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Building Technology

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics in building technology techniques and the method tools available.
- Standards required in the building industry and relevant quality standards.
- Safety precautions during construction and Health & Safety Laws applied to design and construction aims.

Course Duration: Five Days

Course Contents:

- Construction Safety and Health & Safety requirements
- Building Codes. B.S.S. and ASTM and authority for Building Codes
- Classification by Type of Construction
- Loads Carried by Buildings, Effects of Loadings and Stress Transmission
- Building Costs Estimates (Methodology)
- Structure of the industry
- Surface and sub surface site investigations
- Properties of soils
- Function of foundations and design in stable and unstable ground conditions
- Foundation failure
- Functional requirements of external walls
- Load bearing wall construction
- Structural openings and open space requirements
- Performance requirements and construction of roofs and roof coverings
- Space heating installations relative to the building fabric
- Stairways
- Construction and finishes of suspended and solid floors
- Lay-out and construction of estate carriageways and footways, road drainage and sewers,
- Street lighting and public utility services and provision of ducts
- Case studies, discussion periods and practical exercises

Who should attend:

Potential and Practicing Civil Engineers and Supervisors of building and construction sites.

Cement Technology

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics of cement technology and design
- Safety stipulations with cement
- Mixing & applications during processing
- Modern techniques and programs used for fabrication in buildings and other structures.

Course Duration: Five Days

Course Contents:

- Introduction to General Properties and Characteristics of Cement
- Definition of Portland Cement
 - cement chemist's notation
 - the cement manufacturing process
- Constitution of Portland Cement:
 - proportions of phases
 - chemical characteristics of clinker
 - LSF, S/R, A/R
- Proportioning of raw materials:
 -
 - composition of raw materials
 - multicomponent mixes
- Reactions in the cement kiln:
 - liquid phases,
 - formation of calcium silicates,
 - effect of minor constituents
- Effects on clinker of differing production conditions:
 - reducing conditions in the burning zone
 - effects of recirculating volatiles
 - influence of flame design,

- cooling of clinker,
- milling considerations,
- calcium sulphate type

- Structure of hydrated cement:
 - - setting of cement,
 - development of cement hydrates,
 - mature hydrate compositions,
 - effects of cement composition
 - production conditions on cement performance

- Introduction to chemical aspects of concrete durability:
 - permeability and porosity
 - water/cement ratio
 - curing
 - carbonation

- Deleterious processes:
 - alkali-silica reaction (ASR),
 - sulphate attack,
 - delayed ettringite formation (DEF),
 - thaumasite formation

- Case studies
- Group Exercises
- Group Discussions
- Course Evaluation
- Course Summary
-

Who Should Attend:

Builders, Engineers, Cement designers and Technician who are involved in Fabrication of Buildings and other Structures using Cement as basic construction and foundation materials

Reinforced Concrete and Steel Design

Learning Objectives:

- The basics of reinforced concrete and steel design, including the ability to design simple structures according to British Standards. Specifically the trainee will learn BS8110, and BS5950 for reinforced concrete and steel design respectively.
- Modern techniques and programs used in the field of structural analysis and design. Brief description and capabilities of software currently available.

Course Duration: Ten Days.

Course Daily Contents:

DAY 1: Introduction – Topics applicable to both reinforced concrete and steel design.

- Properties of Reinforced Concrete and Steel (strength in tension, compression and shear, durability and fire resistance). Comparison between the two.
- Design methods (Elastic Design, Plastic Design, and Limit State Design)
- In-depth examination of the Limit State Design. (Characteristic Material Strengths and Characteristic Loads, Factors of Safety).
- Analysis of the Structure (Loads, Load Combinations, Analysis of Beams and Frames).

