

# COSCCOMO08 (SQA Unit Code - HA3A 04)

## Develop and agree detailed project designs in construction contracting operations management



### Overview

This unit is about choosing methods for developing detailed designs. It is also about selecting, investigating and analysing the construction and installation criteria and selecting products and design solutions to meet the requirements of the brief.

You will need to identify which parts of the overall project require detailed design and choose a format for presenting the design information. You will also need to identify evaluation interfaces and choose methods for developing detailed designs and associated codes of practice.

You will need to investigate and analyse the construction and installation criteria and select products and processes which meet them. You will then need to assess existing design solutions; choose solutions and evaluate them against the requirements of the project brief. You will need to select and decide the importance of the construction and installation requirements contained in the brief.

You will need to identify and analyse factors that will influence the detailed design solutions. You will need to agree and apply criteria for selecting and evaluating the effectiveness of design solutions. You will need to analyse and test design solutions against relevant factors; recording investigations and analyses.

You will then need to select, recommend and present preferred designs to stakeholders. You will also need to confirm what the costs and implementation time for the design solution. You will also need to reach agreement with stakeholders on the detailed design solution.

**Performance  
criteria**

*You must be able to:*

**Identify and coordinate the methods for preparing initial designs**

- P1 identify which **parts of the overall project** require a detailed design
- P2 identify and **evaluate** interfaces between **parts of the project design**
- P3 choose **methods** for developing detailed designs and associated information and codes of practice
- P4 agree with **stakeholders**, the costs, timetables and clear statements of purpose for the **project stage**

**Select materials, components and systems**

*You must be able to:*

- P5 investigate the **construction and installation criteria which are significant to the overall design** and what potential opportunities and constraints there might be in meeting them
- P6 analyse the **construction and installation criteria which are significant to the overall design**, both individually and in combination with other project considerations
- P7 select **products** which meet the identified **construction and installation criteria and standards**, and which balance cost and quality
- P8 assess whether existing design solutions which contain similar **construction and installation criteria** might be relevant
- P9 choose the solutions which best meet the significant **construction and installation requirements**, evaluate them against the requirements of the project brief and keep records of them for the project team
- P10 select and decide the relative importance of **construction and installation requirements** which are **contained in the project brief**

**Analyse, select and present detailed design solutions**

*You must be able to:*

- P11 **identify factors** which are likely to influence design solutions
- P12 analyse and prioritise the **factors** which will influence the design solution and resolve any conflicts between them
- P13 agree and apply **criteria** for selecting solutions
- P14 analyse and test the design solutions against all relevant **factors**
- P15 record **investigations** and analyses including supporting information and pass them on for approval by others
- P16 select the preferred designs and **present** them appropriately to **stakeholders**
- P17 confirm with **stakeholders** what the recommended detailed design solution will cost and how long it will take to implement
- P18 reach an agreement on the detailed design solution which is acceptable to the **stakeholders** and which allows the project to progress to its next stage

## Knowledge and understanding

*You need to know and understand:*

### Identify and coordinate the methods for preparing initial designs

- K1 what to identify as **parts of the overall project** which require a detailed design (understanding)
- K2 what to identify as interfaces between **parts of the project design** (understanding)
- K3 how and why to **evaluate** interfaces between **parts of the project design** (evaluation)
- K4 how and why to choose **methods** for developing detailed designs and associated information and codes of practice (evaluation)
- K5 how and why to agree with **stakeholders**, the costs, timetables and clear statements of purpose for the **project stage** (evaluation)

