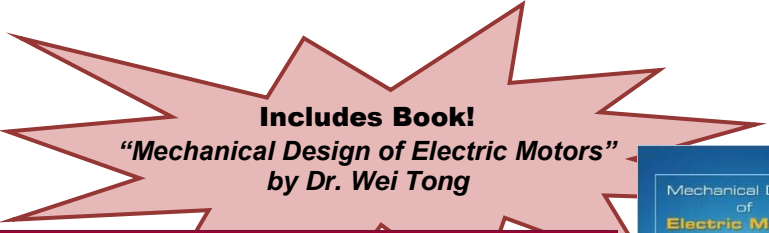


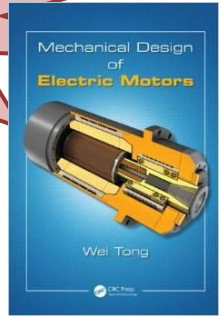


ADVANCED MOTORTECH LLC
 4951 71ST AVENUE NORTH
 PINELLAS PARK, FL 33781-4428 USA



Includes Book!

"Mechanical Design of Electric Motors"
 by Dr. Wei Tong



MOTOR MANUFACTURING METHODS

**June 1st, 2nd, & 3rd -Join Us in Los Angeles, California
 At the Los Angeles Airport Marriott**

The only course of this kind available anywhere! Learn practical understanding & essential concepts of motor manufacturing methods from the experts.

- ◆ Overall Look at Motor Component Manufacturing
- ◆ Lamination Options & Assembly Techniques
- ◆ Old vs New, Low & High Volume Manufacturing Processes
- ◆ Difference in Rotor Fabrication Among Motor Types
- ◆ Handling Parts, Sub-Assemblies, Final Assemblies, & Test
- ◆ Optional Accessories & Finishing Touches



Objectives and Benefits:

This course provides a foundation of technical and practical principles used for electric motor parts manufacturing, construction and testing. The focus is on topics important to motor engineers, and business managers involved with electric motors. The intended audience is production managers and decision makers for the manufacture of electric motors.

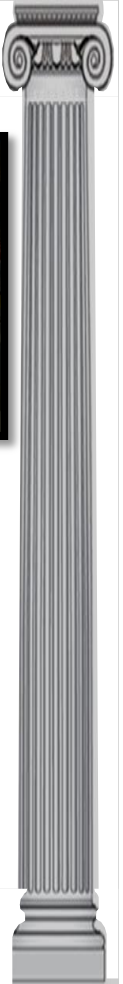
The purpose of this one-of-a-kind course is the understanding of methods and choices for electric motor manufacturing. This unique information is important to sales engineers, design engineers, manufacturing managers, technical purchasers, and users of electric motors.

Your expert instructor will help you understand the technology of electric motors and then delve into the options and tasks for the many methods, design requirements, materials, and tolerance issues. Instruction assumes no prior formal technical education.

A real-world, common sense attitude is used to help demonstrate how key choices in terms of performance, quality and value affect the motor delivered to the customer. Primary focus will be on fractional and integral horsepower NEMA-frame induction machines, including both random-wound and form-wound configurations. Other motor types will be discussed to illustrate their unique features and benefits. Most of the material is on topics and issues common to all motors, as well as most generators.

Those who will benefit:

- ◆ Electrical, Mechanical, and Manufacturing Engineers
- ◆ Application Engineers for Motor Manufacturers, OEMs & Distributors
- ◆ Sales, Marketing & Customer Service Personnel at All Levels
- ◆ Facility Engineers, Users, & Purchasers of Electric Motors
- ◆ Electrical Contractors & Field Service Technicians
- ◆ Engineers Involved in the Design, Planning, & Manufacturing of Electric Motors.



Course Schedule

Day 1: Wednesday, June 1st

7:30-8:00 Registration

8:15 Session Begins

1. Overview of Motors, their Components & Functions

- ☑ Motor types:-What is same & different
- ☑ Key components and their functions
- ☑ Manufacturing issues, operation effects
- ☑ Stator parts & some variations
- ☑ Rotor parts & many variations
- ☑ Major subassemblies
- ☑ Full motor assembly
- ☑ Importance of NEMA-MG1, IEC

2. Laminations

- ☑ Electrical steel materials
- ☑ Lamination dimensions & tolerances
- ☑ Segmented and hinged laminations
- ☑ Punching laminations
- ☑ Laser cutting laminations
- ☑ Coating & annealing, storage

3. Housing

- ☑ Housing types and materials
- ☑ Key housing features, tolerances
- ☑ Housing fabrication & machining
- ☑ Importance of feet
- ☑ Miscellaneous: fan, fan cover, terminal box, bearing caps, baffles

4. Endbells

- ☑ Endbell types and materials
- ☑ Key endbell features, tolerances
- ☑ Endbell fabrication & machining
- ☑ Importance of mounting face
- ☑ Miscellaneous: oil and grease ports, fan cover bolt-holes

5. Shafts

- ☑ Common shaft designs, materials
- ☑ Key shaft features, tolerances
- ☑ Providing for rotor core attachment
- ☑ Shaft machining
- ☑ Adding special features to shafts

6. Bearings

- ☑ Common bearing types
- ☑ Why so many bearings?
- ☑ Key bearing features, tolerances
- ☑ Provisions for lubrication, service

16:45 Session Ends

We will keep you nourished!

