LONDON SOUTH BANK UNIVERSITY

Construction

Unit Number B/UG/3/548

Faculty of Engineering, Science and the Built Environment

2007 - 08

become what you want to be

Construction

(B/UG/3/548)

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Note: Please also make reference to your Course Guide

Basic Unit Information

Unit Title:	Construction
Unit Number:	B/UG/3/548
Unit Value:	1.0
Unit Level:	M

For BS and QS Postgraduate students

Pre-Requisite: None

Time Allocation

Contact hours:	45 hours
Student Centred Learning:	105 hours
Total:	150 hours

Assessment

Coursework:	100 marks
Multiple Choice Assessment Test:	100 marks

To successfully complete the course, a student should achieve a minimum of 35% in each of the above components and an overall aggregate mark of 40%.

Note: all weeks referred to in this guide relate to teaching weeks.

Unit Team

Unit Co-ordinator

Malcolm Dunkeld (MD) Room T608
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Lecturing Staff

Dr. Nick Parine (NP) Room T608
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Aims of the Unit

This unit is intended to provide a broad and critical perspective of the detail of the construction and assembly of buildings and their performance requirements and also to provide an understanding of the context in which construction decisions are made and implemented.

The unit aims:-

- To develop a working knowledge of the performance requirements of a building
- To develop a detailed knowledge of domestic/medium to high-rise/wide-span building construction
- To acquire a working knowledge of how buildings are procured and the legislative framework in which this takes place

Syllabus

The building team and the performance requirements of buildings, including user requirements

Site investigation and appraisal

Design and detail of domestic buildings

An overview of medium/high-rise and wide span structures

Procurement patterns and the building contract and the effect upon the development process

Environmental issues

Building services for domestic and commercial buildings

In addition to the above lectures, you will also be shown a series of videos that deal with different aspects of construction. The titles and dates of these videos are listed in the section entitled "*lecture programme*". It is also hoped to organise a guided site visit to where houses are currently under construction - this will be subject to timetable constraints.

Learning outcomes

By the end of this unit you should be able to:

1) Understand the detail of domestic building construction

2) Understand the main constructional elements of high-rise and wide span buildings

3) Carry out an appraisal, including environmental aspects, of development sites, proposed development schemes and construction forms

4) Demonstrate an awareness of the legislative framework controlling the built environment

5) Appreciate procurement routes available in construction projects

6) Understand the nature and scope of modern building services

Lecture Programme

Day/Time: QS students: Thursday @ 9.30 a.m. (semester 2)

Room: K307/8 – Keyworth Building

Lectures are compulsory. They aim NOT to tell you everything there is to know about the topic of construction technology. At the level of the university, lectures only introduce a topic, outlining the main points and authors. It is up to each student in readings, essays and tutorials to expand their knowledge and, most importantly, develop her/his own point of view on the subject. Over-reliance on the lecture in essay writing will always be penalised at this level. You must read widely to broaden the scope of the lecture!

Week	Lecture	Date Sem. 2
1	Introduction to the unit	31st Jan.
2	Introduction to the building process/Hollow Square Game	7th Feb.
3	Site investigation/Foundations for low-rise buildings	14th Feb.
4	External walls	21st Feb.
5	Ventilation for Homes, Commercial and Other Large Buildings / Electric Supply and Power Distribution	28th Feb.
6	Introduction to Air Conditioning / Air Conditioning Systems	6th March
7	20th century developments in structural form	13th March
8	Introduction to steel frame buildings	10th April
9	Introduction to concrete buildings	17th April
10	Widespan buildings	24th April
11	Cladding systems for larger buildings	1st May
12	Cold Water Supply for Large Buildings / Domestic and Commercial Hot Water Supply Systems	8th May
13	Heating Systems for Domestic and Large Buildings	15th May

Lectures are time-tabled as lasting for 55 minutes. You should arrive on time. There will normally be 5 minutes at the end for questions.

The lecture programme is overleaf. You should try to read some of the recommended reading the week preceding a lecture. For those wanting to purchase general textbooks for the unit, the following are recommended (all books in the unit guide can be found in the Perry library):-

Daniels, K., *Advanced Building Systems: a Technical Guide for Architects and Engineers*, 2003

Emmitt, S. & Gorse, C., *Barry's Introduction to Construction of Buildings*, 2005

Emmitt, S. & Gorse, C., *Barry's Advanced Construction of Buildings*, 2006

Foster, J., *Structure and Fabric Parts 1 & 2*, 2000

Garrison, P., *Basic Structures for Engineers and Architects*, 2005

Gordon, J.E., *Structures*, 1991

Hall, F and Greeno R, *Building Services Handbook*, 2005

Harrison, H.W. & Trotman, P.M., *BRE Building Elements: Building Services*, 2000

Marshall, D. & Worthing, D., *The Construction of Houses*, 2006

Penguin Dictionary of Building

Salvadori, M., *Why Buildings Stand Up: the Strength of Architecture*, 2002

Seward, D., *Understanding Structures*, 2003

Week 1

Lecture 1: Introduction by the unit team MD/NP

Lecture 2: Information and how to find it MD

Learning outcomes:

This lecture will introduce students to the immense volume of material giving information about design problems, materials, technical issues and the outcome of research. You should be able to locate all the main sources of data relating to construction technology.

