



MOTION+POWER TECHNOLOGY EXPO

October 17–19, 2023
Detroit, MI

Motion + Power in the Motor City

MPT Expo 2023 comes to Detroit in October

Randy Stott, Publisher & Editor-in-Chief

The Motion + Power Technology Expo is a three-day show that's designed for the gear and power transmission industry, representing the entire community of professionals involved in the life of a gear, gearbox or other power transmission device—from design to manufacturing, testing, heat treating and more. You can find the suppliers of the equipment to make gears as well as gear and gear drive manufacturers themselves, along with related suppliers of things like software, tooling, lubrication, bearings and more.

Not only is MPT Expo a trade show representing the complete power transmission supply chain, but it's also an educational and networking event that seems to grow in its offerings with every iteration.

The show takes place alongside AGMA's Fall Technical Meeting (October 16-18), where experts will present research on the latest technology in gear manufacturing. MPT Expo also runs concurrently with the ASM Heat Treat and IMAT shows (see our preview article on p. 36).

On the show floor itself, you'll have plenty of opportunities to learn and interact with gear-industry colleagues, including live podcasts, exhibitor demonstrations and our own "Ask the Expert" panel discussions in booth #3136.



Come and meet the AGMA Media team in Booth #3132 and at the "Ask the Expert Stage" in Booth #3136.



Gear Technology and Power Transmission Engineering editors will sit down with technology experts throughout MPT Expo for one-on-one interviews as part of our Revolutions video series.

2023 Ask the Expert Topics

- **The Future of Gear Manufacturing**
(Tuesday 10/17 at 10:30 am)
- **Manufacturing Gears for Electric Vehicles**
(Tuesday 10/17 at 2:30 pm)
- **Automation for Job Shops**
(Wednesday 10/18 at 10:30 am)
- **Skilled Workforce Retention and Development**
(Wednesday 10/18 at 2:30 pm)

Panelists for the “Ask the Expert” sessions will be announced soon! In addition, on the same stage in Booth #3136, our editors will be conducting live interviews with many of the exhibitors and other specialists who will be at the show, highlighting the latest technology and solutions for our industry.



The Gear Technology “Ask the Expert Live” panel discussions always draw a crowd of enthusiastic industry participants.

PRECISE. POWERFUL. PRODUCTIVE.

kapp-niles.com

EMO Hall 11 Booth E06 HANNOVER 18-23.09.2023

KAPP NILES
precision for motion

Educational Opportunities

See the website at motionpowerexpo.com/education-courses/ for information on pricing.

Basics of Gearing. Tuesday, October 17, and Wednesday, October 18, 8:00 am–5:00 pm. Instructor: William Mark McVea, KBE+, Inc. Dramatically improve your knowledge and productivity through Basics of Gearing. This course will be presented in a two-day format and will give you a comprehensive overview of standard gearing nomenclature, gear involute geometry, inspection procedures, and much more.

Integration and Trade-Offs in Gear and Bearing Systems. Tuesday, October 17, 8:00 am–5:00 pm, and Wednesday, October 18, 8:00 AM–noon. Instructor: Michael Berhan, Ford Motor Company. The purpose will be to cover the concurrent design and analyses of gears and bearings in integrated systems like gearboxes, transmissions, and electric motor drives, so as to allow for good integration and faster optimization of the overall system. This will help gear engineers and suppliers better determine the trade-offs with the bearings, help bearing engineers and suppliers similarly with the gears, and system engineers better understand both. The examples covered are generic but should be useful both within and across industries that use these components and systems.

Reverse Engineering: Why, When, and How—Avoiding Pitfalls and Litigation. Tuesday, October 17, 8:00 am–5:00 pm. Instructor: Raymond Drago, P.E. Reverse engineering a gear system is a not too unusual task and in many, but not all, cases the process goes fairly well, thus it is easy to become complacent. It is important, however, to fully understand the process and the best practice procedure for reverse engineering a gear system. This course will review the basic types of reverse engineering projects. The need for understanding the operation of the system in which the gears will be used, the conditions that led to the need for the project and especially, the specific nature of the failure that occurred, if that is the reason for the project, are key, often ignored, elements of the process.

Why Bearings are Damaged. Wednesday, October 18, 1:00 pm–5:00 pm. Instructor: ABMA. The American Bearing Manufacturers Association is offering this course on rolling element bearings for those involved in industrial equipment design, reliability, and maintenance. It will include a basic overview of rolling bearings, their selection, precision and mounting considerations, service life estimation, and lubrication-related influences. A hands-on damage analysis session will be the featured portion of this program.

