



Course Information Letter ---- TG331

HANDS-ON STEAM TURBINE MAINTENANCE TG331

HPC Technical Services' course on Hands-On Steam Turbine Maintenance is a natural follow-on for one of our more popular courses, Steam Turbine Generator Maintenance, TG301. The course targets those individuals who have a need to gain some hands-on activities. This includes engineers (who have not yet received formal training on this topic), experienced-mechanics, mechanical maintenance foremen, planners and management.

HPC acquired a small turbine (and it is small) in addition to the turbine inner-shell we've had for a number of years. These combined components allow us to:

- Provide some hands-on experience on the positioning of a temporary centerline in the inner shell.
 - Provide some hands-on experience in relocating diaphragms to a centerline.
 - Provide some practice at performing coupling alignment, that will include calculations and moves.
 - Provide some hands-on experience at non-destructive examination of steam turbine components. This will include a shell, diaphragms, and a rotor.
 - Provide some hands-on experience at use of dye-penetrant to inspect valve disks, valve stems and a few other steam path components.
 - Provide some hands-on experience at collecting data on valve components.
 - Provide some hands-on experience on repair of diaphragm partitions/blading.
- (this list is expected to grow as we collect and prepare different materials for the implementation of this course).

OBJECTIVES: Upon completion of this course the participant will be able to:

1. Describe the purpose of each of the commonly used non-destructive tests that are used on steam turbine outages.
2. Demonstrate the ability to use and analyze the results of a dye-penetrant on steam turbine components.
3. Demonstrate the ability to use and analyze the results of a magnetic particle examination on steam turbine components.
4. Demonstrate knowledge on the evaluation of found steam path cracks.
5. Demonstrate the knowledge to evaluate repair options associated with the found steam path cracks.
6. Demonstrate the ability to set up a tightwire in an inner shell/casing.
7. Demonstrate the ability to record and interpret tightwire alignment data.
8. Demonstrate the knowledge and ability to move a diaphragm to a tightwire.
9. Demonstrate the ability to record and calculate coupling alignment changes.
10. Demonstrate the knowledge needed to translate coupling alignment data to bearing shim changes.
11. Demonstrate the ability to perform commonly performed evaluations of turbine bearings.
12. Demonstrate the ability to discuss causes and repair options with steam turbine components to include: bearings, rotating blading, diaphragms, steam valve components, rotors, and shell/casings.

COURSE DATES/LOCATION/FEE

For current dates / locations / prices, please see HPC's website, www.hpcnet.com.

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@hpcnet.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes, if you have sufficient hands-on equipment available for use.

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- Is HPC Technical Services' textbook available for purchase as a reference document? No, the emphasis of this course is hands-on activities and although we do have a text it is intended to support these hands-on activities.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary, but generally speaking, if you're planning on having 6+ attend, when considering your T&L, it is to your advantage to perform the course at your plant (if you have equipment available). You gain from the customization and price.
- Can HPC Technical Services provide "Technical Assistance" in the planning and implementation of our outages? Yes we can. Call or contact Harold Parker, hparker@hpcnet.com for our rate sheets and any further information required.

WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' textbook, [Hands-On Steam Turbine Maintenance Activities](#).
2. A "Certificate of Completion" with 2.9 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

STEAM TURBINE MAINTENANCE CERTIFICATION:

There are two levels of certification (Both levels require this course):

1. Engineer
2. Mechanical Technician

Those who attend this course are automatically qualified to take HPC Technical Services' Certification Examination. This examination is offered at no additional expense to the participant. An 80% passing grade is required. The examination length will not exceed 2-hours. Those who complete this examination will receive a revised "certificate of completion" that recognizes this accomplishment along with two-copies of a "To Whom It May Concern" letter that states their accomplishment. (Two copies are provided, one for the participants' employer and one for the participants' personal file.)

Consult HPC's website, www.hpcnet.com, for detail on this certification program.

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INSTRUCTOR (S):



Ray Militello, Mr. Militello has approximately 40-years experience maintaining steam turbine generator equipment. He has worked as a Field Representative for GE Installation & Service Department as well as a Turbine Repair Specialist for GE Apparatus Repair Division. Additionally, Mr. Militello was employed as a Supervisor - Maintenance and Maintenance Planning with Southern California Edison Company. Ray also worked as Manager, Maintenance Training Services with HPC Technical Services for 4-years before joining the Elliot Company as a service shop manager. For the last four years, Mr. Militello has been performing independent contractor work as a consultant, technical writer, and maintenance training instructor for the utility industry.