Week 2

Lecture 1: Introduction to the Building Process and Procurement Systems MD

Recommended Reading:

Ball, M., *Rebuilding Construction: Economic Change in the British Building Industry*, 1988

Egan Report: Sir John, *Rethinking Construction*, 1998

Groak, S., *The Idea of Building*, 1992

Ive, G.J. & Gruneberg, S.L.. *The Economics of the Modern Construction Sector*, 2000

Morton, R., *Construction UK: Introduction to the Industry*, 2002

Learning outcomes :

Most technology failures are associated with the way the building industry is organised (the industrial setting), rather than failures in materials and components per se. This lecture introduces students to the building process in the UK and how the web of relationships can lead to failures of technology and what attempts have been made to improve matters.

Lecture 2: The Hollow Square Game - group game which simulates the problems of building MD

Learning outcomes:

A team game designed to simulate the building process and show the importance of good communication between the parties involved.

Week 3

Lecture 1: Site Investigation MD

Recommended Reading:

BRE Digest 318, *Site Investigation for Low Rise Buildings*

BRE Digest 348, *Site Investigation for Low Rise Buildings: the Walk Over Survey*

BRE Digest 411, *Site Investigation for Low Rise Buildings: Direct Investigations*

Learning outcomes:

Site investigation is often perceived as involving no more than finding out about site conditions and ground properties. While these factors are important, a competent site investigation is a much more wide-ranging activity.

Lecture 2: Foundations for Low Rise Buildings MD

Recommended Reading:

Atkinson, M.F., *Structural Foundations Manual for Low-Rise Buildings*, 2003

Barnbrook, G., *House Foundations for the Builder & Designer*, 1987

BRE Digests 63, 64, 67, 240, 241, 241 and 251.

Charles, J.C., *Geotechnics for Building Professionals*, 2005

CIRIA SP 136, *Site Guide to Foundation Construction*, 1997

Curtins, *Structural Foundation Designers' Manual*, 1996

Harrison, H.W. and Trotman, P.M., *BRE Building Elements: Foundations, Basements and External Works*, 2002

Tomlinson, M.J., *Foundation Design & Construction*, 2001

Waltham, A.C., *Foundations of Engineering Geology*, 2001

Learning outcomes:

Foundations are one of the most important elements of a building. They must be designed in such a way that movement, whether caused by loads or load-independent effects, is sufficiently controlled to keep any distortion (and possible cracking) of the building to within acceptable limits. This lecture introduces foundations systems for low-rise domestic dwellings.

Lecture 3: Video programme - Foundations MD

Week 4

Lectures 1/2: External Walls MD

Recommended Reading:

BDA, *Guide to Successful Brickwork*, 2000

BRE Digest 236, *Cavity Insulation*

BRE Digest 380, *Damp-proof Courses*

Campbell, J.W.P. and Pryce, W., *Brick: A World History*, 2003

CIRIA, *Wall Technology*, Vols. A & B, 1991

Duel, J. & Lawson, F., *Damp Proof Course Detailing*, 1983

Harding, J.R., *Brickwork Durability*, 1986

Hendry, A.W., *Masonry Wall Construction*, 2000

Knight, T.L., *Brickwork: Good Site Practice*, 1991

Lynch, S.G., *Brickwork: History, Technology and Practice*, vols. 1 & 2, 1994

Mitchell's, *Structure and Fabric*, Parts 1 & 2, 2000

Morton, *Designing for Movements in Brickwork*, 1998

Newman, A.J., *Rain Penetration Through Masonry Walls: Diagnosis and Remedial Measures*, 1988

Orton, A., *Structural Design of Masonry*, 1993

Pfeifer, G., Ramcke, R., Achtziger, J., Zilch, K., *Masonry Construction Manual*, 2001

Thomas, K., *Masonry Walls*, 1996

Learning outcomes:

Although external walls for domestic dwellings are built using simple technology, they are often prone to failure (particularly rainwater penetration). This lecture considers good design and site practice for walls.