DAY 2 TO 5: Reinforced Concrete Design

- Analysis of the Section (Stress-Strain Relations, Bending and the Equivalent Rectangular Stress Block, Singly Reinforced Rectangular Section in Bending, Rectangular Section with Compression Reinforcement in Bending, Flanged Section in Bending, Bending Plus Axial Load at the Ultimate Limit State.
- Shear, Bond and Torsion (stirrups, bent-up bars, anchorage bond, laps, etc.)
- Serviceability, Durability and Stability Requirements (Minimum Concrete Mix and Cover, Maximum and Minimum Spacing of Reinforcement, Minimum and Maximum Areas of Reinforcement, Span-Effective Depth Ratios, Control of Crack Widths).
- Design of Reinforced Concrete Beams (Preliminary Analysis and Member Sizing, Design of Bending Reinforcement, Curtailment of Bars, Span-Effective Depth Ratios, Design of Shear reinforcement, Examples of Simply Supported, Continuous and Cantilever Beams).
- Design of Reinforced Concrete Slabs (Simplified Analysis, Shear in Slabs, Punching Shear Analysis, Span-Effective Depth Ratios, Reinforcement Details. Examples of Slabs Spanning in One Direction and Slabs Spanning in Two Directions).



- Column Design (Loading and Moments, Short and Slender Columns, Reinforcement Details, Design of Short Columns, Design of Slender Columns).
- Foundations (Pad footings, Strip Footings, Raft Foundations).
- Retaining Walls.

DAY 6 TO 9: Steel Design

- Definitions of major structural steelwork components, and basic functions of them.
- Materials, different Grades of Steel, Steel Sections, Section Properties.
- Connections (types of connections, bolts, welding, design of connections with examples).

- Beams (types and uses, beam loads, classification of beam cross sections, bending stresses and moment capacity, lateral torsional buckling, shear, deflection, beam connections, examples).
- Plate girders (design considerations, behaviour of a plate girder, design to BS5950).
- Tension members (types and uses, end connections, design examples).
- Compression members (types and uses, loads on compression members, classification of cross sections, axially loaded members, members subjected to axial load and moment, design examples).
- Trusses and bracing (types, uses and truss members, connections, analysis and design of trusses, bracing).
- Portal Design (analysis and design).

DAY 10 : Modern techniques and programs - Summary.

- Modern techniques and programs used in the field of structural analysis and design. Brief description and capabilities of software currently available.
- Case studies and Exercises
- Summary – Discussion.

Who Should Attend:

Potential and Practicing Civil Engineers, Detailers, and Supervisors of Building and Construction sites.

Prerequisite:

Fundamental knowledge of structural analysis is required.

REINFORCED CONCRETE & STEEL DESIGN

Course Objectives:

On completion of the course the trainee/s will be competent in:

The basics of reinforced concrete and steel design, structures according to British Standards. Specifically the trainee will learn BS8110, and BS5950 for reinforced concrete and steel design respectively

Course Duration: Five Days.

Course Contents:

DAY 1 : Introduction – Properties of materials, design loads & methods used.

- Properties of Reinforced Concrete and Steel (strength in tension, compression and shear, durability and fire resistance). Comparison between the two.
- Design methods (Elastic Design, Plastic Design, and Limit State Design)
- In-depth examination of the Limit State Design. (Characteristic Material Strengths and Characteristic Loads, Factors of Safety).
- Analysis of the Structure (Loads, Load Combinations, Analysis of Beams and Frames).

DAY 2 & 3: Reinforced Concrete Design

- Analysis of the Section (Stress-Strain Relations, Bending and the Equivalent Rectangular Stress Block, Singly Reinforced Rectangular Section in Bending, Rectangular Section with Compression Reinforcement in Bending, Flanged Section in Bending, Bending Plus Axial Load at the Ultimate Limit State.
- Shear, Bond and Torsion (stirrups, bent-up bars, anchorage bond, laps, etc.)
- Serviceability, Durability and Stability Requirements (Minimum Concrete Mix and Cover, Maximum and Minimum Spacing of Reinforcement, Minimum and Maximum Areas of Reinforcement, Span-Effective Depth Ratios, Control of Crack Widths).