Involute Spline Design and Rating. Wednesday, October 18, 8:00 am–5:00 pm. Instructor: Raymond Drago, P.E. This course will address both geometry and rating of involute splines of various types. Types of spline joints and their applications are discussed. Spline configuration variations including half depth and full depth and special function designs will be addressed. Both fixed and flexible spline configurations are treated in terms of usage and design. Lubrication methods, including

grease, oil bath and flowing oil as well as coatings appropriate for various spline applications are discussed. Shear and compressive stress rating methods are discussed with analyses methodology presented in both equation and graphical methodology via various rating charts.

Modern Automated Gear Quality Assessment Technology. Thursday, October 19, 8:00 am–5:00 pm. Instructor: William Mark McVea, KBE+, Inc. This course is intended to provide you with a thorough understanding of the information contained within a typical gear inspection report. Specifically, we will look at the contents and meaning of the information contained within the gear charts, as well as the techniques used by the gear measurement system to assess gear quality. An explanation of basic gear measurement techniques, how measurement equipment and test machines implement these techniques, and how to interpret the results from these basic measurements will be covered. We will also discuss how to interpret the results and what corrective actions may be considered if the quality of a particular gear is unsatisfactory.

Materials Selection and Heat Treatment of Gears. Thursday, October 19, 8:00 am–5:00 pm. Instructors: AGMA and ASM International. Because of their unique contribution to the operation of so many machines and mechanical devices, gears have received special attention from the technical community for more than two millennia. New developments in gear technology, particularly from the materials and heat treatment perspectives, have improved gear performance. This course, developed jointly by AGMA and ASM International, will provide an overview of materials selection and heat treatment of gears. Topics covered include: Gear material selection, heat treatment, material hardenability, allow steel selection, gear failure concerns, manufacturing considerations, material form, cast iron, powdered metal, bronze and brass, and plastics.

Networking Events

FTM Networking Reception. Monday, October 16, 6:00 pm–8:00 pm. \$85. Join attendees from the Fall Technical Meeting for a fun networking reception at The Yard in Corktown! The reception includes dinner, drinks, and fun activities including axe throwing, board games, shuffleboard, fire pits, and cornhole. The reception is included in registration for Full FTM attendees, but tickets are available for single-session passholders, other MPT Expo attendees, and anyone else interested in joining the fun!

Women in Manufacturing and Engineering Breakfast. Tuesday, October 17, 7:00 am–9:00 am. \$50. AGMA and ASM are pleased to invite all women at MPT Expo to a networking breakfast where there will be a panel of industry experts sharing experiences and advice about how to become leaders in your field and how to avoid complacency in the workforce to advocate for your own career. Join others from all sectors of manufacturing and engineering, from new employees to high-level executives, to build new relationships, grow your network, and innovate for the future. Who should attend: All

women exhibiting or attending Motion + Power Technology Expo, the Heat Treat Conference & Exposition, or IMAT events who want to network and be inspired!

Opening Night Welcome Reception. Tuesday, October 17, 5:00 pm–6:00 pm. FREE to all attendees. Join exhibitors and fellow attendees on the show floor for the Opening Night Welcome Reception. Your expo pass includes two drink tickets, and hors d'oeuvres will be served. Come meet exhibitors, network with your peers, and meet new friends as we kick off MPT Expo!

Wednesday Networking Reception. Wednesday, October 18, 7:00 pm–10:00 pm. \$100. Take a night off from the tradeshow floor to unwind and network with industry professionals! Meet up with old friends or enjoy the open bar with new prospects. Enjoy local fare and drinks and get ready for an evening of fun and entertainment. More details regarding this event will be posted soon! Who should attend: All those attending or exhibiting at Motion + Power Technology Expo, the Heat Treat Conference & Exposition, or IMAT events.

AGMA Electric Vehicle Technology Town Hall

Thursday, October 19
8:00 am–10:00 am
Free



For more than 100 years, AGMA has led discussions in standards development for the gear industry. From streetcars to wind turbine technology, AGMA has been the facilitator-in-chief bringing together stakeholders to discuss, brainstorm, share, and collaborate in the development of standards that are utilized by entire industries across the globe.

Electric vehicle technology is emerging as a mainstream technology, and to keep within its traditional role as the facilitator-in-chief, it is time for AGMA to gather experts and begin discussion on standards for this space.

The two-hour town hall style meeting will begin with a short presentation by Amir Aboutaleb, AGMA VP, Technical Division, on what current AGMA documents are available for use in the EV space. Next, attendees will be invited to share their thoughts on current state of the EV sector including areas and topics where AGMA could step in to support the gear industry. Drawing on its 100+ year experience, the goal of this event is for AGMA to gather the experts around a table to discuss outstanding issues identified by consensus and collaborate on consensus based, mutually beneficial solutions as it relates to the EV sector. Come be a part of the discussion!

This meeting is open to all interested from the gearing industry, specifically those involved in the electrical vehicle space. Participants should expect, and be ready and willing, to collaborate and share knowledge.