### Select materials, components and systems

*You need to know and understand:*

- K6 how and why to investigate the **construction and installation criteria which are significant to the overall design** and what potential opportunities and constraints there might be in meeting them (analysis)
- K7 how and why to analyse the **construction and installation criteria which are significant to the overall design**, both individually and in combination with other project considerations (analysis)
- K8 how and why to select **products** which meet the identified **construction and installation criteria** and **standards**, and which balance cost and quality (evaluation)
- K9 how and why to assess whether existing design solutions which contain similar **construction and installation criteria** might be relevant (analysis)
- K10 how and why to choose the solutions which best meet the significant **construction and installation requirements** (evaluation)
- K11 how and why to evaluate solutions against the requirements of the project brief and keep records of them for the project team (evaluation)
- K12 how and why to select and decide the relative importance of **construction and installation requirements** which are **contained in the project brief** (evaluation)

### Analyse, select and present detailed design solutions

*You need to know and understand:*

- K13 what to **identify** as **factors** which are likely to influence design solutions (understanding)
- K14 how and why to analyse and prioritise the **factors** which will influence the design solution and resolve any conflicts between them (analysis)
- K15 how and why to agree and apply **criteria** for selecting solutions (evaluation)
- K16 how to apply **criteria** for selecting solutions (application)
- K17 how and why to analyse and test the design solutions against all relevant **factors** (analysis)

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### Knowledge and understanding

- K18 how to record **investigations** and analyses including supporting information and pass them on for approval by others (application)
- K19 how and why to select the preferred designs (evaluation)
- K20 how to **present** the preferred designs appropriately to **stakeholders** (application)
- K21 how to confirm with **stakeholders** what the recommended detailed design solution will cost and how long it will take to implement (application)
- K22 how to reach an agreement on the detailed design solution which is acceptable to the **stakeholders** and which allows the project to progress to its next stage (**evaluation**)

## Scope/range

### Identify and coordinate the methods for preparing initial designs

- 1 Parts of the overall project design:
  - 1.1 location and size
  - 1.2 assembly and construction/installation
  - 1.3 components and systems
  - 1.4 environmental assessment objectives
- 2 Evaluate:
  - 2.1 visual and spatial
  - 2.2 functional performance
  - 2.3 technical performance
  - 2.4 quality
  - 2.5 requirements of relevant legislation and codes
  - 2.6 impact on local community and neighbours
  - 2.7 obsolescence/design life
  - 2.8 cost
  - 2.9 health and safety
  - 2.10 environmental factors
  - 2.11 buildability/disassembly
  - 2.12 maintenance/operation and use
  - 2.13 value management
  - 2.14 concurrent design and construction
  - 2.15 energy use (U value calculations, Building Energy Assessment carbon rating)
  - 2.16 risk/confidence in information
- 3 Methods:
  - 3.1 data research
  - 3.2 comparison with regulations
  - 3.3 specialist guidance and best practice
  - 3.4 experts including experienced craftspersons
  - 3.5 relevant previous solutions and feedback
  - 3.6 computer modelling
  - 3.7 Building Information Modelling
  - 3.8 calculation

## Scope/range

- 3.9 lifetime impact modelling
- 3.10 maintain risk register
- 3.11 performance dynamic modelling
- 3.12 comparison of costs of new and renewable energy
- 3.13 building services systems and controls
- 3.14 minimise thermal bridging and air leakage
- 4 Stakeholders:
  - 4.1 the client
  - 4.2 CDM Coordinator
  - 4.3 consultants
  - 4.4 potential contractors
  - 4.5 potential subcontractors and suppliers
  - 4.6 regulatory authorities
  - 4.7 facilities/asset maintenance managers
  - 4.8 users
  - 4.9 general public
- 5 Project Stage:
  - 5.1 Stage 4 (Design)
  - 5.2 Stage 5 (Build and Commission)

## Select materials, components and systems

- 6 Construction and installation criteria which are significant to the overall design:
  - 6.1 construction processes and quality control
  - 6.2 materials appearance, availability and sustainability
  - 6.3 structural forms
  - 6.4 component life
  - 6.5 heating and cooling
  - 6.6 energy use
  - 6.7 surface type and durability
  - 6.8 occupancy
  - 6.9 health and safety
  - 6.10 fire protection
  - 6.11 access