DAY 4 & 5: Steel Design

- Definitions of major structural steelwork components, and basic functions of them.
- Materials, different Grades of Steel, Steel Sections, Section Properties.
- Beams (types and uses, beam loads, classification of beam cross sections, bending stresses and moment capacity, lateral torsional buckling, shear, deflection).
- Tension members (types and uses).
- Compression members (types and uses, loads on compression members).
- Trusses and bracing (types, uses)

Who should attend:

Potential and Practicing Civil Engineers, Detailers, and Supervisors of Building and Construction sites.

Prerequisite:

Fundamental knowledge of structural analysis is required.

Reinforced Concrete Design

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics of reinforced concrete design, including the ability to design simple R.C. structures according to British Standards (BS8110).
- Modern techniques and programs used in the field of reinforced concrete design.

Course Duration: Five Days

Course Contents:

- Properties of Reinforced Concrete (strength in tension, compression and shear, durability and fire resistance).
- Limit State Design, Characteristic Material Strengths and Characteristic Loads, Factors of Safety.
- Analysis of the Structure (Loads, Load Combinations, Analysis of Beams and Frames).
- Analysis of the Section (Stress-Strain Relations, Bending and the Equivalent Rectangular Stress Block, Singly Reinforced Rectangular Section in Bending, Rectangular Section with Compression Reinforcement in Bending, Flanged Section in Bending, Bending Plus Axial Load at the Ultimate Limit State.
- Shear, Bond and Torsion (stirrups, bent-up bars, anchorage bond, laps, etc.)
- Serviceability, Durability and Stability Requirements (Minimum Concrete Mix and Cover, Maximum and Minimum Spacing of Reinforcement, Minimum and Maximum Areas of Reinforcement, Span-Effective Depth Ratios, Control of Crack Widths).
- Design of Reinforced Concrete Beams (Preliminary Analysis and Member Sizing, Design of Bending Reinforcement, Curtailment of Bars, Span-Effective Depth Ratios, Design of Shear reinforcement, Examples of Simply Supported, Continuous and Cantilever Beams).
- Design of Reinforced Concrete Slabs (Simplified Analysis, Shear in Slabs, Punching Shear Analysis, Span-Effective Depth Ratios, Reinforcement Details. Examples of Slabs Spanning in One Direction and Slabs Spanning in Two Directions).
- Column Design (Loading and Moments, Short and Slender Columns, Reinforcement Details, Design of Short Columns, Design of Slender Columns).
- Foundations (Pad footings, Strip Footings, Raft Foundations).
- Retaining Walls.
- Software that can be used for the design of Reinforced Concrete Structures.

Who should attend:

Potential and Practising Civil Engineers, Detailers, and Supervisors of Building and Construction sites.

Reinforced Concrete Design

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics of reinforced concrete design, including the ability to design simple R.C. structures according to British Standards (BS8110).
- Modern techniques and programs used in the field of reinforced concrete design.

Course Duration: Five Days

Course Contents:

- Properties of Reinforced Concrete (strength in tension, compression and shear, durability and fire resistance).
- Limit State Design, Characteristic Material Strengths and Characteristic Loads, Factors of Safety.
- Analysis of the Structure (Loads, Load Combinations, Analysis of Beams and Frames).
- Analysis of the Section (Stress-Strain Relations, Bending and the Equivalent Rectangular Stress Block, Singly Reinforced Rectangular Section in Bending, Rectangular Section with Compression Reinforcement in Bending, Flanged Section in Bending, Bending Plus Axial Load at the Ultimate Limit State.
- Shear, Bond and Torsion (stirrups, bent-up bars, anchorage bond, laps, etc.)
- Serviceability, Durability and Stability Requirements (Minimum Concrete Mix and Cover, Maximum and Minimum Spacing of Reinforcement, Minimum and Maximum Areas of Reinforcement, Span-Effective Depth Ratios, Control of Crack Widths).
- Design of Reinforced Concrete Beams (Preliminary Analysis and Member Sizing, Design of Bending Reinforcement, Curtailment of Bars, Span-Effective Depth Ratios, Design of Shear reinforcement, Examples of Simply Supported, Continuous and Cantilever Beams).
- Design of Reinforced Concrete Slabs (Simplified Analysis, Shear in Slabs, Punching Shear Analysis, Span-Effective Depth Ratios, Reinforcement Details. Examples of Slabs Spanning in One Direction and Slabs Spanning in Two Directions).
- Column Design (Loading and Moments, Short and Slender Columns, Reinforcement Details, Design of Short Columns, Design of Slender Columns).
- Foundations (Pad footings, Strip Footings, Raft Foundations).
- Retaining Walls.
- Software that can be used for the design of Reinforced Concrete Structures.

