
COURSE DESCRIPTION

CHH624 – Gearless Mill Drive Operation and Maintenance

Course goal

The goal of this course is to provide participants with the required practical knowledge and information on safe operation and maintenance of the gearless mill drive (GMD) system. This training will help to enhance the operation and the maintenance of the GMD in order to ensure a flawless execution of the maintenance tasks.

Main learning objectives

The participants will be able to:

- Safely operate the GMD system on a day-to-day basis
- Understand the start/stop sequence and requirements
- Understand the process interface, alarm list, interlocking
- Understand the maintenance program of a GMD system
- Optimize the maintenance process of the a GMD system

Participant profile

This training is targeted to operators, electricians, technicians and site engineers.

Prerequisites

Participants should have basic electro technical background.

It is highly recommended that the participants successfully completed the course “Gearless Mill Drive – Theoretical System Overview” (CHH621).

Topics

- E-house and motor overview
 - Sub-systems / auxiliaries
 - Motor control center, PLC (overview)

- GMD human machine interface (HMI)
 - Cyclo control terminal (CCT) and operations
- Faults and reset function
 - How to work with alarms, trips and faults
 - Excitation controller faults E-stop
- Mill start-up and stop sequences
 - GMD start/stop sequence
 - Inching, creeping, normal operation
 - Auxiliaries start-up sequence
 - Close circuit breaker command
 - System shutdown
 - Abnormal stop sequence
- Motor local control panel (MLCP)
 - Control location selection / key switch
 - Pushbutton and control station
- Ring motor sub-systems
 - Air gap monitoring
 - Dust sealing system
 - Off-load disconnect switch (knife switch)
 - Sub-systems / auxiliaries
- GMD medium voltage system
 - MV main circuit breaker(s)
 - Cycloconverter and excitation transformer
- Rotor excitation
 - Excitation converter DCS800
 - Rotor protection / overvoltage arrester
 - Diagnostic software tool
- Thyristor firing & supervision (operational overview)

- GMD regulation & operation (operational overview)
 - Operation of synchronous motor
 - Vector control
 - Motor equivalent circuit
 - Current based flux calculation
 - Voltage based flux calculation
 - Controlling the motor torque
 - Synchronous motor operation curves
 - Voltage and flux
 - Torque
 - Power
 - Operation curve
 - Principle of regulation
 - Speed control (task C)
 - Flux control (task B)
 - Current control (task B)
 - Excitation control (task C)
 - Operation functions
 - Controlled rollback
 - Frozen charge protection (task C)
 - Ride through function
 - Load shedding function
 - Speed calculation for the ring motor
 - Air gap measure and protection
- Maintenance strategies and concepts applied to the GMD system
- 6/12/36 months maintenance tasks and inspections according to electrical maintenance plan, periodical tests
- Spare parts/tools and their storage

Remarks

This course can be delivered at:

- Customer site / any training facility organized by customer
- ABB training center in Switzerland
- As a remote training session

Course type and methods

This is an instructor led course and includes classroom training, discussions, demonstrations and practical hands-on activities (depending on drive availability).

Duration

The duration is 5 days:

- 8 hours daily for face-to-face classes
- 5 hours daily for remote sessions

Course map

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Topics	Welcome, personnel introduction Course introduction E-house and ring motor overview AC 800PEC hardware GMD human machine interface Faults & reset function Mill start-up & stop sequences	Review day 1 Motor local control panel (MLCP) Ring motor sub-systems (auxiliaries) GMD medium voltage system E-house Motor control center E-house Rotor excitation	Review day 2 Thyristor firing & supervision GMD regulation & operation Questions and answers Exercise on GMD operation Review of the exercise	Review day 3 Operation and maintenance manuals (OMM) of the GMD system Spare parts/tools and their storage, periodical tests/checks 6/12/36 months shutdown for electrical maintenance tasks and inspections	Review day 4 Preparation for maintenance Questions and answers Exercise on GMD maintenance Review of the exercise Summary Questions and answers Evaluation Course close
Time (face-to-face class)	9:00 am – 5:00 pm	9:00 am – 5:00 pm	9:00 am – 5:00 pm	9:00 am – 5:00 pm	9:00 am – 5:00 pm
Time (remote session)	to be defined	to be defined	to be defined	to be defined	to be defined

Typical course layout (time or sequence may change)