

## SPEAKING ENDURICAN **Endurica** Get Durability Right™

Endurica's 2024 SAE WCX paper is now Open Access

**Best Paper Honor + selected to be published in the SAE International Journal of Advances and Current Practices in Mobility**

### Durability of elastomeric bushings computed from track-recorded multi-channel road load input

William V. Mars<sup>1</sup>, Kevin Barbach<sup>2</sup>, Matthew Wiecek<sup>3</sup>, Scott Braddock<sup>4</sup>, Joshua Goossens<sup>5</sup>, Ethan Steiner<sup>1</sup>

**SAE INTERNATIONAL**    <sup>1</sup>Endurica LLC    <sup>2</sup>General Motors    <sup>3</sup>Tenneco    **WCX** WORLD CONGRESS EXPERIENCE

SAE 2024 World Congress Experience

The qualification requirements of automakers derive from track testing in which road load and moment inputs to a part in x, y and z directions are recorded over a set of driving conditions selected to represent typical operation. Because recorded histories are lengthy, often comprising many millions of time steps, past industry practice has been to specify simplified block cycle schedules for purposes of durability testing or analysis. Simplification, however, depends on imprecise human judgement, and risks fidelity of the inferred life and failure mode relative to actual. Fortunately, virtual methods for fatigue life prediction are available that are capable of processing full, real-time, multi-axial road load histories. Two examples of filled natural rubber ride bushings are... [READ MORE](#)

[Read the Paper](#)    [OPEN ACCESS](#)

## Vibration Isolation and Durability: True-Load Meets Endurica EIE

159 words | less than 1:00 read

Join us for an exciting and informative webinar on integrating durability solutions with a method for collecting load data. Discover how we've tackled the challenge through a real-world case study, where we measured the loads experienced by rubber isolators supporting a battery over a one-hour drive through Milwaukee. Using advanced strain gauge technologies, True-Load procedures, and cutting-edge software from Endurica, we processed these loads into stress-strain histories and performed a comprehensive fatigue life analysis.

**You will learn:**

- How we captured and analyzed real-world load data using strain gauges and True-Load procedures.
- Endurica EIE's nonlinear interpolation process that transformed these loads into detailed stress-strain histories for each of 4 rubber mounts
- The use of the critical plane method for predicting fatigue life and failure modes of elastomer mounts.
- Key insights into ensuring the long-term durability of vibration isolation systems in high-stress applications.

**Session 1: Europe / Middle East / Africa and Asia**  
**1-2 PM CET (UTC+1)**  
for reference, that makes our starting time  
1:00 PM in Luxembourg (CET) | 3:00 PM in Istanbul (GMT+3) | 5:30 PM in Chennai (IST) | 9:00 PM in Tokyo (JST)

[Learn More and Register for Session 1](#)

**Session 2: North and South America**  
**11:00 AM EST (UTC-5)**  
for reference, that makes our starting time  
8:00 AM in San Diego (PST) | 9:00 AM in Denver (MST) | 10:00 AM in Chicago (CST) | 12:00 PM in São Paulo (BRT)

[Learn More and Register for Session 2](#)

**Tim and Will are at it again!**

**Tim Hunter, Ph.D.**  
President  
Wolf Star Technologies LLC

**Will Mars, Ph.D., P.E.**  
Founder & President  
Endurica LLC

Getting Bounced: Pogo Stick Loads and Durability was presented by Tim and Will at the International Association for the Engineering Modelling, Analysis and Simulation (IAEMAS) Community world wide event, CAAS20. The structural and rubber virtual digital twins of a pogo stick lifted interest of the charts. A pogo stick became its own load transducer with True-Load by leveraging the Abaqus FEA model, and Endurica's software then simulated the fatigue damage on the rubber. The mathematically efficient and quick load and damage calculations were completed in real time during the on-stage demo. As cool as the pogo stick project was, we're even more excited about Vibration Isolation and Durability: True-Load Meets Endurica EIE