Who should attend:

Potential and Practising Civil Engineers, Detailers, and Supervisors of Building and Construction sites.

Contract Management & Administration

Course Background:

As projects become more cost effective and the systems for tender bidding become more competitive the need for effective contracting and tendering systems has in turn become critical to ensure minimal risks are taken.

The lowest bidder may or may not be the best option and could lead to more costs and unavoidable legalities, frustrated contracts, delayed or suspended projects, uncompleted works, additional costs and expenses and damages.

Quality and competitiveness need to be balanced and filtering of bids to ensure that the materials, goods or services that are contracted are fit for the purpose for which they are intended of merchantable quality. Performance has also to be executed and monitored and requires careful design of the service contract.

How can this be avoided and how can costly trial and error be eliminated.

Learning Objectives:

This four- day program is designed to deal with the main contract stages of planning, formation and administering. It will also take a practical approach to the contract stages from inception through to finality of the project. It uses case studies to illustrate the pit falls of this process and analysis of developing systems to ensure minimum risks. It will also overview on basic legal contract terms but is not intended as a legal instruction program.

Daily Course Contents:

Day One

Introduction to Contract Management & Administration

- Stages of Planning
- Hazards and Pitfalls
- Ascertaining Internal Customer Needs
- The Scope of Work
- Technical Reports
- Identifying Specifications
- Identifying Quality Needs
- Budgeting and Cost Approvals
- Vendor Selection
- Selection Processes
- Confidentiality

Day Two

Performance

- Agreed and Expectations
- Performance Monitoring
- Performance Bonds
- Guarantees & Warranties
- Negligence
- Delays
- Defects
- Force Majuere
- Liabilities
- Damages
- Compensation
- Contract Amendments

Tendering Procedure

- Tendering Concepts
- Type of Systems
- Tender Documents
- Quotations
- Tendering Committees
- Procedures
- Assessing Bids
- Analyzing Bids
- Preparing Reports & Recommendations
- Awards

Day Three

Contract Administration

- Basis of Contracts
- Legalities (Overview)
- Contract Design
- Specifics Involved
- Mobilisation Phase
- Bonds and Insurance's
- Subcontracting
- Meeting

Execution of the Contract

- Creating and Maintaining Records
- Monitoring Performance
- Approvals, Inspection and Testing
- Quality and Rejected work
- Instruction, Variations, Substitutions
- Mistakes, Conflicts and Ambiguities
- Status of Shop Drawings, Co-ordination

Day Four

Successful Contract Negotiations

- Art of Negotiations
- Ongoing Negotiations
- Handling Conflict
- Win - Win Situations

Project Completion

- Trials and Commissioning
- Take over and Final Completion
- Punch lists and Defects
- Training and Operation
- As-Builts, Manuals Etc.
- Operating and Maintenance Instructions
- Activities and Assignments
- Case studies and Review
- Program Summary and Analysis

Program Support:

This program is supported by interactive discussions, case studies, exercises and appropriate audio / visual means to illustrate various aspects of the program.

Who Should Attend:

Those responsible in contracts formulation and scope of work preparation through the tendering system to awarding contracts to vendors.

Contract Planning

Course Background:

Various projects in many sectors such as engineering, process and petrochemical industries have passed through one of its most important and critical periods in the Gulf Community Countries.

Fewer projects and increased competition resulted in very low bids, which consequently required a much higher standard of management and control systems. Frustrated contracts, delayed or suspended projects, uncompleted works, additional costs and expenses, damages and losses and eventually litigation in court or arbitration have become common occurrences.

