American Gear Manufacturers Association

Letter from the Vice President, Technical Division

Advancing gear science is the foundation of the AGMA, and the technical excellence in the industry is on display each year at AGMA's Fall Technical Meeting. This year the FTM will be held October 17-19 at the Hyatt Regency in Milwaukee, Wisconsin, and I encourage you to join us. Each year the FTM highlights the latest technical research in the industry from experts from all over the world. In preparation for this FTM we received a record number of abstracts, and the Technical Division Executive Committee and others have worked diligently with the authors to select the best 18 papers for presentation at the 2010 FTM. In only two and half days you will get to learn, share ideas, and network with others on the design, analysis, manufacturing, and application of gears, gear drives, and related products, as well as associated processes and procedures. This year's FTM will have four sessions, each different in scope: Manufacturing & Heat Treatment; Load Capacity Analysis; Gear Design Considerations; and Gear Applications. A complete list of the papers that will be presented and a short description of each topic is presented on the following page.

Attending the FTM affords you with an intimate setting for learning and networking. The conference is designed for attendees to take in all the presentations, and to take home practical information that may ultimately affect your company's bottom line. Additionally, the AGMA prides itself on the opportunity offered during each FTM for participants to have ample time to question the authors on the technical aspects of their papers and research, which often leads to interesting and thought-provoking discussions. But the meeting is also designed to afford invaluable networking time between sessions and in the evenings to interact with colleagues and meet new experts in the industry.

While I hope you will take advantage of all the great papers during the Fall Technical Meeting, we understand that you may not have two and a half days to attend the event. For those of you who can only make it for a few papers that you are particularly interested in, or only have a day to spare from the office, you can register "a la carte" for the sessions, as well. For more information on all of your registration options visit our Web site, which is listed at right. For the first time we are offering early bird discounts to everyone who registers by August 27th, so don't miss out on this opportunity.

Finally, while you are attending the Fall Technical Meeting I would encourage you to explore the Milwaukee area. The Hyatt Regency where the FTM will be held has just completed a large renovation, but there are great destinations such as the recently opened Harley Davidson Museum less than a mile way. Plus the Milwaukee area hosts a number of great gear companies that you may want to visit. The Fall Technical Meeting is your best opportunity to learn the latest gear research from the best experts in the industry, and I look forward to seeing you there!

AGMA's 2010 Fall Technical Meeting

October 17-19

REGISTRATION FEES

EARLY BIRD
(must register by August 27):
$695 AGMA Member
$985 Nonmember

REGULAR
(after August 27):
$745 AGMA Member
$1,035 Nonmember

REGISTRATION
www.agma.org or call (703) 684-0211

LOCATION
Milwaukee Hyatt Regency
333 West Kilbourn Ave.
Milwaukee, Wisconsin 53203
(414) 276-1234

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AGMA Fall Technical Meeting

The 2010 Fall Technical Meeting is a great opportunity for you to learn from the best experts in the industry. This year's meeting, to be held October 17-19, 2010 at the Hyatt Regency Milwaukee in Wisconsin will feature 18 papers during four sessions. Visit www.agma.org to take advantage of early bird registration prices and for more information.

Session I: Manufacturing and Heat Treatment

Complete Machining of Gear Blank and Gear Teeth
Author: Dr.Ing. Claus Kobialka, Gleason-Pfauter
This paper will discuss the risks and benefits of multi-process machines that are capable of turning, hobbing, drilling, milling, chamfering and deburring of cylindrical gears.

Improving Heat Treating Flexibility for Wind Turbine Gear Systems Through Carburizing, Quenching and Material Handling Alternatives
Author: Wallace (Jack) Titus, AFC-Holcroft
This presentation will explain alternative methods for heat treating large components that allow part distortion to be minimized.

A Novel Approach to the Refurbishment of Wind Turbine Gears
Authors: Mark Michaud and Gary J. Sroka, REM Surface Engineering, and Ronald E. Benson, REM Research Group
This presentation discusses chemically accelerated vibratory finishing, or isotropic superfinishing (ISF), as a low-cost option for refurbishing case carburized and nitrided gears.

Low Distortion Heat Treatment of Transmission Components
Authors: Dr. Volker Heuer and Dr. Klaus Loeser, ALD, Donald R. Faron, General Motors, and David Bolton, ALDTT,
This presentation will explain how the successful application of LPC and HPGQ eliminated the need for subsequent machining ring gears for a six-speed automatic transmission.