Douglas Lemmo, P.E. Mr. Lemmo has 35 years experience in the power generation industry, 31 of them with GE. Within GE he was initially employed as a field engineer (1971-1976). Here he was responsible for the installation and startup of a number of large and medium steam turbine generators and the feed pump turbines. In addition to this installation work, Mr. Lemmo also performed maintenance service on a variety of nuclear, fossil and marine turbine units. After leaving the field, Mr. Lemmo taught in GE's Field Engineering Development Center. Here his specialty was steam turbine generators, installation, alignment and maintenance. After a couple years instructing, he accepted a position selling maintenance and repair services. In 1982, Mr. Lemmo was the Project Manager for a Waste-to-Energy site. Later projects included a modernization of a hydroelectric facility and the management of the installation of a few combined cycle sites. In 2002, Doug left GE and has been closely aligned with HPC as he has instructed many of our courses and provided site-engineering support on HPC contracts.



Art Hinch, P.E. Mr. Hinch as worked in the Power Generation industry for 30+ years. During the 1974-1980 period, Mr. Hinch was employed by GE and was responsible for the installation of multiple large steam turbine generators (fossil and nuclear) and for multiple steam and gas turbine generator outages. To 1992 Mr. Hinch worked as an independent consultant in the south and southwestern regions. During this time frame he worked many turbine-generator outages on GE, Westinghouse, and Siemens units. In addition he worked the start up of a 1300-MW turbine generator unit. In 1992 Art signed on with Arkansas Nuclear One as a senior engineer in the turbine group where he worked primarily in the planning and implementing of turbine generator outages (GE and Westinghouse units). In 2003, Art accepted an early retirement package and has again functioned as an independent engineer, an associate of HPC Technical Services. In this capacity Art has worked multiple steam turbine generator outages on a variety of manufacturers as well as being primary instructor on a number of courses that HPC offers.

Robert Doughty, Mr. Doughty has more than 30 years of experience in start up, maintenance and operation of both large and small turbine-generators. Bob started his career as a power plant instrumentation technician while he completed his BS degree in Engineering Technology (1976) at the University of Houston. He has worked as a start up and field engineer for one of the major turbine-generator OEM's and as a consulting engineer, supporting the initial operation of two nuclear fueled power plants. He also was the field-engineering supervisor with overall responsibility for construction testing, initial start up and operations of a 600 MW coal fired generating plant. Later, as an employee of one of the larger independent turbine-generator service corporations, he worked as a start up and maintenance engineer on turbine-generators of all sizes from nearly all the major manufacturers. His most recent position (1999) as the President of Turbine Services, Inc., has allowed him to continue to provide on site technical direction, start up and controls adjustments for several major turbine inspections in the range of 35 to 835 MW. He is experienced in electro-hydraulic and mechanical governor control systems and turbine valve and control system up-grades. Bob is a member of ASME (18 years) and has worked closely with HPC on multiple projects, training as well as field service.

HPC TECHNICAL SERVICES
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Website: www.hpcnet.com

REGISTRATION FORM

Company: _____

Plant: _____

Address: _____

City/State/Zip: _____

Telephone: _____ FAX: _____

Course Number/Title: _____

Course Dates: ____/____/____ Thru ____/____/____

Course Location: _____ Course Fee: _____

PLEASE ENROLL THE FOLLOWING INDIVIDUAL(S) LISTED BELOW:

Student #1: _____ Email: _____

Student #2: _____ Email: _____

Taking advantage of HPC's 3-4-2 Policy: Send 3, Pay for 2 when paying in advance.

Student #3: _____ Email: _____

ENROLLED BY: _____ **Email:** _____

Date: _____

METHOD OF PAYMENT

Check to Follow: _____

Check Enclosed #: _____

MC/Visa/AMEX #: _____

Expiration Date: _____ CV Code: _____

Purchase Order #: _____

Please advise how you found out about this course initially.

- Website search
- Fax advertisement
- Magazine advertisement
- Familiar with HPC
- HPC mailing
- Other: _____