Besides dealing with three main contract phases of planning, formation and administering, this program will also take a practical approach to the project from inception through to final completion.

Course Duration: Five Days

Course Contents:

Contract Planning:

- Ascertaining "The Needs of the Customer"
- The Designing Process

Contract Administration:

- Mobilisation Phase
- Bonds and Insurance's
- Authority and Communication
- Subcontracting
- Agenda for a kick of meeting
- Mobilisation Checkli

Execution of the Works:

- The Engineer and his Assistant
- Creating and Maintaining Proper Records
- Monitoring Procedures
- Approvals, Inspection and Testing
- Quality and Rejected work
- Instruction, Variations, Substitutions
- Mistakes, Conflicts and Ambiguities
- Status of Shop Drawings, Co-ordination

Project Completion:

- Trails and Commissioning
- Take over and Final Completion
- Punch lists and Defects
- Training and Operation
- As-Builts, Manuals Etc.
- Operating and Maintenance Instructions
- Activities and Assignments
- Case studies & Exercises
- Discussion Groups
- Course Evaluation
- Course Summary

Who Should Attend:

If you are responsible or likely to be responsible to administer any phase of a project, the seminar will be practical value because effective administration depends the continued application of sound principles and prove

Excel for Engineers

Course Objectives:

On completion of the course the trainee/s will be competent in:

- Using Excel's worksheet features to handle more professionally everyday engineering tasks: design, planning, organizing, management of costs, materials and labor.
- Lay out models representing the problem to be solved on the electronic worksheet, organize and present their solutions as true professionals.

Course Duration: Five Days

Daily Course Contents:

Day One:

Session 1: Worksheet Basics (The window environment, file manager concepts, starting and exiting Excel, what is workbook and worksheet, moving around in the worksheet, getting help, Excel commands, Entering data, Correcting errors, Erasing worksheet data, Lesson summary, Review exercise).

Session 2: Managing workbooks, Working in workbooks, Defining your calculations, Arithmetic formulas, Copying and moving worksheet data, Rearranging the worksheet, Formatting cell contents, Altering column widths, Lesson Summary, Review exercise.

Day Two:

Session 3: Inserting and deleting columns, rows, worksheets, Changing the alignment of label entries, Working with files, Using logical formulas (If Statement), Printing your worksheet, workbooks, Lesson summary, Review exercise.

Session 4: Creating graphs, Working with database, Lesson Summary, Review exercise.

Session 5: Creating Reports, Creating customized reports with pivot tables, Lesson summary, Review exercise.

Day Three:

Session 6: Becoming more efficient (Formulas and links, Working with Links,

Inserting cell notes, How many directors in each fee scale – Use 'AND' logic or data distribution, Reconcile your bank statement using 'IF' logic to compare entries, Financial analysis, Lesson summary, Review exercise).

Session 7: Analyzing and sharing your data, Comparing alternatives, Sharing your data with other applications, Lesson Summary, Review exercise.

Day Four:

Session 8: End tedious repetitive typing! Learn how to automate your commands (Creating macros, Macro building blocks, Creating a few more macros, Creating macro buttons, Using macros to help data import from other applications, Macro libraries, Lesson summary, Review exercise).

Day Five:

Session 9 @10: The last sessions will be divided into four parts:

Part I: Presentation from the trainer and discussion of two alternative case studies in preparation for Part II of this session. Case I will be a Heating Installation Project, and Case II a Lighting Installation Project.

Part II: The participants will make a plan on how spreadsheets can be best implemented to improve and develop the planning and controlling activities of their companies so as to improve performance.

Part III: The participants will work on their plan using everything they have learnt on Excel.

Part IV: The participants will present their work and the trainer will offer provide his consultation.

Who should attend:

Engineers from all disciplines (not Technicians) whose duties involve Design, Planning, Organizing and Management of cost, labor and materials.

Prerequisites:

No prior knowledge of Excel is required. However, basic knowledge of the personal computer would be usefu

Quantity Surveying in Project Management **(Customers / Clients)**

Course Introduction:

Tendering for Projects is required to be highly accurate especially when mis-estimations and under estimating may not exactly represent the true value of the total costs of the project.