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### Scope/range

- 6.12 equipment performance
- 6.13 resource availability
- 6.14 transportation
- 6.15 risk assessment
- 7 Products:
  - 7.1 raw materials
  - 7.2 manufactured materials
  - 7.3 components
  - 7.4 systems
- 8 Standards:
  - 8.1 National and International standards
  - 8.2 Codes of Practice
  - 8.3 Building Regulations
  - 8.4 advisory guidance publications
  - 8.5 assessment/certification schemes
- 9 Construction and installation requirements contained in the project brief:
  - 9.1 client, user and community requirements, expectations, options and preferences
  - 9.2 project type
  - 9.3 purpose
  - 9.4 location
  - 9.5 durability
  - 9.6 scale
  - 9.7 occupancy
  - 9.8 legal and regulatory constraints
  - 9.9 programme budget and anticipated development timetable
  - 9.10 resources (physical, human and time)
  - 9.11 surrounding environment
  - 9.12 specified materials and component performance standards
  - 9.13 specified technical performance standards
  - 9.14 operations and maintenance
  - 9.15 available and projected technology
  - 9.16 health and safety

**Scope/range**

9.17 buildability

**Analyse, select and present detailed design solutions**

- 10 Identify:
  - 10.1 standard lists and procedures
  - 10.2 investigative research
- 11 Factors:
  - 11.1 physical conditions
  - 11.2 technical (including materials performance and availability, structural forms, component life, heating and cooling, surface type and durability, occupancy, fire protection, access, equipment performance, plant availability, transportation)
  - 11.3 health and safety
  - 11.4 sustainability
  - 11.5 energy use
  - 11.6 resource availability e.g. human, physical and time
  - 11.7 agreed design information from previous stage
  - 11.8 technical information related to materials, components, systems and production methods
  - 11.9 environmental assessment information
- 12 Criteria:
  - 12.1 function
  - 12.2 physical
  - 12.3 fit and tolerances
  - 12.4 practicality and buildability
  - 12.5 health and safety
  - 12.6 maintenance
  - 12.7 cost factors
  - 12.8 materials availability and capability
  - 12.9 environmental quality & sustainability
  - 12.10 aesthetics
  - 12.11 technical
  - 12.12 resources (human, physical and time)
  - 12.13 fitness for purpose



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### Scope/range

- 12.14 meeting technical factors
- 12.15 meeting environmental factors
- 13 Investigations:
  - 13.1 compliance with regulations
  - 13.2 specialist guidance and good practice
  - 13.3 experts including experienced crafts persons
  - 13.4 relevant previous solutions and feedback
  - 13.5 calculations
  - 13.6 simulation modelling
  - 13.7 Building Information Modelling
  - 13.8 computer aided analysis
- 14 Present:
  - 14.1 sketches
  - 14.2 drawings
  - 14.3 physical models
  - 14.4 electronically
  - 14.5 diagrams
  - 14.6 mathematical modelling
  - 14.7 photo-montage
  - 14.8 mock-ups
  - 14.9 written reports
  - 14.10 cost estimates
  - 14.11 orally
  - 14.12 aurally
  - 14.13 Building Information Modelling
- 15 Stakeholders:
  - 15.1 the client
  - 15.2 CDM Coordinator
  - 15.3 consultants
  - 15.4 potential contractors
  - 15.5 potential subcontractors and suppliers
  - 15.6 regulatory authorities
  - 15.7 facilities/asset maintenance managers

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### Scope/range

- 15.8 users
- 15.9 general public

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**Developed by** ConstructionSkills

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**Version number** 2

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**Date Approved** November 2013

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**Indicative review date** May 2020

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**Validity** Current

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**Status** Original

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**Originating organisation** ConstructionSkills

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**Original URN** COSCCOMO08

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**Relevant occupations** Building and civil engineering technicians; managers in construction; estimators; valuers and assessors managers; quantity surveyors

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**Suite** Construction Contracting Operations Management

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**Keywords** Detailed design; construction; installation; project brief

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