Lecture 3: Video programme – External Walls MD

Week 5

Lecture 1: Ventilation for Homes, Commercial and Other Large Buildings – NP

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 5, Ventilation Systems

CIBSE, *Natural Ventilation in Non-Domestic Buildings*, Application Manual, AM 10, 1997

Nicholls, R., *Heating, Ventilating and Air Conditioning*, Sections 4.2, 2001

De Saulles T, *The Illustrated Guide to Mechanical Building Services*, BSRIA, AG15/2002

Learning Outcome:

This lecture will examine the need and requirements for mechanical ventilation in large buildings and also the need for fresh air, natural ventilation and mixed mode. It will describe the components and function of a typical natural, mechanical or mix mode ventilation system

Lecture 2: Electric Supply and Power Distribution – NP

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 10, Electrical Supply and Installations

Atkinson, B. & Lawrence, R., *Electrical Installation Design*, 2000

De Saulles T, *The Illustrated Guide to Electrical Building Services*, BSRIA, AG14/2001

Learning Outcome:

This lecture will examine methods for supply electricity to large buildings. It will include electrical supply and power distribution to large buildings. The lecture will describe the installation of an electrical supply to large buildings.

Week 6

Lecture 1: Introduction to Air Conditioning - NP

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 6, Air Conditioning

Chadderton D, Air Conditioning: A Practical Introduction, E & FN Spon, 1997

DTLR, *Approved Document L2 - Conservation of Fuel and Power in Buildings Other than Dwellings*, 2002

De Saulles T, *The Illustrated Guide to Mechanical Building Services*, BSRIA, AG15/2002

Learning Outcome:

This lecture will examine applications for providing comfort to large buildings via air conditioning. The need and definition of air conditioning, including the selection of systems and centralised systems will be considered. It will argue for and against the installation of air conditioning in urban areas.

Lecture 2: Air Conditioning Systems - NP

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 6, Air Conditioning

CIBSE, *Energy Efficiency in Buildings*, Guide F, Chapter 6, 2nd Edition, CIBSE, 2004

CIBSE, *CIBSE Guide Volume B2*, Ventilation and Air Conditioning, CIBSE, 2001

Facer M and Olley J, Building Services (Chapter 12), in Battle T (Ed), *The Commercial Offices Handbook*, RIBA Enterprises, 2003

Learning Outcome:

This lecture will consider available air conditioning systems and analyse their suitability in different situations. Centralised, all air, air and water, local systems of air conditioning. It will describe the components and variations of air conditioning systems.

Week 7

Lectures 1/2: 20th Century Developments in Structural Form MD

Recommended Reading:

Blanc, A. (Ed.)., *Architecture and Construction is Steel*, 1993, Chpts. 11, 14 and 20

Bradford, S., & Condit, C.W., *Rise of the New York Skyscraper*, 1996

Edwards, B., *The Modern Station*, 1996

Harris, J.B. & Li, K.P., *Masted Structures in Architecture*, 1996

Mainstone, R., *Developments in Structural Form*, 2001

Mainstone, R.J., *Structure in Architecture: History, Design and Innovation*, 1999

Murray, P. (Ed.), *Architecture and Commerce: New Office Design in London*, 2004

Robbin, T., *Engineering a New Architecture*, 1996

Salvadori, M., *Why Buildings Stand Up*, 1990

Schodek, D.L., *Structures*, 1980

Learning Outcome:

Recognise the main structural systems used in earlier societies; appreciate the revolution in structures that occurred in the late 19th/early 20th centuries; categorise the main structural innovations introduced this century; have a basic understanding of how the more important structural systems work; link structural innovation to particular buildings.

Week 8

Lectures 1/2: Introduction to Steel Frame Buildings MD

Recommended Reading:

Abel, C., *Sky high: Vertical Architecture*, 2003

Blanc, A., McEvoy, M. and Plank, R., *Architecture and Construction in Steel*, 1993

Copeland, B., Glover, M., Hart, A., Haryott, R. and Marshall, S., Designing for Steel, *Architects' Journal*, 24 and 31 August 1983. Vol. 178, Nos. 34 and 35, pp. 41-57

Davison, B. & Owens, G., *Steel Designers' Manual*, 2003

Garber, G., *Design and Construction of Concrete Floors*, 2006

Schulitz, H.C., *Steel Construction Manual*, 2000

Steel Construction Yearbook 2006

Trebilcock, P., & Lawson, M.R., *Architectural Design in Steel*, 2003

Learning Outcome:

Understand the basic properties of steel and its manufacturing process; have knowledge of the basic structural principles of multi-storey buildings in steel; understand the factors that determine column grid layout; be able to select beam and column sizes; have a basic knowledge of steel connections; have an awareness of different lateral bracing systems for steel frame buildings.

