



STEAM TURBINE GENERATOR CONTROLS FOR OPERATORS (TG307)

Learn (or re-affirm) proper operation of the steam turbine-generator from the perspective of the control room operators. Emphasis is on decision-making regarding safe and effective operation of steam turbine generator equipment: TG Instruments / Controls, Starting and Loading Procedures/Considerations, and those Abnormal Events that occur all too often. Equipment discussed is normally a function of the participants' background. Presentation includes industry events/case studies. This course is intended for Control Room Operators, Shift Supervisors, Operations Superintendents, and Engineers.

Learn how a machine is at risk in service. Learn what are the symptoms of abnormal conditions and what might be proper corrective actions. Learn the purpose and function of the turbine-generator controls, how they are properly operated, how the controls respond to system conditions and what is the type and purpose of various protective circuits.

"I found the class to be immensely helpful and informative as it pertains to my job function and responsibilities. The instructor was enthusiastic, and very helpful with questions and concerns of those participating in the class. Especially helpful with generator operation and protective systems. I enjoyed the instructor's effort and ability to encourage participants to become involved with the overall theme of the class, and the exchange of dialogue as to our specific areas of concern." --- **KJC OPERATIONS**, Kramer Junction, CA

OBJECTIVES

1. Participants will become familiar with those turbine-generator components susceptible to damage in abnormal or fault like conditions, the type of damage that could occur, and what the operator can (or cannot) do to correct for the situation.
2. Participants will be able to draw a simple block - diagram that describes all the elements of steam turbine controls: speed, load, and pressure control, the generation of a servomechanism signal, feedback and regulation.
3. Participants will be able to draw a simple block-diagram that describes all the elements of a generator voltage regulator including the generation of excitation power, manual control, auto voltage regulation, anti-hunt devices, and limiters.
4. Participants will be describe in detail the process of synchronizing, including discussion on the effects of synchronizing errors.
5. Participants will be able to describe normal steam turbine-generator operating procedures as well as the more routine (using that word loosely) abnormal events.

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 Generator Controls for Operators, a \$195 value, as written by Harold Parker.
2. A Certificate of Completion with 3.1 PDH awarded.

COURSE OUTLINE

Monday

Steam Turbine Fundamental Review: Theory, Turbine Sections and Component Descriptions

Turbine Systems: Lubricating Oil Systems, Gland Steam and Water Seal Systems and Hydraulic Power Unit (where applicable). Emphasis is on abnormal operations as opposed to being a "system description".

Tuesday

TSI Interpretations: Eccentricity (Overview, Component Description, Use of Instrument and Data Interpretation), Speed Detection, Valve Position, Vibration (including discussion of causes within a steam turbine), Shell Expansion, Differential Expansion, Metal Temperatures

Turbine Controls for the Operators: Speed Control, Load Control, Limiters, Flow Control, Extraction Turbines, Overspeed and Reset System, Overspeed Trip

Wednesday

Turbine Operations: Thermal Stress, Starting and Loading, Drains, Pre-warming Procedures, Normal Operations.

Abnormal Conditions: Oil Whip, Packing Rubs, Mechanical Unbalance, Cracked Rotors, Water Induction, Low Speed Operation, Low Frequency Operation, High Exhaust Hood Temperatures, Vacuum Breaking, Over Pressure, Over Temperature, Feedwater Heater Removal

Periodic Tests

Thursday

Generator Fundamentals: Principles of a Simple Generator, Principles of Large Generators, Generator Regulation, Active and Reactive Power, Operation of Paralleled Generators, Power Angle Relation and Instability

Generator Construction: Stator Assembly, Rotor Assembly, and Exciters

Generator Support Systems: Shaft Sealing System, Hydrogen Control, and Stator Cooling Systems

Excitation Systems: Introduction to Voltage Regulators, Transient Response of a Voltage Regulator, Stabilizing Circuits

Friday

Generator Operations: Prior to Startup, Startup, Shutdown, Power Factor Adjustment, Operation of Gas Coolers, Abnormal Operations, Relationship Between Operation, Protection and Alarms, Alarms, Protection when Generator is Off-Line, Tripping Methods, Protective Actions for Generator

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? Yes. \$195 + S&H.
- 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 an audit of our operating procedures, or an In-Service Inspection? Yes we can. Call or contact Stephen Parker, Stephen@TurbineGeneratorTraining.com for our rate sheets and any further information required.

STEAM TURBINE GENERATOR OPERATIONS 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: _____ 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: _____ **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: _____