



CONCEPTS OF STEAM TURBINE CONTROLS (TG422)

"Concepts of Steam Turbine Controls" is a course designed to provide a working knowledge of steam turbines and their associated control and protection equipment. Although not the focus of the course, attendees will gain a solid understanding of how power is generated. Turbine controls system design concepts are the primary focus. Included in these discussions are Speed Control, Load Control, Pressure Control and Protection Against Overspeed. All discussions are conceptual. It is our intention that the participant understand these topics well enough (conceptually) that they can be readily applied to any steam turbine operating unit.

Topical Outline includes: Review of Steam Turbine Fundamentals, Turbine Theory and Performance Curves, Governor Operation @ FSNL, Governor Operation on-line, Pressure Control Concepts, Steam Valve Operation, Thermal Stress Considerations, Steam Turbine Protection.

Recommended for Engineers and E&I Technicians.

OBJECTIVES

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

1. Describe how steam turbine governors function off-line.
2. Describe how steam turbine governors function on-line and being responsive to grid conditions.
3. Describe how steam turbine governors function on-line when programmed to not be responsive to grid conditions.
4. Describe steam turbine governor response to overspeed conditions.
5. Describe how an emergency governor should respond to overspeed conditions.
6. Describe how to determine proportionality between inlet valve position and steam flow.
7. Describe operation of typical servomechanisms such as the Abex and Moog servo-valves.
8. Describe typical operational exercises.
9. Describe typical routine preventive maintenance activities.

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.

COURSE OUTLINE

- I. **Turbine Theory & Performance Curves:** Fundamental Theory of Operation, Efficiency Issues, Valve Positioning for Efficiency and Reliability
- II. **Governor Operation:** Purpose, Speed Control, Load Control, Pressure Control, Valving, Start-Up, System Frequency Deviations, and Shutdown
- III. **Steam Turbine Protection:** Stability Issues, Loss of Synchronism, Synchronizing Errors, Motoring, Overspeed, Thrust Bearing Failure

WHAT YOU WILL RECEIVE

1. 1 copy of HPC Technical Services' textbook, Concepts of Steam Turbine Controls, as written by Harold Parker.
2. A "Certificate of Completion" with 14 PDH awarded.

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@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, this course book is not for sale.
- 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 (office). You gain from the customization and price.
- Can HPC Technical Services perform a functional checkout and calibration of your control system during the upcoming outage OR provide troubleshooting support should it be required? Yes we can. Call or contact Stephen Parker, stparker@TurbineGeneratorTraining.com for our rate sheets and any further information required.

STEAM TURBINE I&C AND FIELD ENGINEERING MAINTENANCE CERTIFICATION

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 mailing advertisement

Internet search

Other: _____