This course is designed to introduce the various proven methods and tools involved and the various Quantity Surveying techniques to ensure accurate estimations and successful projects.

- The basics of quantity surveying and the methods of calculations involved
- Preparing and compilation of a Tendering Documentation
- Formulating Bills of Quantity for analysis and overall project consideration within the Tender document by the Customer / Client.

Course Duration: Four Days

Course Contents:

- Preparation of Scope of Work
- Preparation of Invitation to Tender (ITT)
- Potential Contractor Evaluation
- Preparation of Bidders List
- Preparation of Guides to Tender Analysis
- Analysis of Milestone Payments, Cash Flow Position and Retention
- Clarification of Tenders
- Preparation and Issue of Contract Documents
- Work Measurement
- Dealing With Invoices
- Preparation of Variation Orders
- Agreement of Change Orders
- Preparation of Punch Lists
- Handover
- Final Account and Retention
- Case studies, interactive discussions and exercises
- Course Evaluation and Summary

Who Should Attend:

Project and Contract Site Managers, those responsible for Projects costing and costing analysis for medium to large projects

Quantity Surveying in Project Management (Contractor)

Course Introduction:

The most important and most successful part of any project is the costing involved. Most projects fail because of mis-estimations and under estimating the total costs of the project.

This course is designed to introduce the various proven methods and tools involved and the various Quantity Surveying techniques to ensure accurate estimations and successful projects.

- The basics of quantity surveying and the methods of calculations involved
- Preparing and compilation of a QS Report for overall project analysis
- Formulating Bills of Quantity for analysis and overall project consideration.

Course Duration: Four Days

Course Contents:

- Evaluation of Tender Documentation
- Analysis of Contractual Risk
- Evaluation of Scope of Work
- Preparation of Bills Of Quantity (BOQ) and Provisional Sum elements
- Analysis of Cash Flow Position, Milestone payments and Retentions
- Preparation of Contractual Method
- Pricing of Bid
- Preparation of Bid Package
- Response to Clients Questions and Bid Clarification
- Re- Estimate Following Clarification
- Evaluation / Agreement of Final Contract Documents
- Measurement of Work and Invoicing
- Milestone Payments
- Variation Orders
- Change Orders / Re-Measurement of BOQ
- Monitoring of Terms of Contract
- Preparation of Final Account
- Punch List and Handover
- Case studies, interactive discussions and exercises
- Course Evaluation and Summary

Who Should Attend:

Project and Contract Site Managers, those responsible for Projects costing and costing analysis for medium to large projects

Quantity Surveying

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics of quantity surveying and the methods of calculation.
- Preparing and compilation of a QS Report for overall project analysis
- Formulating Bills of Quantity for analysis and overall project consideration.

Course Duration: Three Days

Course Contents:

- The position of the Q.S. in the construction team
- The workload of the Q.S.
- Methods used in site co-ordination
- The Bill of Quantities
- Calculation: Tools, Methods and Techniques
- Conducting Surveys
- Preparing Reports: Types,
- Maintaining Records, Storage and Systems
- Cost Analysis: Materials, Labor and General
- Health and Safety Considerations
- Contractors: Usage and Expectations
- Budgeting: Preparation and Submission
- Preparation of the Monthly Valuation
- Preparation of new prices for Variations
- Full re-cap on the work of the Q.S.
- Case studies, discussions and exercises

Who should attend:

Practicing or aspiring civil engineers and construction supervisors with at least one year of site or construction experience.

Roads & Highway Construction

Course Objectives:

- Planning, Design and Construction Practises in Highway Engineering.
- Computers in modern practice of Highway Design.

