AGMA Offers Basic Training For Gear Manufacturing

By Casandra Blassingame

Manufacturers rely on a trained workforce now more than ever. AGMA works to bring new courses and webinars in an effort to be responsive to the workforce needs of the gear manufacturing industry. At the core of our training is the Basic Training for Gear Manufacturing course, which continues to be one of AGMA’s strongest offerings. We have been providing this course since 1994.

Held twice a year at Richard J. Daley College in Chicago, Illinois, the Basic Training for Gear Manufacturing course provides the primer for the gear industry, offering both classroom and hands-on training. It covers the topics of gearing and nomenclature; principles of inspection; gear manufacturing methods; and hobbing and shaping. Although the course is designed primarily for newer employees with at least six months’ experience in setup or machine operation, it can also benefit quality control managers, sales representatives, design and mechanical engineers, management, and executives. Students learn to understand the process and the physics of making a gear and can apply this knowledge with CNC equipment commonly in use.

The course crosses the gamut of the industry because each class is an amalgam of individuals ranging from apprentices and machinists to CEOs. During downtime and in the classroom, the students network, collaborate, and discuss challenges — often finding solutions and other ideas as a result. The instructors are readily available to answer questions and discuss topics of interest with the students during and after the course has ended. This type of interaction gives the students the opportunity to assess their own work and make the necessary process improvements following the training.

Dwight Smith, Peter Grossi, and Allen Bird are the dynamic trio of instructors who facilitate this course. They have created the perfect balance of classroom learning and hands-on gear cutting experience and bring a level of energy and passion that permeates the class and creates an enthusiasm for learning. Classes are kept to fewer than 20 participants so that each person has enough time to complete the hands-on component of the course. A pre-test and a post-test are administered to assess learning before and after the course has concluded.

AGMA APPRECIATES AND EXTENDS GRATITUDE TO THE INSTRUCTORS.

DWIGHT SMITH
Dwight Smith is currently the vice president of the Mitsubishi Heavy Industries America, Inc. Machine Tool Division and has a wide range of experience in gear manufacturing, including workholding, metrology, analysis, and project management. He has been developing and presenting basic gear training sessions globally since 1989. Smith also serves as chairman of the AGMA Nomenclature Committee.

PETER GROSSI
Peter Grossi’s career in gear manufacturing began in 1977. He has more than 13 years of experience in gear cutting machine operations, including large gear hobbers, Fellows shapers, and Gleason straight and spiral bevel gear cutting machines. Grossi also has more than 26 years of experience in gear manufacturing management, including supervision of gear cutting machine operations, gear grinding machine operations, and quality assurance. He has worked with a variety of companies in the industry, including Arrow Gear Company, Brad Foote Gear Works, Philadelphia Gear Corp., and AGMA.

ALLEN BIRD
Allen Bird’s career in gear manufacturing began in 1964 with Milwaukee Gear Company as a machine repair apprentice and eventually as a journeyman. After four years as a service engineer for Barber-Colman Co., Bird worked more than 28 years at American Pfauder Ltd./Gleason Works as a service engineer. He has installed and repaired numerous gear cutting machines and related products, and he has taught how to cut gears and solve gear-related problems.
Each year, the Fall Technical Meeting (FTM) provides an outstanding opportunity to share ideas with others in the gear industry on design, analysis, manufacturing, and application of gears, gear drives, and related products, as well as associated processes and procedures. Authors have the opportunity to present the results of their work to an audience of knowledgeable professionals from the United States and around the world and to participate in discussions with that audience.

SESSION 1
Manufacturing, Inspection & Quality Control

Efficient Hard Finishing of Asymmetric Tooth Profiles and Topological Modifications by Generating Grinding
Andreas Mehr, Liebherr-Verzahntechnik GmbH

The Whirling Process in a Worm Gear Drives Company
Massimiliano Turci, Studio Tecnico Turci

Computerized Simulation of Manufacturing Errors in Cylindrical Gears and Their Compensation Through Flank Modifications
Ignacio Gonzalez-Perez, Polytechnic University of Cartagena

Worm Screws High Speed Manufacturing
Jean-Laurent Feutren, Affolter Technologies SA

Gear Skiving on Multi-Tasking Machines: An Evaluation of the Sensitivity of Process Variables
Nilin Chaphalkar, DMG MORI USA Inc.