Daily schedule includes:

Mid-morning break (10:00)

Lunch (12:00-13:15)

Afternoon break (15:30)

Day 2: Thursday, June 2nd

8:15 Session Begins

7. Coil Insulation components

- ☑ Slot cell liner, powder coat
- ☑ Wedges, topsticks, sleeving
- ☑ Slot cell divider, mid-sticks
- ☑ Phase separator for end-turns
- ☑ Mica & cloth tapes
- ☑ Surge rope, blocking, lace

8. Random-wound Coils

- ☑ Round wire & coils for motors
- ☑ Key random winding coil features
- ☑ Common methods to manufacture coils
- ☑ Random coil manufacturing—lap coils
- ☑ Random coil manufacturing—concentric & concentrated coils
- ☑ In-slot winding methods

9. Form-wound Coils

- ☑ Types of wires & coils for motors
- ☑ Construction of form coils
- ☑ Form coil manufacturing
- ☑ Bobbin and field coil manufacturing
- ☑ Form-wound armature coils

10. Stator & Rotor Core Stack

- ☑ Stacking methods, important issues
- ☑ Aligning the core slots
- ☑ Clamping methods and effects
- ☑ Bonding cores, pro's and con's
- ☑ Options for PM rotors cores
- ☑ Some post-assembly options
- ☑ Making individual stack, poles

11. Coil Insertion & Connections

- ☑ Effect of slot fill on manufacturing
- ☑ Inserting slot liners
- ☑ Methods for Inserting Coils
- ☑ Inserting wedges, likely problems
- ☑ Phase separator at endturns
- ☑ Connections, lead wires
- ☑ Bench test of winding assembly
- ☑ Lacing and shaping

12. Winding Resin Process

- ☑ Key functions of impregnation
- ☑ Impregnation methods, pro's & con's
- ☑ Compatibility of materials
- ☑ Choice of resins, effect on process
- ☑ No resin at all? Bondable wire
- ☑ Encapsulation or overmold
- ☑ Getting Stator into housing, fixing it

16:45 Session Ends

**Course content is subject to change. All issued material may not be covered contingent on time used for Q&A*

Day 3: Friday, June 3rd

8:15 Session Begins

13. Rotor SubAssembly

- ☑ Construction concepts, features
- ☑ Methods of making cage rotors
- ☑ Performance issues of mfg process
- ☑ Methods of making rotors with coils
- ☑ Getting rotor onto shaft, fixing it
- ☑ Shaft fans, accessories
- ☑ Dynamic balance principles

14. Rotor Magnets & Installing

- ☑ Magnets types & coatings
- ☑ Placing/inserting magnets
- ☑ Fixing in place, more than adhesive?
- ☑ Retention methods, pro's & con's
- ☑ 'Charged magnet' assembly safety

15. Motor Assembly

- ☑ Getting rotor in stator without damage
- ☑ Attaching endbells, bearing caps
- ☑ Fastener choices; torques, adhesives
- ☑ Lifting eyebolts, safety in handling
- ☑ Nameplates & connection diagrams
- ☑ Box labels: What they care about
- ☑ Installation & operating manuals
- ☑ Terminals marking
- ☑ Accessories: thermals, space heaters, resolvers

16. Motor Testing

- ☑ In-process testing
- ☑ Full dynamometer testing
- ☑ Efficiency testing
- ☑ Commercial test
- ☑ Large motor testing
- ☑ Environmental qualification testing
- ☑ The "Acceptance Test Procedure"

17. Other Motor Manufacturing

- ☑ High speed motors
- ☑ High voltage motors
- ☑ Axial flux motors
- ☑ EV/HEV motors
- ☑ Reluctance motors
- ☑ Wind generators
- ☑ Liquid cooled motors

15:00 Closing & Adjourn

Onsite training is now available!

Send inquiries to

sales@advancedmotortech.com

Instructor:



Dr. Keith W. Klontz is President & CEO of Advanced MotorTech LLC, an engineering services company with emphasis on electric machine design engineering. He holds BS & MS degrees in Electrical Engineering from the University of Illinois, Champaign-Urbana, and a Ph.D. in Electrical Engineering from the University of Wisconsin-Madison. Dr. Klontz is a world-recognized expert in electric machine design and has over 40 years hands-on experience with electric machine design engineering, analysis, and manufacturing. He has been involved in the research, development, testing, manufacture, repair, and training of machines from 10 Watts to 50 MW. Recent work includes design of permanent magnet alternators, IPM traction motors, brushless d.c. motors, brush d.c. motors, high efficiency induction motors, and very high power density machine.

Tuition Fees Include:

- Extensive Training Manual (full color)
- "Mechanical Design of Electric Motors" book by Dr. Wei. Tong
- Mid-Morning & Afternoon Break w/ Refreshments Each Day
- Lunch Each Day in Session
- Signed Certificate of Course Completion



Host Hotel Location:

Los Angeles Airport Marriott
 5855 W. Century Boulevard
 Los Angeles, California 90045-5614
 Phone: (800) 228-9290

Hotel Reservations:

Make sure to reserve by *May 30th* your hotel room at the phone number above. Mention 'Advanced MotorTech' to receive your special room rate.

Enrollment:

- Yes! Please enroll me in **Motor Manufacturing Methods – June 1-3, 2016**
Fee: \$1725.00 (USD only) Course No. MMM-0616

PAYMENT: (Deadline: *must be received before start of course)

MasterCard Visa AMEX

- Cardholder Name _____
- Card No. _____
- Exp ___/___/___ Billing Zip _____ Security Code: _____

Check enclosed (payable to Advanced MotorTech, LLC) Purchase Order

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone () _____ Email _____

* Cancellations received 14-30 days before the course are subject to a 15% late cancellation fee. Cancellations made 7-13 days before the course starts are subject to a 50% cancellation fee. Cancellations made less than 7 days of the course beginning are subject to the full fee.

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