Course Duration: Five Days

Course Contents:

- Introduction
- Highway Systems, Organisations, and Associations
- Highway and Urban Transportation Planning
- Highway Economy
- Highway Finance
- Highway Surveys, Plans, and Computations
- Rights of Way and Other Legal Problems
- Driver, Vehicle, and Road Characteristics
- Highway Design
- Highway Operations – Traffic Engineering
- Highway Drainage
- Highways and the Environment
- Highway Subgrade Structure
- Constructing the Roadway
- Gravel and Crushed Rock Roads – Stabilised Roads
- Base Courses
- Bituminouw Pavements
- Portland Cement Concrete Pavements
- Highway Maintenance
- Course Discussion
- Course Summary and Evaluation

Who Should Attend:

- Potential and Practising Civil Engineers, Traffic and Site Engineers.

Prerequisite:

- Ideally an Engineering background

STRUCTURAL STEELWORK DESIGN

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics of steel design, including the ability to design simple structures according to British Standards, BS5950.
- Modern techniques and programs used in the field of structural analysis and design. Brief description and capabilities of software currently available.

Course Duration: Five Days.

Course Contents:

DAY 1 : Introduction

- Properties of Steel (strength in tension, compression and shear, durability and fire resistance). Comparison with concrete.
- Design methods (Elastic Design, Plastic Design, and Limit State Design)
- In-depth examination of the Limit State Design. (Characteristic Material Strengths and Characteristic Loads, Factors of Safety).
- Analysis of the Structure (Loads, Load Combinations, Analysis of Beams and Frames).

DAY 2 TO 4: Steel Design

- Definitions of major structural steelwork components, and basic functions of them.
 - Materials, different Grades of Steel, Steel Sections, Section Properties.
 - Connections (types of connections, bolts, welding, design of connections with examples).
 - Beams (types and uses, beam loads, classification of beam cross sections, bending stresses and moment capacity, lateral torsional buckling, shear, deflection, beam connections, examples).
 - Plate girders (design considerations, behaviour of a plate girder, design to BS5950).
 - Tension members (types and uses, end connections, design examples).
 - Compression members (types and uses, loads on compression members, classification of cross sections, axially loaded members, members subjected to axial load and moment, design examples).
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- Trusses and bracing (types, uses and truss members, connections, analysis and design of trusses, bracing).

ORCA Marketing and Consultancy Ltd

- Portal Design (analysis and design).

DAY 5 : Modern techniques and programs - Summary.

- Modern techniques and programs used in the field of structural analysis and design. Brief description and capabilities of software currently available.
- Summary – Discussion.

Who Should Attend:

Potential and Practicing Civil Engineers, Detailers, and Supervisors of Building and Construction sites.

Prerequisite:

Fundamental knowledge of structural analysis is required.

Steel Design

Course Objectives:

On completion of the course the trainee/s will be competent in:

- The basics of steel design, including the ability to design simple steel structures according to British Standards (BS5950).
- Modern techniques and programs used in the field for steel design.

Course Duration: Five Days

Course Contents:

- Definition of major structural steelwork components, and basic functions of them.
- Properties of Steel (strength in tension, compression and shear, durability and fire resistance). Comparison with reinforced concrete.
- Design methods (Elastic Design, Plastic Design, and Limit State Design).
- Materials, different Grades of Steel, Steel Sections, Section Properties.
- In Depth Examination of the Limit State Design, Characteristic Material Strengths and Characteristic Loads, Factors of Safety.
- Connections (types of connections, bolts, welding, design of connections with examples).
- Analysis of the Structure (Loads, Load Combinations, Analysis of Beams and Frames).
- Beams (types and uses, beam loads, classification of beam cross sections, bending stresses and moment capacity, lateral torsional buckling, shear, deflection, beam connections, examples).
- Plate girders (design considerations, behaviour of a plate girder, design to BS5950).

- Tension members (types and uses, end connections, design examples).
- Compression members (types and uses, loads on compression members, classification of cross sections, axially loaded members, members subjected to axial load and moment, design examples).
- Trusses and bracing (types, uses and truss members, connections, analysis and design of trusses, bracing).
- Portal Design (analysis and design).
- Software that can be used for the design of Steel Structures.

Who Should Attend:

Potential and Practicing Civil Engineers, Detailers, and Supervisors of Building and Construction sites.

Prerequisite:

Fundamental knowledge of structural analysis is required.