Twist Control Grinding (TCG)
Walter Graf, Reishauer AG

SESSION 2
Material & Heat Treatment

Review of Microstructure and Properties of Non-Ferrous Alloys for Worm Application and Advantages of Centrifugally Cast Bi-Metal Blanks
Giri Rajendran, MCC International

PreNitriding: A Means of Significantly Increasing Carburizing Throughput
Thomas Hart, Seco/Warwick Corporation

Performance and Machining of Advanced Engineering Steels in Power Transmission Applications – Continued Developments
Lily Kamjou, Drako AB

Fatigue Performance and Cleanliness of Carburizing Steels for Gears
Joakim Fagerlund, Drako

SESSION 3
Application, Design & Rating

Computerized Design of Straight Bevel Gears with Optimized Profiles for Forging, Molding, or 3D Printing
Alfonso Fuentes, Rochester Institute of Technology

Contact Fatigue Characterization of Through Hardened Steel for Low Speed Applications Like Hoisting
Michel Octrue, CETIM

Investigation of Transmission Testing on a Back-to-Back Arrangement
Nandkishor Mantri, Eaton Technologies Pvt. Ltd.

Determination of Load Distributions on Double Helical Geared Planetary Gear Boxes
Tobias Schulze, DriveConcepts GmbH

Designing Very Strong Gear Teeth by Means of High Pressure Angles
Richard (Rick) Miller, Innovative Drive Solutions LLC

SESSION 4
Efficiency, Lubrication, Noise, and Vibration

Investigation of Isotropic Superfinishing Effects on Ground Hypoid Gears
Hai Xu, General Motors Company

Impact of Surface Condition and Lubricant on Effective Gear Tooth Friction Coefficient
Aaron Isaacson, Gear Research Institute

Surface Structure Shift for Ground Bevel Gears
Sebastian Strunk, The Gleason Works

SESSION 5
Gear Wear & Failure

Numerical Thermal 3D Model to Predict the Surface and Body Temperature of Spur and Helical Polymer Gears
Niranjan Raghuraman, Romax Technology

Influence of the Defect Size on the Tooth Root Load Carrying Capacity
Jens Brimmers, RWTH Aachen University

Flank Fracture as an Example of International Standardization of German Drive Technology Applications
Norbert Haefke, FVA GmbH

Influence of Contact Conditions on the Onset of Micropitting in Rolling-Sliding Contacts Pertinent to Gear Applications
Amir Kadric, Imperial College London

Comparison of TIFF Load Capacity to Standardized Gear Failure Modes Using Boundary Conditions from an Efficient and Accurate Loaded Tooth Contact Analysis
Raydu Al, Smart Manufacturing Technology Ltd.

A New Approach to Repair Large Industrial Gears Damaged by Surface Degradation – The Refurbishment Using the Modification of Both the Profile Shift Coefficient and the Pressure Angle
Horacio Albertini, HASA – Horacio Albertini Ltda
AGMA Presents Webinar Series

Part I: Load Distribution • Part II: Lubrication • Part III: Condition Monitoring

AGMA is presenting a three-session webinar series, Gearbox Field Inspections: Observations, Troubleshooting and Establishment of Maintenance Procedures. Each webinar will run 90 minutes. Complete information is available on www.agma.org.

Gearbox Field Inspection – Part I: Load Distribution June 9, 2016

Gears can fail due to various damage patterns. In this study, the combined influence of shaft misalignments and gear lead crown on load distribution and tooth bending stresses is applied to real-world circumstances.

THIS WEBINAR WILL:
• Delve into the unique attributes of load distribution effects pertaining and comparing the use of spur, single, and double helical gearing.
• Demonstrate the importance of the design of gear units and its interrelationship with inspections and maintenance.
• Provide an overview on long-term benefits in the use of friendly design features such as integral flanges, separable bearing caps, external adjustable casings, separately mounted terminals for instrumentation, enclosures, and attributes of the three-point mount.

At the end of the webinar, reasonable real-world predictions of gear load distribution will be provided, and recommendations for optimal lead and crown will be given based on an observed misalignment condition.

AFTER ATTENDING PART I, STUDENTS WILL BE ABLE TO:
• Identify damage patterns that occur as a result of various stresses during operations.
• Provide an analysis and corrective plans to avoid tooth distress.
• Have a deeper understanding of the unique attributes of load distribution effects.
• Interpret the connection between gear design and inspections and maintenance.
• Identify key design attributes that lend maintenance-friendly requirements for gears.
• Apply and relate theoretical frameworks in gear load distribution.