EMEA Session
AMERICAS Session

**Highlight video from Trelleborg's 2024 Innotrans promotion featuring Endurica and presentation from the Eclipse with Endurica conference**

## Software to transform fatigue simulation in rail

Dr Nina Heinrich

[Watch the Video](#)

### Cutting Edge Methods for Rubber Wear & Tear

Macro

Micro

Similarity Principle,  $W = f(\rho)$

$\sigma_N, \tau, \dot{\sigma}, \dot{\tau}, \theta, \rho$

$z(x, y), \bar{\sigma}_N, \bar{\tau}, \bar{\dot{\sigma}}, \bar{\dot{\tau}}, \bar{\theta}, \bar{\rho}$

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Endurica combines software workflows, simulations and material characterizations to fully analyze rubber products' structural integrity in terms of "wear and tear" AND "chipping and flaking".

See our methods to evaluate if your component will wear out before it blows out.

Discover:

- the physics governing wear and chip & cut phenomena in rubber
- how Endurica's workflows are different from other durability analysis workflows
- typical testing machines and tests for friction, abrasion and cut & chip characterization
- methods to combine wear and structural fatigue for an overall look at product durability.

[Watch the Webinar](#)

**LAST CHANCE THIS YEAR to Learn Endurica's Software through Live, Online Training**

**Application of Rubber Fatigue Analysis with Endurica Software**

Join Dr. Will Mars and learn how to run Endurica's software.

The last live, online workshop in 2024 is November 19-22, 2024

[Learn More](#)

**Take the Software out for a test drive: request a trial license NOW!**

Fatigue Analysis Software

Incremental Fatigue Analysis

Fast Loads Processing

The best way to see Endurica in action is in your own operation and there is no better time to get started with a trial license. There is no cost involved and no commitment required.

[Send a quick email to start the process](#)

**Submit Testing Projects Now to Complete by Year End 2024 2025 Price Increase Just Around the Corner**

Time is running out for materials characterization testing to be completed in 2024. Contact us NOW to get your projects completed this year. Email [tgebott@endurica.com](mailto:tgebott@endurica.com)

Now is the time to start your Endurica software license at current prices - a rate increase will go into effect 01-01-2025

### Influencing Lifetime of Rubber Advances in Understanding Thermal Effects in Rubber

**3<sup>rd</sup> WEBINAR**  
**Influencing Lifetime of Rubber**

**Advances in Understanding Thermal Effects in Rubber**

Introduction: Gert Heinrich<sup>1,5</sup>

**Organizers:** Radek Stoček<sup>1,2</sup>, Reinhold Kipscholl<sup>3</sup>

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<sup>5</sup> Elm-Tec (Elastomer-Tec-Consulting), 30263 Hannover, Germany

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**Presentations include:**  
Thermo-mechanical and Energetic Behavior of Elastomers Investigated with IP Thermography by Professor Jean-Benoit LE CAM.

A Review of Thermal Effects on Elastomer Durability  
By Dr. William V. MARS, Endurica LLC, USA

Kinetics of Self Heat Build Up in Carbon Black Filled Natural Rubber  
by Assoc. Prof. Radek STOČEK, PRL s.r.o. o., Tomas Bat a University in Zlín , Czechia

[Watch the Webinar](#)

**FLASHBACK TO THE ENDURICA COMMUNITY CONFERENCE**

APRIL 8-9, 2024  
FINDLAY, OH USA

Highlight Video

1:45

**DELIVERING DURABILITY ACROSS THE RUBBER SUPPLY CHAIN**

FEATURING INDUSTRY LEADERS FROM GENERAL MOTORS, TENNECO, BASF, BRIDGESTONE, STELLANTIS, DASSAULT SYSTEMS CENTRE, CNH INDUSTRIAL, BIRLA CARBON, AXEL PRODUCTS, COESFELD, BASSINI BYPASS, WOLF STAR TECHNOLOGIES

[Watch the Video](#)