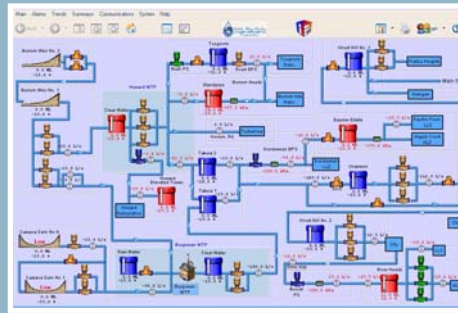




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GRADUATE DEVELOPMENT PROGRAM ACTIVITIES BY DIVISION



PROJECTS AND CONSTRUCTION

Upon successful completion of assignment to the Projects department the engineer will be able to:

1. Understand and apply the concepts involved in project level design of industrial systems
2. Understand the various facets of project management.
3. Prepare Services Requests and associated documentation to delegate specialised work to other business units
4. Understand and follow the processes from receipt of clients requirements or contract through to preparation of a package suitable for subcontract construction
5. Understand and use all project related standard processes such as RFI's, AA's, variation notifications
6. Understand and apply fundamental engineering technical design of all disciplines and develop an appreciation of construction concepts relating to industrial applications
7. Undertake basic contract scope of work interpretation
8. Understand the commercial purpose and application of the formal contract associated with a project and the roles of the various nominated parties
9. Appreciate the importance of client liaison for the purposes of project management
10. Appreciate the importance of responsibility for the whole of project management as a project engineer

The development modules undertaken in this area are as follows:

Project Drafting

- Drafting processes and practices in AutoCad specific to project design and construction
- Prepare general project construction related drawings
- Prepare drawings suitable for further design and detailing by switchgear manufacturing

Project Design and Engineering

- Understand Project related electrical engineering design concepts
- Exposure to Project related civil and mechanical/structural engineering design concepts
- Design of standard and project specific electrical engineering documents and drawings suitable for construction (cable schedules, equipment schedules, schematic diagrams, termination diagrams, block diagrams, general arrangements, layouts, P&ID's)
- Use computer based design tools to design electrical systems
- Understand how to follow, read and interpret schematic diagrams for basic (hardwired only) and complex systems (contain control systems equipment and device interfaces)
- Carry out equipment selection and obtain quotes
- Prepare materials take-off lists, bills of materials, purchase orders
- Prepare Manufacturing Services Request packages for action by Switchgear department
- Prepare Automation Services Request packages for action by Automation department
- Prepare Scopes of Work for internal departments, external consultants, subcontractors
- Cost control and project management of jobs (budget, forecast, financial, schedule)
- Prepare Client related job control documentation
- Prepare project schedules
- Interpret complex project scopes of work and technical specifications of all disciplines
- Co-ordinate, monitor progress and direct recovery where necessary of all aspects of project delivery (materials supply, external consultant deliverables, customer feedback and direction, workshop manufacturing and testing, automation deliverables, subcontractor progress)
- Use of "Ironbark" to obtain project cost information and complete project cost forecasts.
- Understand and interpret General Conditions of Contract in relation to projects, including the role of the Principal, Contractor and Superintendent
- Participate in client, subcontractor and design consultant progress meetings
- Prepare Inspection and Test Plan documentation and deliverables
- Manage and co-ordinate document control systems for specific projects
- Collate final Inspection and Test documentation
- Prepare project technical, operations and maintenance manuals

Site Construction and Commissioning

- Assist the site construction supervisor to set-up and manage the construction workplace
- Act in the role of Field Engineer responsible for providing technical direction and administration of construction activities
- Participate in workplace safety and progress meetings
- Determine job progress and record with respect to the schedule
- Check that construction deliverables are in accordance with design
- Carry out safety, environmental and workplace audits
- Assist with the completion of Inspection Documentation
- Assist with the definition and finalisation of any out of scope works
- Carry out field initiated changes to design and implement directly, referring back to the design office for clarification only if necessary and time permits
- Carry out precommissioning work
- Carry out commissioning work
- Monitor and assist with the completion of as-built documentation
- Assist with the demobilisation of site

SWITCHGEAR

Upon successful completion of assignment to the Switchgear Design department the engineer will be able to:

1. Understand and apply the concepts involved in designing electrical switchgear, both standard products and custom equipment for process and heavy industrial applications.
2. Prepare detailed design drawings for use in manufacture of switchgear
3. Understand and follow the processes from receipt of clients requirements or contract through to preparation of a package suitable for production
4. Understand and apply fundamental electrical technical design and develop an appreciation of advanced electrical concepts relating to electrical switchgear
5. Undertake basic contract scope of work interpretation
6. Appreciate the importance of client liaison for the purposes of job control and management of scope change

The development modules undertaken in this area are as follows:

Design Drafting

- Drafting processes and practices in AutoCad specific to equipment design and manufacturing
- Application of standard design processes using AutoCad and company standard design systems

Product Design

- Switchgear and electrical engineering design concepts
- Manufacturing design concepts
- Design of standard and custom switchgear equipment suitable for manufacture
- Use computer based design tools to design switchgear and mining equipment
- Carry out equipment selection and obtain quotes
- Prepare materials take-off lists, bills of materials, purchase orders
- Prepare production packages for handover to manufacturing
- Cost control and project management of jobs (budget, forecast, financial, schedule)

PROCESS AUTOMATION

Upon successful completion of assignment to the Automation department the engineer will be able to:

1. Understand and apply the concepts involved in the design and implementation of automation systems in an industrial environment.
2. Understand how the automation systems interact with the real world devices in real time
3. Understand how to configure PLC's, HMI's and intelligent devices for industrial applications
4. Understand and apply fundamental control system logic design and develop an appreciation of advanced instrumentation and control concepts relating to plant automation
5. Appreciate the importance of client liaison for the purposes of job control and management of scope change

The development modules undertaken in this area are as follows:

Project Design and Programming (basic)

- Learn the basic procedures for configuration of PLC systems
- Learn the basic procedures for configuration of SCADA systems
- Learn how to interpret Process and Instrumentation Diagrams (P&ID's)
- Learn how to interpret functional descriptions into control system programs
- Learn the logical and physical connections for a control system from HMI through to field devices
- Learn how to set-up, configure and commission communications interfaces between control system devices
- Learn to identify industry standard communications protocols, how they are physically implemented, their advantages and limitations
- Exposure to plant-wide control system networking and systems integration
- Prepare functional descriptions

Project Design and Programming (advanced)

- All of the elements of (basic), plus;
- Determine and design PLC and SCADA system configurations
- Programming of PLC systems
- Programming of SCADA systems
- Programming of intelligent control system devices and instrumentation
- Writing HMI scripts in 4th generation programming languages
- Prepare Inspection and Test Plans for automation systems

Site Commissioning

- Install and commission PLC systems
- Install and commission SCADA systems
- Implement Inspection and Test Plans for automation systems

WORKSHOP MANUFACTURING

Upon successful completion of assignment to the Manufacturing department the engineer will be able to:

1. Understand the workflow processes involved in the operation and management of a manufacturing facility.
2. Understand the roles and capabilities of the different trades involved in the manufacturing process
3. Understand and apply scheduling practices necessary for job management
4. Understand the importance of inputs (design, materials, QA) management to the manufacturing process
5. Understand logistics associated with operation of the workshop facility
6. Appreciate the importance of interdepartmental liaison for the purposes of job control and management of scope change
7. Apply and appreciate safe work practices for the electrical industry and in a manufacturing environment

The development modules undertaken in this area are as follows:

Electrical Testing and Final Assembly

- Learn basic electrical safety practices
- Learn testing techniques
- Apply quality inspection techniques and manage rework requirements within cost and time constraints
- Apply testing techniques

Manufacturing Process Administration

- Understand the manufacturing process flow
- Assist the workshop foreman and manufacturing manager with matters of job and technical engineering administration, including actioning urgent inputs due from the design department
- Obtain an insight into the efficient operation of inventory management
- Obtain an insight into logistics associated with the operation of a manufacturing facility

Quality Process

- Assist the quality manager with administration of the company quality system
- Provide input into the continuous improvement of quality system documentation via direct user technical feedback as a result of electrical testing activities
- Streamlining of the implementation of the quality procedures in testing by having direct engineering level technical input

Fabrication Inspection and Testing (mechanical discipline)

- Assist the quality manager with administration of the company quality system
- Involvement in determining mechanical fabrication and assembly techniques and provision of technical advice where necessary
- Inspection of mechanical manufactured works
- Provide input into the continuous improvement of quality system documentation via direct user technical feedback as a result of mechanical fabrication activities
- Streamlining of the implementation of the quality procedures in testing by having direct engineering level technical input