Week 9

Lectures 1/2: Introduction to Concrete Buildings MD

Recommended Reading:

Abel, C., *Sky high: Vertical Architecture*, 2003

Arya, C., *Design of Structural Elements*, 2000, Chpt. 3

Bennett, D., *Exploring Concrete Architecture: Tone, Texture, Form*, 2001

Benton, R., *Basic Structural Detailing*, 1989

Boughton, B., *Reinforced Concrete Detailers Manual*, 1983

Chudley, R., *Building - Superstructure*, 1997, pp. 95-146

Concrete Magazine (excellent articles on the latest developments in concrete)

Elliot, *Precast Concrete Structures*, 1999

Elliot and Tovey, *Precast Concrete Frame Buildings Design Guide*, 1992

Gaventa, S., *Concrete Design*, 2001

Illston, J.M. & Domone, P.L.J., *Construction Materials: Their Nature and Behaviour*, 2001, Chpts. 13-24

Kind-Barkauskas, F., *Concrete Construction Manual*, 2002

Nolan, E., *Innovation in Concrete Frame Construction 1995-2015*, 2005

Odd, E., Gjorv, K., *Concrete Technology for a Sustainable Development in the 21st Century*, 1999

Reading Production Engineering Group, *In Situ Concrete Frames*, 1995

Seward, D., *Understanding Structures*, 1998

Stanley, C.C. & Bond, E.G., *Concrete Through the Ages*, 1999

Threlfall, T., *An Introduction to Prestressed Concrete*, 2002

Learning Outcome:

Understand the technology associated with insitu and precast concrete buildings.

Week 10

Lecture 3: Wide-Span Buildings - MD

Recommended Reading:

Barnes, M. & Dickson, M., *Widespan Roof Structures*, 2000

Barry, R., *The Construction of Buildings*, Vol. 3, 1996, pp. 2 - 25; pp. 62 - 73

Chudley, R., *Building - Superstructure*, 1997, pp. 352 - 392

Foster, J. & Harington, R., *Structure & Fabric Part 2*, 1997, pp. 282 - 342

MacDonald, A., *Structure & Architecture*, 1994

Sebestyėn, G., *Construction Craft to Industry*, 1998, pp. 211-234

Wilkinson, C., *Supersheds*, 1996

Learning Outcome:

Recognise the need for structures which can achieve uninterrupted spans; compare and contrast the range of structural solutions for wide span buildings and be able to make reasoned choices; understand and illustrate the structural principles and const

Week 11

Lectures 1/2: Cladding Systems for Larger Buildings MD

Recommended Reading:

Architectural Cladding Association, *Architectural Cladding Association Handbook*,

Blanc, A. (Ed.)., *Architecture and Construction is Steel*, 1993, Chpt. 26

Brookes, A.J., *Cladding of Buildings*, 1998

Brookes, A.J., Grech, C., *Connections & the Building Envelope*, 1993

Compagno, A., *Intelligent Glass Facades*, 1995

McEvoy, M., *Mitchell's External Components*, 1994

Nijsse, R., *Glass in Structures: Elements, Concepts, Designs*, 2003

Rice, P., *Structural Glass*, 2004

Ryan, P.A., Wolstenholme, R.P. & Howell, D.M., *The Durability of Cladding: A State of the Art Report*, 1994

Selves, N.W. (Ed.)., *Profiled Sheet Roofing and Cladding*, 1999

Standard & Guide to Good Practice for Curtain Walling, Published by the Centre for Window & Cladding Technology, 1993

The Institution of Structural Engineers, *Structural use of Glass in Buildings*, 1999

Wiggington, M., *Glass in Architecture*, 1996

Learning Outcome:

Understand the engineering characteristics of various cladding systems including glass curtain walling, profiled metal sheet and concrete panels

Week 12

Lecture 1: Cold Water Supply for Large Buildings - NP

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 1, Cold Water and Supply Systems

Garrett, R. & British Standards Institute, *Hot and Cold Water Supply*, 2nd Ed, Blackwell Science, 2000

Water Regulation Advisory Service
http://www.wras.co.uk/regulations/Default.asp

Institute of Plumbing, Plumbing Engineering Services, Chapter: Hot and Cold Water Services, pp 1-40, IOP, 2002

CIBSE, CIBSE Guide G: Public Health Engineering, Section 2: Water Service and Utilities, CIBSE, 1999

Learning Outcome:

This lecture examines the techniques for supplying cold water to commercial and other tall buildings. Pump boosting, storage tanks and distribution of cold water will be considered. The lecture describes the components of a typical large building cold-water installation and explains why specific components are used

Lecture 2: Domestic and Commercial Hot Water Supply Systems

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 2, Hot Water Supply Systems

Nicholls R, *Heating, Ventilating and Air Conditioning*, 3rd Edition, Sections 1 to 3 (Heating Systems), 2001
(The 3rd Edition of this book is available for download (free at: www.info4study.co.uk/ebook.htm)

Martin P and Oughton D, *Faber and Kell's Heating and Air Conditioning of Buildings*, 9th Edition, Butterworth Heineman, 2002

CIBSE, *CIBSE Guide Volume B Heating*, CIBSE, 2002

Learning Outcome:

The focus of this lecture is the workings of a typical domestic hot water system, which may be of the instantaneous type or form part of a central heating system (or both). Not all large buildings require large quantities of DHWS (Domestic Hot Water Services), while others do. This lecture describes hot water systems and methods of distribution and storage.