Session II: Load Capacity Analysis

Evaluation of Gear Bending Fatigue Life Under Single and Bidirectional Loads
Authors: Joseph Chen and James Bishar, GM Powertrain
The authors propose a new approach, to use the averaged slope and endurance limit from a series of S-N curve equations for (fully or partially) bi-directional loading conditions.

Comparison of the AGMA and FEA Calculations of Gears and Gearbox Components Applied in the Environment of the Small Gear Company
Author: Vanyo Kirov, RotoMetrics
This presentation offers a comparison between AGMA and FEA in strength and deflection calculations of spur gears and gearbox components.

Finite Element Analysis of High Contact Ratio Gear
Authors: M. Rameshkumar, G. Venkatesan, and P. Sivakumar, Combat Vehicles Research and Development Establishment, DRDO
This paper deals with finite element analysis of high- and normal-contact ratio (NCR) gears with same module and center distance and the comparison of bending and contact stress.

A New Statistical Model for Predicting Tooth Engagement and Load Sharing in Involute Splines
Authors: Janene Christensen, Carl D. Sorensen, and Kenneth W. Chase, Brigham Young University
This report presents an extension of the new sequential engagement model, which more completely predicts the variations in the engagement sequence for a set of spline assemblies.

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, the AGMA has something to offer you. If you would like more information on any of the following events visit www.agma.org or send e-mail to events@agma.org.

August

5-6 Fine Pitch Committee Meeting
Buffalo, NY
This committee continues work on the new revision for AGMA 910-C90 "Formats for Fine-Pitch Gear Specification Data." The committee will also continue its work on AGMA 916-AXX "Face Gears with Intersecting Perpendicular Axes."

10 Mill Gearing Committee Meeting
WebEx

17 Energy Efficiency Committee Meeting
WebEx

24 Technical Division Executive Committee Meeting
WebEx

September

** Event open to AGMA members only. Not a member? Send e-mail to membership@agma.org.

Calculation of Load Distribution in Planetary Gears for an Effective Gear Design Process

Authors: Dr.Ing. Tobias Schulze, Dipl.Ing. Christian Hartmann-Gerlach, DriveConcepts GmBH, and Dr.Ing. Berthold Schlecht, Technical University of Dresden

The calculation of gears—especially planetary gears—should include extended analysis of load distribution, flank pressure, root stress, transmission error, and contact temperature.

Session III: Gear Design Considerations

Recommendation Reverse Engineering

Author: Charles D. Schultz, Beyta Engineering Service

This paper will describe a methodology for the reliable measurement, evaluation, re-design, and manufacture of replacement parts for gearboxes and industrial machinery.

Evaluation of Methods for Calculating Effects of Tip Relief on Transmission Error, Noise and Stress in Loaded Spur Gears

Authors: Dr. Mike Fish and D. Palmer, Dontyne Systems, Ltd.

This paper explains the theory behind transmission error and the reasoning behind applying profile modifications through mapping the surface profiles and deducing the load sharing.

PointSurfaceOrigin (PSO) Macropitting Caused by Geometric Stress Concentration (GSC)

Authors: R. Errichello, GEARTECH, C. Hewette, Afton Chemical Corporation, and R. Eckert, Northwest Laboratories, Inc.

An FZGC gearset was tested at load stage 9 and three pinion teeth failed by PSO macropitting, and the authors show that the root cause was GSC created by tiptoroot interference.

Flank Load Carrying Capacity and Power Loss Reduction by Minimised Lubrication

Authors: Dr. Bernd-Robert Höhn, Dr. Klaus Michaelis, and Dr. Hans-Philipp Otto

This presentation offers an advanced calculation algorithm for pitting load carrying capacity calculation at high gear bulk temperatures.

Gear Design for Wind Turbine Gearboxes to Avoid Tonal Noise According to ISO/IEC 61400-11

Author: Dipl-Ing. Jörg Litzba, Hansen Transmissions International N.V.

This presentation introduces the definition of tonal noise per ISO/IEC 61400-11 and presents measurement results from test rigs and from the field.

Session IV: Gear Applications

Analysis and Testing of Gears with Asymmetric Involute Tooth Form and Optimized Fillet Form for Potential Application In Helicopter Main Drives

Authors: Frederick W. Brown, Scott R. Davidson, David B. Hanes, and Dale J. Weires, The Boeing Company, and Alex Kapelevich, AK Gears, LLC

Helicopter gears with an asymmetric involute gear tooth form were analyzed to determine their bending and contact stresses relative to symmetric involute gear tooth designs.

Driveline Analysis for Tooth Contact Optimization of High Power Spiral Bevel Gears

Authors: Jesse Rontu, Gabor Szanti, and Eero Mäsä, ATA Gears Ltd., Finland

A discussion of using calculation methods to predict the relative displacements of gears under operating load and conditions.