MASTA

Electric Powertrain, Transmission & Electric Machine Design, Analysis & Optimisation

MASTA, is a comprehensive, proven and trusted CAE software.

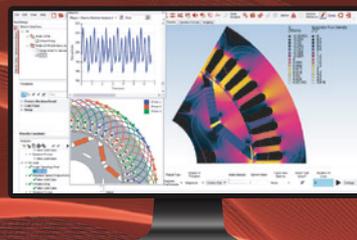
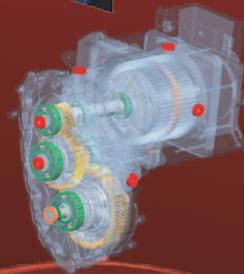
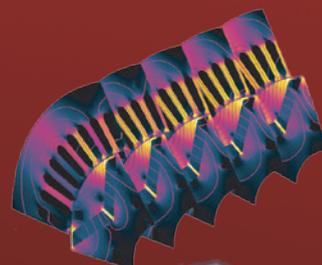
This powerful solution enables engineers to design robust, efficient, lightweight and quiet transmissions and electric machines.

SMT's MASTA is the first powertrain design and analysis software to offer seamless analysis of both motor and gearbox. It ensures a greatly improved workflow and reduces the potential for errors. MASTA will electrify engineers' design and analysis capabilities like never before.

Increase your efficiency, run full system simulations, and generate reports on a range of component, and system level analysis on durability, NVH, and more.

Visit smartmt.com/masta to learn more and request your free trial.

SMT
smartmt.com





AGMA's Fall Technical Meeting attracts engineers and technical specialists who want to learn the latest technical information about gears from the world's leading experts.

Fall Technical Meeting 2023

AGMA's Fall Technical Meeting begins one day before MPT Expo, and it requires a separate admission (see www.agma.org/events/fall-technical-meeting-ftm/ for details on pricing).

This meeting brings together top researchers from across the globe who will provide the latest information on their peer-reviewed gear industry research. Network with the industry experts, academics, and engineers; ask your burning questions; and see what is in the future of this industry.

Monday, October 16

Technical Session 1—Efficiency, Lubrication, Noise, and Vibration (1:00 pm–5:00 pm)

- How Many Gears for Electric Cars? One Example
- Cross-Correlation of Design Variables for Epicyclic Systems
- Particle-Based CFD Study of Lubrication in Power Transmission Systems Using Local Refinement Techniques
- Modeling Lubricant Flow and Thermal Response for Gears

Tuesday, October 17

Technical Session 2—Materials and Heat Treatment (8:00 am–12:00 pm)

- Influence of Precipitation Conditions on the Tooth Root and Pitting Load Carrying Capacity of Carbonitrided and Low Pressure Carburized Gears
- Methodology to Evaluate the Bending and Contact Allowable Stress Numbers of Gears from Rotating Bending Database
- Advanced Distortion Control for Case Hardening of Transmission Components
- 3D Printing Plastic Gears
- SPECIAL PRESENTATION: Updates to AGMA 926, Recommended Practice for Carburized Aerospace Gearing

Technical Session 3—Gear Wear and Failure (1:00 pm–5:00 pm)

- Non-Linear Analysis of Gear-Fatigue-Damage Under Variable Load
- Use of Gear Reliability Data in a Cloud-Based Gearbox Digital Twin
- Wear Behavior of Polymeric Compound Measured on a New Test Rig for Plastic Gears
- Tooth Flank Fracture—Investigations on the Influence of Overloads on the Fatigue Strength of Case-Hardened Gears
- Experimental and Analytical Study of the Effect of Shot Peening on Gear Micropitting and Contact Fatigue Failure

Wednesday, October 18

Technical Session 4—Manufacturing, Inspection, Testing, and Quality Control (8:00 am–12:00 pm)

- Laser Material Processing for the Production of Bronze Coatings for Tribological Applications
- Influence of Tooth Root Contour Deviations on the Tooth Bending Strength
- Power Skiving Tool Offsets and the Feasibility of Using a Calculator for Manipulating the Resulting Geometry
- Virtual End of Line Test—Prediction of the Acoustic Behavior of Gearboxes Based on Topographic Deviations Using Neural Networks

Technical Session 5—Application, Design, and Rating (1:00 pm–5:00 pm)

- Holistic Assessment of Drive Systems with Gears, Shafts and Bearings Using Measured Torque-Speed Data
- Local Load Capacity Analysis for the Design of a Balanced Flank Modification for Cylindrical Gears According to Bevel Gear Procedures
- Determination of the AGMA J-Factor for Internal Spur Gears
- Flexible Planet Pins for High Torque Epicyclic Gears: Experience with Design, Manufacturing and Application
- Numerical Approach to Account for Actual Tooth Root Geometry