Week 13

Lecture 1/2: Heating Systems for Domestic and Large Buildings - NP

Recommended Reading:

Hall, F and Greeno R, *Building Services Handbook*, 2nd Ed, Butterworth Heinemann, 2005 – Part 3, Heating Systems

CIBSE, *CIBSE Guide Volume B1 - Heating*, CIBSE, 2002

CIBSE, *CIBSE Guide Volume H –Building Control Systems*, CIBSE, 2000

Day A, Ratcliffe M and Shepherd K, Heating Systems, Blackwell Science, 2003

DTLR, *Approved Document L2 - Conservation of Fuel and Power in Buildings Other than Dwellings*, 2002

Nicholls, R., *Heating Ventilating and Air Conditioning*, Sections 1-3, 2001

Nicholls, R., *Heating, Ventilating and Air Conditioning*, Sections 1.6, 2001

Martin, P. & Oughton, D., *Faber and Kell's Heating and Air Conditioning of Buildings*, 1995

Learning Outcome:

This lecture considers systems for providing heating in large buildings. Multiple boiler systems, perimeter heating systems and air versus water systems will be discussed. The lecture describes the components of a typical large building heating system. Control systems are also considered that provide energy efficiency and occupant comfort in larger buildings.

COURSEWORK

You are required to complete **ONE** of the following pieces of work. All work must be handed-in on **Friday, 30th May 2008**. Unless you have obtained the agreement of the unit co-ordinator to the late submission of work, coursework submitted:-

- up to two weeks after the deadline date will receive a maximum mark of 40%
- more than two weeks after the deadline date will not be marked

If you want an extension of the deadline date, you must:-

- get a copy of the form for late submission from the Faculty Office (Rm. J200)
- fill in Part A of the form, giving reasons why you cannot meet the existing deadline date
- ask the unit co-ordinator to fill in Part B - the decision whether to agree the request rests with the unit co-ordinator
- attach the form to the front of your coursework when you submit it.

University regulations state the maximum extension is two weeks.

(a) Construction Analysis Project

Introduction

Building professionals are likely to deal with large buildings at some stage during their careers. This may involve designing, constructing, costing or refurbishing these types of building. From a construction technology viewpoint, the key issues to understand about buildings are how loads are distributed through the structure and then to foundations, how the weather is to be excluded and how the internal environment of the building is to be moderated to provide comfort for the building occupants. This project requires you to address these issues in a building of your choice.

Work Required

You are required to select a building which is NOT a domestic dwelling and which does NOT rely on loadbearing brick walls as the main structural support. This building can be a multi-storey structure or a wide span building that is used , say, as a commercial office, hospital, leisure complex, shopping centre, railway station, football stadium, concert hall, airport terminal etc. The building can be already built or in the process of construction. Having chosen your building, you are required to undertake the following tasks:-

a) Take at least 5 photographs of the building which show the main structure and significant structural details. You are required to produce an annotated **3D** line drawing which shows how loads placed on the building are carried down

to the ground. Your drawing should show all the important structural elements of the building (including how the building is braced against wind load) and should be presented on A2 paper to a scale of your choice. In addition, you are required to produce several detail annotated drawings showing the connections between main structural elements. Building elements in tension can be shown thus →←; elements in compression thus ← →. You should also show the bulb of pressure associated with the foundation system of your selected building. If possible, show magnitude of loadings on foundations, columns and floors.

You are required to produce a 1000 word essay explaining how the main structural system works and, if necessary, how it can be improved.

b) Take at least 5 photographs of the main external wall cladding of the building and produce a sectional line drawing showing the materials used in the cladding and how this element is fixed to the main structure.

You are required to produce a 1000 word essay describing the main performance characteristics associated with cladding and how the cladding on your particular building works. You should be particularly alert to any potential defects associated with your cladding system.

c) Select ONE of the following building services:-

Hot and cold water distribution
Air conditioning
Heating
Sanitary disposal system
Electrical power distribution

You are required to take at least 5 photographs that show the major items of plant and the components that the building occupants can see. You should produce a schematic drawing showing how the system works, following the flow of the system from the plant to the end user.

You are then required to produce a 1000 word essay that describes the system selected and which comments on its suitability in the light of current developments in engineering.

To maintain equity with the amount of work covered you will be given detailed guidance on the level of study required from each of the above tasks.

