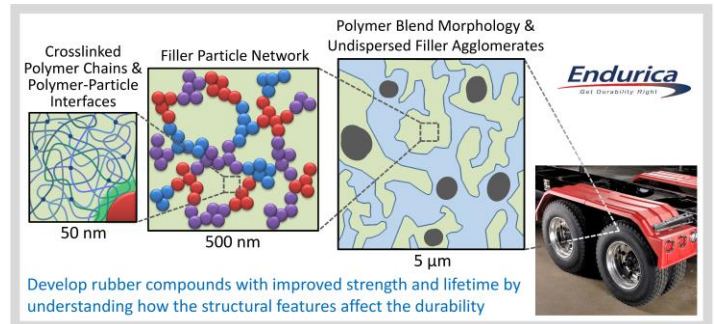
- Understand how rubber fatigue and failure characteristics are influenced by materials selection and compound structural features
- Learn compounding strategies to improve strength and fatigue lifetime
- Know the right testing methods to characterize rubber durability efficiently in the lab

Format

The course includes lectures and classroom exercises focused on understanding fatigue behavior of rubber and developing compounding approaches to improve durability. Lunch (Day 1) and snacks are included.

Instructor

Dr. Chris Robertson is an international authority on polymer science and rubber compounding for performance. He brings over 15 years of materials research and product development experience at tire and rubber companies and raw materials suppliers. Chris is co-inventor of 32 patents, co-author of 55 publications in peer-reviewed journals, and serves as Associate Editor of *Rubber Chemistry & Technology*.



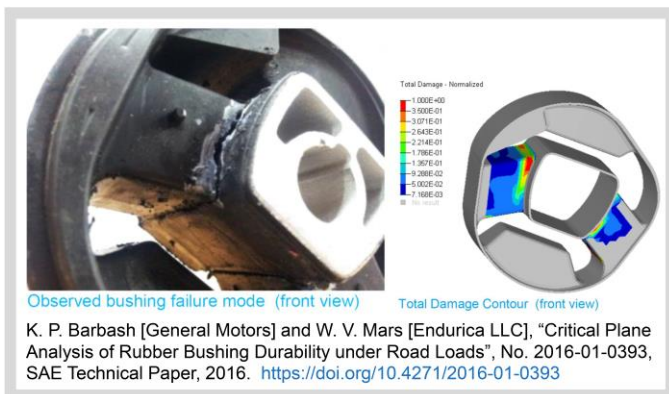
Agenda

Day 1: 8:30 am – 4:30 pm

- Introduction: What types of failure are manifested in your products, and what is durability worth to you?
- Brief overview of rubber formulations and mixing approaches
- Testing for durability in the rubber lab: Focus on efficient testing of crack nucleation and crack growth
- Framework for compounding for durability
- Polymer selection: Chemical stability, strain-induced crystallization, molecular mobility, polymer blends
- Crosslinking effects: Effects of type, density, and distribution of crosslinks
- Filler type, dispersion, and reinforcement topics, including processing effects and crack precursors

Day 2: 8:30 am – 12:00 pm

- Stiffness and deformation control mode
- Influence of oils, plasticizers, and resins
- Stabilizing against aging
- Simulation for materials selection and durability prediction
- Wrap-up discussions, final Q&A





Registration Form: *Rubber Compounding for Durability*

Course Dates: November 7-8, 2019

Course Location: Crystal Glen Office Center
Conference Room L55
39555 Orchard Hill Place
Novi, Michigan 48375

Price: \$1280 *

*for registrations received 14 days prior to course date. Registration after this date incurs a late fee of \$250.

To **Register ONLINE**, go to www.endurica.com/training/#compounding.

OR you can mail, fax or e-mail this form to:

Attention: Joe Suter
jasuter@endurica.com
Fax: 567-429-7034
Phone: 419-957-0543 x707
Endurica LLC
1219 West Main Cross, Suite 201
Findlay, Ohio 45840

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Or, write a check payable to Endurica LLC.

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, 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.

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