

## How-To Courses

Evening concurrent sessions

Wednesday March 21, 2018

7:00 p.m. – 8:00 p.m.

Oak

### Applying the Steinberg Component Fatigue Equation to Estimate Life

Nick Clinkinbeard, Rockwell Collins

Several years ago, Dave S. Steinberg presented an empirically-based equation to estimate component fatigue life during equipment exposure to vibration, as published in *Vibration Analysis for Electronic Equipment and Preventing Thermal Cycling and Vibration Failures in Electronic Equipment*. Although widely used, the equation was developed for a specific set of boundary conditions (simply-supported boundary conditions on four edges of a rectangular printed circuit board) that limits its application. This How To session will describe the fundamental approach developed by Steinberg to estimate the fatigue life of electronic components. In addition, it will describe a method developed by the author, by reverse-engineering Steinberg's equation and applying engineering judgment, to extend the approach to estimate component fatigue on circuit boards with many different shapes and boundary conditions.



**Nick Clinkinbeard** is a Principal Mechanical Engineer for the Rockwell Collins in Cedar Rapids, Iowa, where he has functioned as both a general design engineer and a vibration and shock specialist. For the past eleven years, he has worked in the Environmental Effects Engineering department, where his duties have focused primarily on shock and vibration—specifically including requirements capture and design support, classical and finite element analysis, test lab development and support, and training. Nick is also a Vice President of Education for the Institute of Environmental Sciences and Technology, and has taught courses on vibration and shock testing for the organization. Nick

has BS and MS degrees in mechanical engineering from Iowa State University, where he is currently pursuing a PhD in the field.

7:00 p.m. – 8:00 p.m.

Fir

### How to Select an Air Mover

Presented by: Guy Wagner, Electronic Cooling Solutions Inc.

This "How To" session focuses on the basics of fan/blower selection and their interaction with system airflow. Topics will include basic types of air movers, choosing the proper type of air mover for the system, determining the most efficient operating point, the effect on noise and power draw, and other applications.



**Guy Wagner** has 45 years of experience in the electronics industry. His experience includes cooling of a wide variety of electronics using natural, forced air and liquids, avionics cooling, medical device cooling, IC packaging technology, disk drive and computer system design. Mr. Wagner is an expert in the development of cooling technology for systems ranging from small handheld natural convection devices to liquid cooled 20 KW neural network learning machines. He has authored over 40 papers and presentations at international conferences and holds 29 patents.

Before becoming a Director at Electronic Cooling Solutions, he held positions as a Director of Engineering at Cornice Inc., Chief Scientist for the HP/Agilent Technologies PolarLogic Business Unit, and Member of Technical Staff at AT&T Bell Laboratories.

Guy's degrees in Mechanical Engineering are from Iowa State University.

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**8:00 p.m. – 9:00 p.m.**

**Oak**

#### **How to Use Content to Turn Thermal Management Sales Leads into Customers**

**Graham Kilshaw, ITEM Media**

The days of having a sales plan that relies primarily on cold actions to generate leads – calls, emails, and visits – is long gone. Now, you need a multi-pronged sales approach that incorporates timely content that entices a prospect to come to you, and builds a relationship of trust between your company and your prospects. But how do you know what types of content to create and – even more importantly – how to use content in the sales cycle? Join Graham Kilshaw, CEO of ITEM Media, in this interactive session as he takes you through the steps in building a realistic content marketing strategy, while providing you the opportunity to ask questions and contribute thoughts along the way.

Some of the topics discussed will include how to:

- Deliver the right content at the right time
- Develop key accounts with personalized content
- Repurpose content to minimize workload
- And more.

By the end of the presentation, you'll have completed a checklist of next-steps and developed a toolbox of content development and marketing tactics that you can take back to the office and begin implementing immediately.



**Graham Kilshaw** is the CEO of ITEM Media: a marketing agency and publisher that services the electronics industry with sales-driven marketing strategies and its media brands Electronics Cooling (dedicated to thermal management) and Interference Technology (dedicated to EMI/EMC).

From his 20 years' experience as CEO, Graham has developed a comprehensive understanding of the business needs of the US and international electronics industry. Combined with his background in sales, media, and marketing, Graham has transitioned ITEM Media from a traditional print publisher to a marketing powerhouse specialized in multi-channel marketing, events, content development, and sales enablement - all for its clients within the electronics equipment, components, materials, software, and testing service spaces.

**7:00 p.m. – 8:00 p.m.**

**Fir**

#### **App Development Challenge**

**Ross Wilcoxon, Rockwell Collins**

The App Development Challenge overview will describe two apps developed for Android platforms to provide users with simple tools for estimating electronics cooling performance issues such as heat sink thermal resistance, cooling air requirements, heat pipe performance, etc. The app will be made available to SEMI-THERM attendees for their own use. In addition, this session will include an open discussion of how to extend this activity to encourage SEMI-THERM participants to develop their own mobile apps that can be used to analyze thermal systems, evaluate design options, provide useful information for analysts, teach important concepts in the field of electronics cooling, etc. The goal will be for conference attendees to share their apps, with the most useful ones being recognized at the conference.



**Ross Wilcoxon** is a Principal Mechanical Engineer in the Rockwell Collins Advanced Technology Center. He conducts research and supports product development related to component reliability, electronics packaging and thermal management for communication, processing, displays and radars. Ross is also an editor for Electronics Cooling Magazine and a past General Chair for SEMI-THERM. Prior to joining Rockwell Collins in 1998, he was an assistant professor at South Dakota State University.