If you select a completed building, most of the details will be hidden and you will be required to use keen observation and undertake a literature search in order to interpret how the details work. Many larger buildings are reviewed in the building press and valuable information can be gained from journals such as the *Architectural Review*,

Architects Journal, Arup Journal, Architecture Today, Building Magazine, Building Design and *Building Service - the CIBSE* journal etc. Useful web sites to consult include those of well known architectural practices (e.g. Foster & Partners http://www.fosterandpartners.com;, Richard Rogers http://www.richardrogers.co.uk; Nicholas Grimshaw http://www.ngrimshaw.co.uk; Michael Hopkins http://www.hopkins.co.uk; Ove Arup http://www.arup.com etc.); see also the RIBA gateway to internet resources http://www.riba.org/library/links and the AJ magazine web site.

You will NOT be able to complete the project without working drawings of the building. These should include elevations, sections and plans plus detailed drawings of the cladding system, foundation arrangement, structural connections, service layouts etc. You will also be expected to meet and discuss the building with some and/or all of the following professionals involved in the scheme: architect, structural engineer, mechanical services engineer. Working drawings can usually be obtained from the architect or structural engineer (for tasks "a" and "b") or mechanical engineer (for task "c") or local building control department. Sometimes the client is prepared to issue drawings. If you require a letter of introduction confirming your student status and the nature of the project, please see Malcolm Dunkeld. **All collected working drawings should be submitted as an appendix in your report.**

You should choose a recent building; it is a much more difficult task finding working drawings of older buildings since many of the professionals involved in the scheme may have retired or died.

It is your responsibility to find a building to study: this can be a time consuming process and therefore work should begin immediately on identifying your building. DO NOT LEAVE IT TO THE LAST MINUTE - this will result in failure.

All work associated with the project should be placed in an A4 ring binder (with your name on the front), with each of the above sections clearly differentiated. DO NOT place your drawings or writing in plastic wallets since this makes marking difficult. The drawings can be executed in pencil, ink or CAD and should be appropriately titled. Your drawings should NOT be submitted on tracing paper. All photographs should be original and taken by yourself. A full bibliography of all sources consulted should be included in your report.

Marking Schedule

Marks for the project will be allocated in the following manner:-

Task "a"	34%
Task "b"	33%
Task "c"	33%

TOTAL 100%

(b) Site Investigation

Introduction

The starting point of good building is to undertake a thorough and competent site investigation.

A preliminary survey should establish

- feasibility in the light of external constraints, the terrain, local environment, and the activities of neighbours
- the character of site as a whole
- more specific information about possible locations within the site including topography, environment prospect, services, possible constraints on construction activities

Once work begins on site, changes in design and assembly can prove very expensive. All the crucial decisions about building are taken before the construction phase and is predicated on a thorough ranging site investigation.

This project seeks to develop your understanding of what constitutes a proper site investigation.

Work Required

You are required to select a site for site investigation. That site can be located in the countryside or city, but should not contain any built structures. For example, the site could be a parking lot, sports field, derelict site, field, pasture etc. Having selected your site you are then required to carry out a desk study of available data and walkover survey.

You are then required to write a 3000 word report that deals with the following:-

- History of the site (including ordnance survey maps, air photographs, mining records etc.)
- Ground conditions (soil and water table)
- Obstructions in the ground (post office tunnels, underground railway)
- Services
- Archaeological importance of the site
- Planning constraints
- Meteorological data
- Topography

- Flood risk
- Construction factors
- Local environment
- Unusual features
- Legal ownership

You should indicate what type of built structure would be suited to the site.

Your report should not only contain relevant 'facts' about the site but also some interpretation and analysis of these factors. The report must contain a full bibliography which lists the various sources you have consulted. The report is to be presented on A4 paper, typed and properly bound with a title, student name, date and class on the cover. The report should contain all relevant drawings, sketches, layouts etc.

To complete this project you will need to collect information from the local council (strategic planning document, planning constraints, tree preservation orders etc.), the British Geological Survey (for local borehole records. I will be able to provide you with a letter that gets this information for free), Department of the Environment (for information on whether the site is prone to flooding), local library for historic Ordnance Survey maps, the Meteorological Office for weather data (annual rainfall, hours of sunshine, temperatures, wind speeds etc.), Land Registry for legal ownership and the local archaeological service for an assessment of whether the site is likely to be of archaeological importance. All sites are different and have issues that are contingent to the site (for example, it might be an old cemetery and therefore consecrated ground, or have pylons nearby, or be close to a railway line etc.); if you site has a problem not listed above then you are encouraged to explore the implications in more detail.

(c) Product Design and Manufacture

Introduction

In the modern building industry most materials and components are manufactured off site under factory controlled conditions: designers like architects and surveyors often simply choose from a range of off-the-shelf components which are then transported to site. Many manufactures have technical departments where expert advice is available and it is a relatively simple matter to order a special variation of a standard design.

A service like this is redefining what is meant by the term "designer of buildings". Design is no longer the exclusive province of professional architects and building surveyors, but includes specialist manufacturers and suppliers.

