

Basic Hydraulic Design

Course Code: BHD

Bosch Rexroth, St Neots

Aims

- › The BHD course takes a more mathematical approach to the theory covered in the MH or MH-s courses. After covering basic theory and operation of hydraulic components, the emphasis moves to circuit design and basic project work
- › The course is intended for design and technical personnel who are involved with machine design and the specification of hydraulic components and systems
- › Although this course is not intended to fully instruct the student in proportional technology it is inevitable that this subject is covered as this technology forms an integral part of modern hydraulic systems

Course Content

Day one

- › **Fundamental Principles**
- › Cylinders – relationship between valves
- › Cylinder size, pressure, area and effective force
- › Cylinder size, supply flow rate and velocity
- › **Motors**
- › Motor displacement, pressure and shaft torque
- › Motor displacement, supply flow rate and shaft speed
- › Motor performance and effects of fluid viscosity
- › **Loads to be moved**
- › Application of the laws of dynamics, with reference to Mass and inertia, friction, gravity and other external forces; direct and indirect loads
- › **Pumps**
- › Displacement, shaft speed and flow rate
- › Flow rate, system pressure and fluid viscosity
- › Pressure difference, component flow area and flow rate
- › Fluid Viscosity, Renolds number, flow characteristics, recommended flow velocities
- › Pressure difference, flow rates, heat generation and temperature changes

Day two

- › Step by step to follow, relating to system design
- › Outline of common design faults
- › Preparing outline circuitry
- › **Component selection to meet specification Actuators**
- › Cylinder to meet force, speed and application needs
- › Motors to meet torque, speed and application needs
- › Pressure – Time/flow diagrams and duty cycles
- › **Pumps**
- › Sizing, power requirements and Q/P requirements
- › Circuitry relating to fixed and variable displacement pumps
- › **Hydraulic valves**
- › Size selection, flow rates, pressure and configurations
- › Proportional control valves:
- › Overview of valve selection, sizing and application

Day three

- › Contamination control at the design stage
- › Health and performance monitoring when designing
- › Reservoir sizing and layout considerations
- › Design exercises and practical tasks

St Neots
3 days

15 - 17 June

Note:

Practical exercises form an important part of this course, carried out using our range of specially designed training rigs. Course participants are asked to bring current circuit diagrams to these sessions where time will be devoted to their explanation.

Pre-requisites

- › Attendance on either the MH or MH-s course.
- › See Stage 2 pre-requisites (page 6)

Participants

- › Maintenance Engineers
- › Project Engineers
- › Technical Personnel
- › Sales Personnel