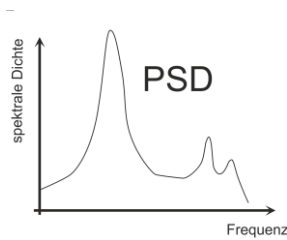




## Invitation to our Seminar



## Random Fatigue

in Niederstotzingen-Stetten near Ulm

Steinbeis-Transfer Centre  
New Technologies in Traffic Engineering  
Tel +49 (0)7325 3306  
Fax +49 (0)7325 4992

<http://www.stz-verkehr.de>

### Aims:

The methods of crack initiation calculation and stochastic analysis in winLIFE are new. We want to show our customers the theories of these methods.

### Requirements:

The participants should have a good knowledge of mechanical engineering, mathematics and physics and be familiar with the Windows operating system.

### Procedure:

All participants are provided with a computer installed with winLIFE and FEMAP/NASTRAN. Participants may bring their own PC if preferred. Tutorial exercises are done by all participants. The necessary data is already installed and the crucial point of the problems quickly reached.

## Seminar Program

- 9.00 Welcome and introduction
- 9.15 Stochastic basics:  
Analysis in time and frequency ranges, performance density spectrum, transmission, frequency analysis, white noise, broad and narrow-band analysis
- 10.30 Break
- 10.45 Examples for the stochastic analysis where the performance density spectrum of the acceleration is provided for a vibration table, calculation of PSD of the stresses with FEM, ascertaining the damage equivalent amplitude collectives in winLIFE, calculating the fatigue life, comparison with the analysis from the time range
- 12.30 Lunch
- 14.00 Mechanical basics of crack propagation:  
Phases of component fatigue, crack initiation, propagation, fracture.  
States of stress at the tip of the crack, crack behaviour under cyclic loading, stress intensity factor, mathematical description of crack propagation according to Paris, Erdogan Ratwani, and material data for description
- 15.00 Break
- 15.15 Crack models, assessing the stability of cracks, calculation approaches (Paris, Erdogan Ratwani, J-Integral), material data, calculation example with winLIFE
- 16.15 Break
- 16.30 Discussion
- 17.15 Seminar ends



## Organisational Details:

**Time:** from 9 AM to 5:15 PM

**Place:** Hotel Zum Mohren, Familie Dörflinger, Oberdorfstrasse 31, 89168 Niederstotzingen-Stetten, Tel. +49 (0)7325 92247-11, Fax.: +49 (0)7325 92247-12, info@lonetalhotel.de, www.lonetalhotel.de

It is also possible to reach us by train. The nearest railway station is Niederstotzingen.

There are enough PCs for all the participants.

**Cost:** 680 € + VAT

**Registration:** Due to limited space, we can only accept a maximum of 10 participants. All applications are binding. As soon as we have received your application, we will send you confirmation and an invoice which we would ask you to pay as soon as possible.

**Overnight Stays:** We recommend the conference hotel where the course is held: Zum Mohren, Oberdorfstrasse 31, 89168 Niederstotzingen-Stetten, Tel. +49 (0)7352 92247-11, Fax.: +49 (0)7325 92247-12, info@lonetalhotel.de, www.lonetalhotel.de

**Organising Company:** Steinbeis Transfer Centre New Technologies in Traffic Engineering, Tel.: +49 (0)7325 3306, Fax. +49 (0)7325 4992

**Lecturers:** Prof. Dr.-Ing. G. Willmerding and Mr. Jakob Häckh MSc

**Aims:** To provide the participants with knowledge of fatigue life calculations of dynamically loaded components with multiaxial loads. We cover the basic theory of multiaxial fatigue life analysis and calculate examples using winLIFE. Test results exist for all the calculation examples we do and this enables the participant to assess the accuracy.

**Requirements:** The knowledge gained in the winLIFE-BASIC Seminar is essential for this course. This Seminar is therefore only recommended for participants who have already attended the winLIFE-BASIC Seminar.

### Seminars:

Three times a year:

- winLIFE-BASIC (2 x German, 1 x English)
- winLIFE-MULTIAXIAL (2 x German, 1 x English)

Once a year

- FKM-guideline: static strength and dynamic fatigue prove (German, English on request)
- Power-User: Effective use of winLIFE for complex problems (German, English on request)
- Crack Growth and Random Fatigue (German, English on request)

## The winLIFE-Modules

The **winLIFE-Modules** can be used in conjunction with finite element programs such as *NASTRAN* for Windows, *IDEAS*, *SAMCEF*, *WTP 2000* and, with the help of *FEMAP*, with all standard FE programs. Measured data can be transferred from several programs (*LMS Roadrunner*, *winEVA*). The interfaces are documented in such a way that they can be programmed by the customer.

**winLIFE FKM QUICKCHECK** static strength analysis and fatigue analysis according to FKM-guideline for non-welded components, welded components can be analysed by a hot spot search (not according FKM)

**winLIFE BASIC** is for the basic procedures of fatigue life analysis.

**winLIFE MULTIAXIAL** is for calculating special problems where the direction of principal stress is not consistent. This program is an extension to the BASIC module and is for solving the most difficult of problems.

**winLIFE GEARWHEEL&BEARINGS** is for calculating gear wheels and bearings according to standard calculation procedures without finite elements. It is designed to transfer data from the program to our drive train simulation program winEVA and the measuring programs winADAM and DIANA.

**winLIFE CRACKGROWTH** You can calculate the crack growth of a component according to established theories.

**winLIFE RANDOM FATIGUE** Based on a given acceleration of a component in g<sup>2</sup>/Hz (PSD-spectrum) the stress PSD is calculated and a fatigue calculation performed.

## Applications

**winLIFE** has been sold to more than 240 customers and is used in the automobile, military and engineering industries, ship building, wind energy, mining industry, planning and universities.

### Short Description / Demo-Version

<http://www.stz-verkehr.de>

22.01.2019

Steinbeis-TZ Verkehrstechnik, Rosenstr. 5, 89168 Niederstotzingen  
Tel.: 07325 3306 email: [guenter.willmerding@t-online.de](mailto:guenter.willmerding@t-online.de)



## Registration

Please send this page by post to:

Steinbeis Transfer Centre  
New Technologies in Traffic Engineering  
Rosenstr. 5  
89168 Niederstotzingen

Or fax to: +49 (0)7325 4992.

Registration for the Seminar

### Crack Propagation Calculation and Random Fatigue

on \_\_\_\_\_

This application is binding.

After receiving the registration confirmation and the invoice, the applicant agrees to transfer the seminar fee of 680 € + VAT to our bank account at the Volksbank Brenztal eG IBAN DE92 6006 9527 0063 7300 06 BIC Code: GENODES1RNS

When we receive your registration form we will send you confirmation within three days.

Surname \_\_\_\_\_

First name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Dept. \_\_\_\_\_

Street \_\_\_\_\_

Post code \_\_\_\_\_ Town \_\_\_\_\_

Tel \_\_\_\_\_

Fax \_\_\_\_\_

Email \_\_\_\_\_

Date \_\_\_\_\_ Place \_\_\_\_\_

Signature \_\_\_\_\_