If you are involved in the assembly of buildings it is therefore vital to have a detailed knowledge of the materials and components being used. This project seeks to develop your understanding of component design and manufacture.

Work required

You are required to choose **ONE** material or component used by the modern building industry. This could be a particular type of cladding system, structural frame, roofing system, air-conditioning system, ductwork, underground drainage, doors, staircases, floor system etc. You are then required to **VISIT** the manufacturer of the selected system to establish:-

- how the component/material is manufactured
- where the materials for manufacture come from
- what quality control mechanisms have been established
- what British Standard or Euronorm applies to the product
- the degree of mechanisation of the production process
- the environmental impact of manufacture
- manufacturing time and lead-in times for delivery

Before visiting the factory you should have undertaken a considerable amount of research work on the selected product. This will allow you to ask penetrating questions of the manufacturer. The *Construction Information Service* database is a wonderful resource in this respect and should be consulted (visit the Library online homepage [http://www.lisa.lsbu.ac.uk/]; click on *E-resources A-Z*, click on *'T'* which will bring you to *Technical Indexes: Construction Information Service*; click on this and log in).

Most manufactures of building components have their products tested at an independent testing house (typically the British Board of Agrément). You are required to visit the independent tester of your selected component/material to establish how the product is tested and over what period. You should also comment on the approval process.

The above information is then required to be written-up into a 3000 word report. Your report should contain all relevant photographs, accompanying illustrative material and full bibliography. **The report should NOT consist of a series of facts but rather be a critical assessment of the design and manufacture of the selected product.** Your report should contain a full bibliography of all sources consulted.

You will not receive extra marks for visiting a manufacturer at the other end of the country (it is not the distance of travel that is important, but the content of your essay).

Tutorial Support

ALL students are expected to attend at least one tutorial with Malcolm Dunkeld and/or Nick Parine. To make an appointment simply speak to the lecturer concerned or make contact by e-mail.

In week 4 you are required to decide which of the above pieces of coursework you intend completing.

Assessment Test

Construction technology is a wide-ranging disciple where competence is partly acquired through extensive reading, site visits and careful note taking during lectures. In order to facilitate your knowledge of construction technology and to provide feedback on the understanding of key concepts, a multiple choice test paper will be held at the end of the semester. This test will last 1½ hours and will be based on information given in lectures (including videos and handouts) and textbooks recommended as key reading.

The test will take place in early January and the actual date will be announced on the Blackboard website once the University exam timetable is published.

Test results will be pinned on the notice board outside room T608 in the following week - you may book an appointment with Malcolm Dunkeld to discuss your result in more detail.

Examples of typical multiple-choice questions are shown in Appendix 1.

In order to successfully pass this component of the construction technology unit, a student should achieve a minimum marks of 35%. Non attendance at the test will result in failure of the technology unit.

Please note: regular attendance at lectures is strongly recommended in order to pass the assessment test.

Feedback

Feedback will normally be given to students 15 working days after the submission of an assignment.

Unit Evaluation

The unit team is keen to know your views of the education programme associated with the Construction Technology unit. In week 12 you will be issued with a unit evaluation questionnaire where you can express your views on the unit. This is done anonymously and helps the lecturing staff to further improve the unit.

Plagiarism

Plagiarism is the unacknowledged use, as one's own work, of work of another person, whether or not such work has been published. In plainer words it means copying. Recently a small number of students have submitted work for the *Construction* unit that

has been plagiarised: this is both unacceptable and against the regulations of London South Bank University and also undermines the intellectual development and veracity of the student concerned. IT WILL NOT BE TOLERATED ON THIS UNIT.

In order to check the originality of your work please make use of *TurnitinUK* on the unit Blackboard site, where you will find instructions on how to use the software.

Appendix 1

London South Bank University
Faculty of Science, Engineering and the Built Environment

Construction Technology - Masters

Multiple-Choice Assessment Test – Sample Only

Full Name (please print): .....

Year: .....

Date:

Time:

Construction Technology - Masters

Time allowed 1½ hours
Attempt ALL questions
All questions carry equal marks

For each question below, circle the correct answer

1. The basic objective of a site investigation for new work is to:

   a) Collect and record data about the site

   b) Design the foundations

   c) Set up temporary bench marks (TBMs)

   d) assess the groundwater regime

2. Piles for use in domestic buildings should never be located at:-

   a) corners of the house

   b) ends of flank or party walls

   c) external walls

   d) beneath openings in walls (i.e. doors and large window areas)