SPEAKERS
John B. Amendola is the chief executive officer of Artec Machine Systems where he has been working for 43 years. Prior to that, he was with Western Gear, Texaco, and Boeing Company. He is currently an active member of the AGMA Technical Division Executive Committee (TDEC), active chairman of the AGMA Enclosed High Speed Units Committee, and active chairman of U.S. TAG to ISO TC 60. He holds a Bachelor of Science in mechanical engineering from Villanova University and a Master of Science in mechanical engineering from Brooklyn Polytechnical Institute.

John B. Amendola III is the president of Artec Machine Systems where he has been working for 22 years. Prior to that, he spent one year at Maag Gear in Zurich, Switzerland, with the assembly, testing, and field services group for high-speed gear applications, and two years at SUNY Maritime College as assistant professor of the engineering department, training engineering undergrads in marine/mechanical operations. He is an active member of the AGMA Helical Gear Rating Committee and holds a Bachelor of Science in marine engineering from Maine Maritime and a professional engineering license for mechanical engineering. Amendola III also maintains a United States Coast Guard (USCG) unlimited license as a senior marine engineering officer and a retired commander of the U.S. Navy Reserve.

Dereck Yatzook is a mechanical engineer with a BSME from University of New Haven. He has been employed at Artec for the past 14 years and is currently the manager of contract engineering. Yatzook is an active member of the AGMA Metallurgical Committee.

Gearbox Field Inspection – Part II: Lubrication Date/time is to be determined

Both the operator and designer must consider gear tribology. In this second part of the series, the focus is placed on lubrication.

INSTRUCTORS WILL:
• Provide an overview of elastohydrodynamic lubrication (EHL).
• Discuss how pitting and scuffing are the primary failure modes influenced by lubrication.
• Describe how the operator can discern the difference between primary and secondary modes of failure.
• Provide information on the choice of lubricants and their characteristics.
• Give examples of how the choice of lubricant affects the life of the gear unit.
• Identify the effects of antisuff (AS) additives (formerly known as extreme pressure or EP).

Gearbox Field Inspection – Part III: Condition Monitoring Date/time is to be determined

Gearbox diagnostics and service are critical to the field inspection process. In this third part of the series, these concepts will be explored in depth.

INSTRUCTORS WILL:
• Discuss audio and visual gearbox diagnostic techniques.
• Provide information for interpreting and understanding the results of the oil analysis.
• Identify the three types of maintenance programs: reactive, preventative, and predictive.
• Review service concepts as it relates to preventative gear maintenance.

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CALENDAR OF EVENTS

Whether you’re looking for technical education, networking opportunities, or a way for your voice to be heard in the standards process, AGMA has something to offer you. If you would like more information on any of the following events, visit www.agma.org or send an email to events@agma.org.

Events are open to AGMA members only. Not a member? Send an email to membership@agma.org.

MAY

Wormgearing Committee Meeting — May 5, 2016 WebEx
Cutting Tools Committee Meeting — May 6, 2016 WebEx
Wind Turbine Committee Meeting — May 10, 2016 WebEx
Lubrication Committee Meeting — May 11, 2016 WebEx
Mill Gearing Committee Meeting — May 12, 2016 WebEx
AGMA/ABMA Annual Meeting — May 12-14, 2016 Amelia Island, Florida
Flexible Coupling Committee Meeting — May 17, 2016 WebEx
Metallurgy & Materials Committee Meeting — May 18, 2016 WebEx
Gear Accuracy Committee Meeting — May 19, 2016 WebEx
Vehicle Gearing Committee Meeting — May 20, 2016 WebEx
Technical Division Executive Committee (TDEC) Meeting — May 24-25, 2016 Alexandria, Virginia

JUNE

Helical Gear Rating Committee Meeting (925) — June 1-2, 2016 Hartford, Connecticut
Sound & Vibration Committee Meeting — June 3, 2016 WebEx
Aerospace Gearing Committee Meeting — June 6-7, 2016 Hartford, Connecticut
Lubrication Committee Meeting — June 9, 2016 WebEx
Bevel Gearing Committee Meeting — June 9, 2016 WebEx
Wind Turbine Committee Meeting — June 14-15, 2016 Portland, Oregon
Computer Programming Committee Meeting — June 15, 2016 WebEx
Wormgearing Committee Meeting — June 21, 2016 WebEx
Plastics Gearing Committee Meeting — June 21-22, 2016 Chicago, Illinois
Cutting Tools Committee Meeting — June 23, 2016 WebEx
Nomenclature Committee Meeting — June 28, 2016 WebEx

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