



STEAM TURBINE OVERHAULS & REPAIR (TG316)

We all want to improve the effectiveness of steam turbine maintenance activities. This course is an important step toward accomplishing this goal. Collectively, we want to:

REDUCE: Outage Durations, Outage Extensions, Work Duplication, and Rework.

INCREASE: Outage Intervals, Reliability, Availability, and Productivity.

Extensive "Training Aids" exercises are utilized during the entire 4 1/2-day session. This course is presented at our facility in Bradenton, FL due to extensive uses of steam turbine components for practical exercises.

This course has been designed for steam turbine facility foremen, supervisors, mechanics, engineers, and all other plant personnel who are concerned with increasing the effectiveness and reducing the cost of steam turbine/generator maintenance outages. A thorough understanding of turbine fundamentals is a prerequisite for this course. This basic knowledge may be obtained by "On-Job" experience or by completion of a turbine fundamentals course.

Topical Outline includes: Diaphragm Area Checks, Diaphragm Drop Checks, Diaphragm Repairs, Steam Path Audit, Bucket/Blade Repair, Shell / Casing Repair, Bearing Repairs, Valve Component Repairs, and Packing / Seal / Fitting Repairs as-well-as stationary and rotating component repairs.

OBJECTIVES

Upon completion of this course, participants will be able to:

1. Describe the major activities associated with turbine maintenance.
2. Identify and define the items of concern related to turbine maintenance activity.
3. Identify the types of defects encountered during turbine maintenance inspections.
4. Identify the relationship between operational effects and maintenance activity.
5. Describe the various inspections performed during disassembly of the turbine.
6. Describe the procedures for cleaning and inspecting the turbine components.
7. Describe the impact of the various types of defects on turbine efficiency and reliability.
8. Describe the criteria used to evaluate turbine component defects.
9. Describe the various repair methods for defective component condition.
10. Describe the details required for an effective steam path audit.
11. Describe the methods used to properly align turbine components.
12. Describe the criteria used to establish unit specific maintenance clearances.
13. Describe the tasks involved in the performance of diaphragm area checks, diaphragm drop checks, and minor or major diaphragm repairs.
14. Describe the tasks involved in the performance of steam path audits.
15. Describe the tasks involved in the performance of bucket/blade repairs.
16. Describe the tasks involved in the performance of bearing repairs.
17. Describe the tasks involved in the performance of valve repairs.
18. Describe the tasks involved in the performance of packing fitting and repairs.

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, Stephen@TurbineGeneratorTraining.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes.
- Is HPC Technical Services' textbook available for purchase as a reference document? No, however, HPC's full color illustrated Steam Turbine Generator Maintenance (TG301) text is available for \$219 plus shipping & handling.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary and it needs to be priced on an individual need basis. You gain from the customization and price.
- Is HPC Technical Services' consultants available for "technical advise" during our upcoming outage? Yes. Call Stephen Parker, Stephen@TurbineGeneratorTraining.com for a rate sheet.

COURSE OUTLINE

I. Introduction

- II. **Maintenance**
- III. **Definition of Maintenance**
- IV. **Maintenance Concern**
- V. **Types of Defects**
- VI. **Operational Effects**
- VII. **Turbine Overhaul:** Disassembly, Component Cleaning, Inspection Techniques, Component Inspections, Steam Path Audits, Reassembly
- VIII. **Bearing/Coupling Maintenance**
- IX. **Steam Valve Maintenance:** Safety Considerations, GE Valve Disassembly, W Valve Disassembly, Cleaning/Inspection, Practical Lab Exercises, Valve Assembly
- X. **Alignment:** Provisions, Alignment Checks, Internal Alignment Methods, Special Cases
- XI. **Diaphragm Area Checks:** Taking Data, Calculating Areas, Evaluating Data, Corrections
- XII. **Diaphragm Drop Checks:** Taking Data, Evaluating Data, Other Techniques
- XIII. **Diaphragm Repairs:** Inspections, Evaluations (Minor, Major), Repairs (Inco 182/82, 410 Stainless)
- XIV. **Steam Path Audits:** Operating Data, Defect Effecting Performance, Taking Data (Seal Leakage, Other Leakage, Erosion, Surface Finish, Deposits, Mechanical Damage, Economic Evaluation)
- XV. **Bucket/Blade Repair:** Cover/Shroud Band Removal, Tenon Recontour, Tenon Peening, Cover/ Shroud Band Fitting, Cover/Shroud Band Foxhole, Tenon Welding, Bucket Weld Repairs, Erosion Shielding Replacement, Tie Wire Repair
- XVI. **Casing/Shell Repairs:** Defects, Evaluations, Repairs
- XVII. **Bearing Repairs:** Defects, Evaluation, Repairs
- XVIII. **Valve Component Repairs:** Casings, Stems, Disks, Seats
- XIX. **Packing/Seal Fitting/Repair:** Casing/Diaphragm Bore Distortion, Offset Seals, Long Neck Seals
- XX. **Course Conclusion / Examination**

COURSE DATES/LOCATION/FEE

See www.TurbineGeneratorTraining.com for detail on the course dates / locations / and registration fees.

HPC's 3-4-2 policy applies: Sign up 3 for the same course/date, pay in advance, and pay for only 2 (the 3rd participant is free)!

HPC Technical Services reserves the right to cancel any course/seminar within 10-working days of the scheduled date. Fees are 100% refunded or credited to another Seminar (clients' choice) if HPC should cancel any Seminar. HPC is not responsible for non-refundable airline tickets or other travel expenses under any circumstance.

WHAT YOU WILL RECEIVE

1. 1 copy of HPC Technical Services' textbook, Steam Turbine Overhauls & Repairs.
2. A Certificate of Completion with 31 PDH awarded.

STEAM TURBINE MAINTENANCE CERTIFICATION

There are two levels of certification (both levels require this certification or TG301).

- 1) Mechanical Maintenance Technician
- 2) Field Engineer

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.TurbineGeneratorTraining.com, for detail on this certification program.

HPC TECHNICAL SERVICES
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Website: www.TurbineGeneratorTraining.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: _____

Student #2: _____

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

Student #3: _____

Enrolled by: _____ **Date:** _____

METHOD OF PAYMENT

Check to Follow: _____

Check Enclosed #: _____

MC/Visa/AMEX #: _____

Expiration Date: _____ CV Code: _____

Purchase Order #: _____

HOW DID YOU LEARN OF THIS COURSE

Attended HPC courses before

Received a fax

Received an email

Received HPC update

Internet search

Other: _____