3. The main function of an Architect is to:-

   a) Price building work

   b) Calculate structural loads

   c) To find land for building developments

   d) Design buildings

4. Clay in engineering terms is classified as a form of:-

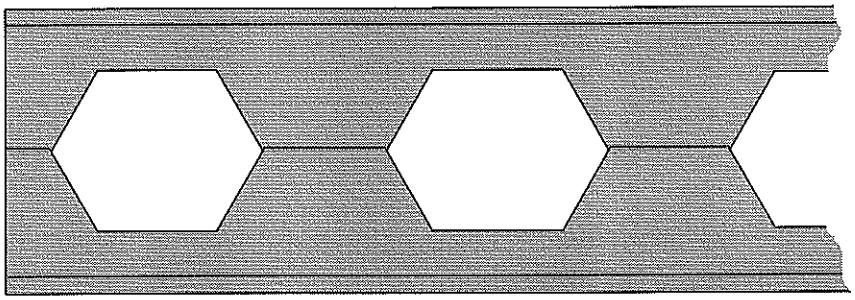
   a) Rock

   b) Cohesive soil

   c) Non-cohesive soil

   d) Sand

5. The steel beam below is an example of a:-



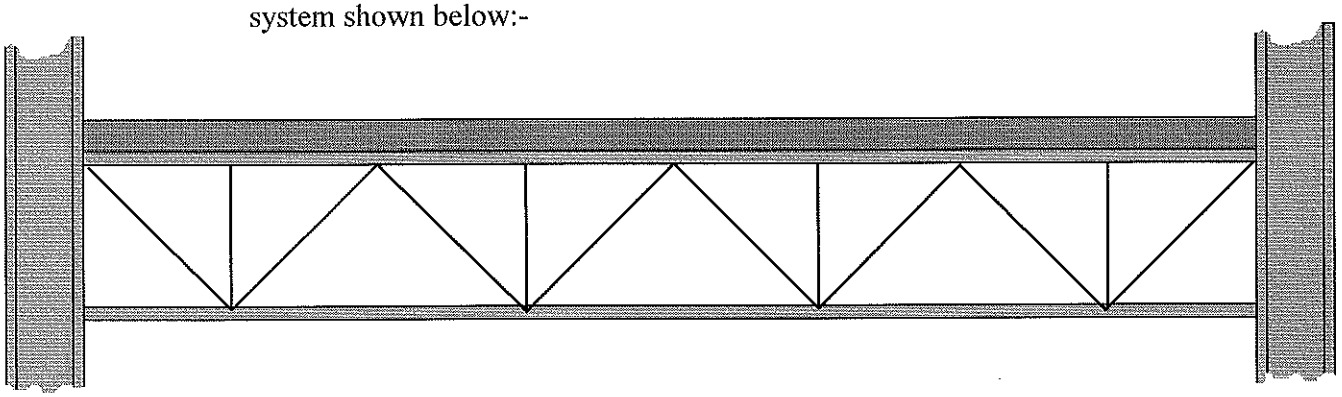
a) tapered beam

b) stud girder

c) composite truss

d) castellated beam

6. Which of the following statements is true in regard to the composite truss floor system shown below:-



a) the top cord in the truss is in compression, the bottom in tension

b) the profile of the beam follows the bending moment diagram

c) services cannot easily pass through the beam

d) composite trusses are capable of supporting very high loads

7. Slim floor construction is marketed by British Steel under the trademark "Slimflor". Which of the following statements is true?

a) it has limited fire resistance

b) it has a shallow floor depth leading to savings in cladding costs

c) there is little space to accommodate services

d) it is heavy in comparison to concrete alternatives

8. In r.c. 'flat slabs' the area of the greatest risk of failure due to shear is:-

a) mid-span due to excessive bending and shear

b) slab-column junction due to punching shear

c) slab-column junction due to bending and shear at supports

d) edge of the slab due to cantilever action

9. "Cover" is a term used for

a) the thickness of protection to reinforcement given by the concrete

b) the outside shell of formwork

c) the seal formed to concrete joints

d) a design tolerance for pre-cast concrete

10. All the following are examples of boiler burner technology, except:-

    a) Gas turbine

    b) Premix

    c) Atmospheric

    d) Forced draught

11. A valve connected to the cold water main and designed to prevent backflow contamination of class 2 is called a:-

    a) Single check valve

    b) Double check valve

    c) Air gap

    d) RPZ valve

12. Pressure flushing valves are not allowed on WCs in which type of building:-

    a) Sports |Centres

    b) Hotels

    c) Homes

    d) Pubs

13. The voltage between any two phases in a three phase supply is:-

    a) 230 Volts

    b) 240 Volts

    c) 400 Volts

    d) 415 Volts

14. CIBSE recommend a minimum fresh air rate (for non-smoking areas) of:-

    a) 8 l/s per person

    b) 16 l/s per person

    c) 24 l/s per person

    d) 32 l/s per person

16. Cooling towers might be used in buildings to reject heat from a chiller. The tower would be connected to the chiller's:-

    a) The Compressor

    b) The Condenser

    c) The Evaporator

    d) The Expansion valve