Analysis of Load Distribution in Planet-Gear Bearings

Authors: Louis Mignot, Loïc Bonnard, and Vincent Abousleiman, Hispano-Suiza

In epicyclic gear sets planet gears are supported by spherical roller bearings with the bearing outer race being integral to the gear hub. This paper presents a new computational methodology.

Self-Locking Gears: Design and Potential Applications

Authors: Alex Kapelevich, AKGears, LLC, and Elias Taye, ET Analytical Engineering, LLC

This paper describes the design approach, as well as potential applications, of parallel axis self-locking gears.

Chicago, IL
AGMA's seminar will allow students to examine various types of gear failure, such as macropitting, micropitting, scuffing, tooth wear and breakage. Possible causes of these failures are presented along with some suggested ways to avoid them.

Gear Failure Analysis Seminar
13-15

WebEx
The committee evaluates special considerations required for helical and herringbone gears used to drive cylindrical grinding mills, kilns, dryers and metal rolling mills.

Mill Gearing Committee Meeting
22

AGMA EDUCATION EVENT
Concordville, PA
Gain a broad understanding of the methods used to manufacture and inspect gears, and much more. Take it one step further, learning how the resultant information can be applied and interpreted in the design process. It is critical that the design engineer understand the manufacturing and inspection processes that will be employed so that the intent of the design can be successfully translated into practice.

Gear Manufacturing and Inspection
28-30

14-15
Helical Gear Rating Committee Meeting

Chicago, IL
This committee determines strength and durability rating of spur and helical gears.

21-22
Wormgearing Committee Meeting

Chicago, IL
The scope of this committee covers all aspects of cylindrical and globoidal wormgearing, including design, rating, application of enclosed drives and inspection.

Available Year-Round

Online Workforce Education

Gain basic gear training in three courses: Fundamentals of Gearing, Gear Inspection, and Hobbing. Go to www.agma.org/events-training/detail/online-workforce-education.

AGMA Welcomes New Members

AGMA is happy to report that the association continues to grow and now has more than 475 companies in its membership representing the industry in more than 30 countries. So far in 2010, 25 companies have joined. To find out more about these companies visit their Web sites. To find out more about AGMA and how membership can help your company visit www.agma.org or e-mail membership@agma.org.

Dearborn Precision Tubular Products
www.dearbornprecision.com
Founded in 1947 by Howard K. Dearborn, Dearborn Precision has led the way in deep hole drilling, machined tubular components, and precision tubing. One of the company's early accomplishments was to develop deep-hole drilled components for the first U.S. Navy nuclear submarine. This groundbreaking work led to the development of machinery and processes that are now applied to commercial nuclear, aircraft, and tubular parts.

GE Energy Engineering Div. (Wind Energy)
www.ge.com
GE is one of the world's leading wind turbine suppliers. With over 13,500 wind turbine installations worldwide comprising more than 218 million operating hours and 127,000 GWh of energy produced, and wind manufacturing and assembly facilities in Germany, Norway, China, Canada, and the United States, GE's current products include wind turbines with rated capacities ranging from 1.5 to 4.0 megawatts and support services including development assistance, operation, maintenance, and more.

QC American, LLC
www.qcamerican.com
QC American, LLC offers CNC form and generation gear grinders, CNC and manual OD grinders, and gear chamfering/deburring machines suitable for machining high precision components. Industries served include aerospace, automotive, power transmission, wind power generation, power generation, and defense.

Supreme Industrial Works
www.gearsupreme.com
Supreme Industrial Works has been a part of India's industrial growth since 1950, when the company was founded. The group of companies includes Supreme Industrial Works, Techno Gear Works Pvt. Ltd, and Gear Enterprises Works, which is engaged in the manufacture of precision gears. The product range covers all types of gears such as spur, helical, straight bevel, spiral bevel, worm wheel and worm shaft, rack and pinion, and spline shafts. From only four machines the company has grown to a full-fledged gear manufacturing unit with 125 machine tools and various inspection facilities. Supreme Industrial Works is a supplier to various end users of gears with a capacity to produce gears ranging from 10mm to 3000mm in diameter.

Technology Market, CJSC
www.ec-gearing.com
Located in Tomsk, Russia, Technology Market, CJSC is using EC (eccentrically cycloidal) gearing , a new kind of toothed engagement that can be used for the manufacture of almost any type of gearboxes: cylindrical, planetary, bevel, EC gearboxes, and also rack-type EC gears for mechanisms with rectilinear motion.

AGMA Leadership

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