TAYLOR'S UNIVERSITY

Wisdom · Integrity · Excellence

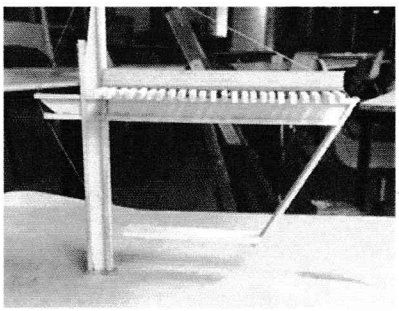
SCHOOL OF ARCHITECTURE, BUILDING & DESIGN

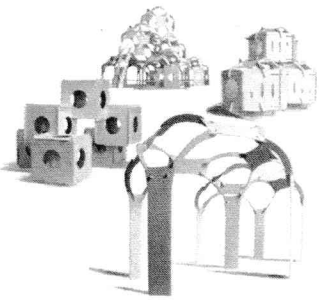
Centre for Modern Architecture Studies in Southeast Asia (MASSA)
Bachelor of Science (Honours) (Architecture)

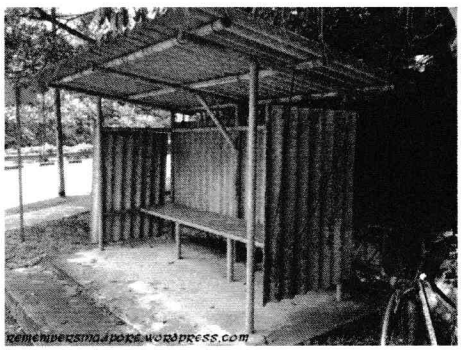
BUILDING CONSTRUCTION 2 (BLD 60703/ARC 2513)

Project 1	**: Skeletal Construction (Temporary Bus Shelter)**
Marks	**: 30% (group work & peer evaluation)**
Duration	**: 8 weeks**
Submission date	**: 24 May 2017 - Week 8 (Presentation, Testing & Submission of Report)**

Introduction







Experiencing and understanding skeletal construction is important as it is one of the most widely used structures for building support. As a designer we should know how skeletal structure works.

Objectives of Assignment

The objectives of this project are as follows:

- To create an understanding of skeletal structure and its relevant structural components.
- To understand how a skeletal structure reacts under loading.
- To demonstrate a convincing understanding of how skeletal construction works.
- To be able to manipulate skeletal construction to solve an oblique design problem.

Learning Outcomes

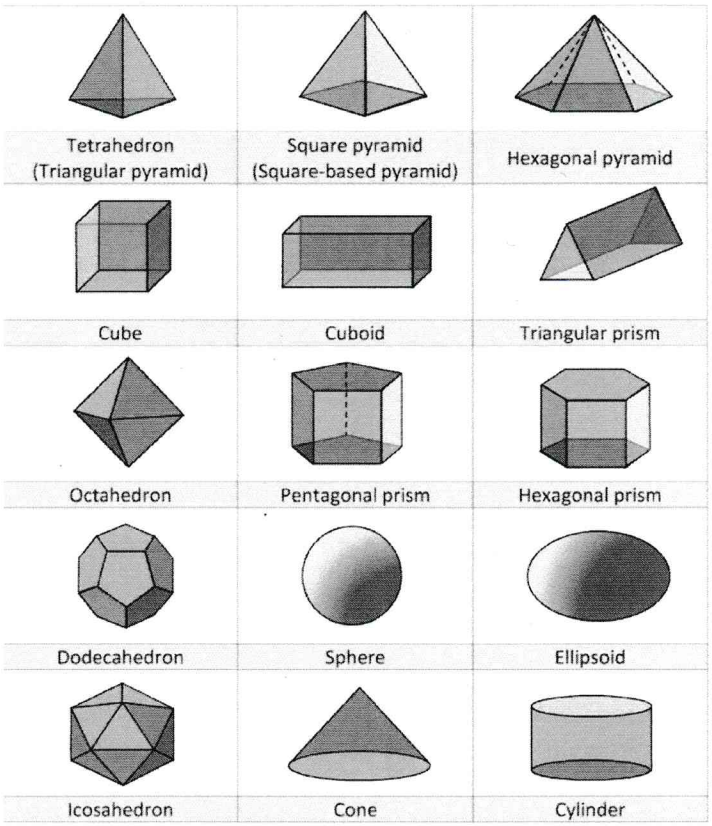
Learning outcomes assessed in this project include:

- Apply construction system in design.
- Recognize the implication of construction systems in design.
- Analyse the issues of strength, stiffness and stability of structures including modes of structural systems, forces, stress and strain and laws of static.

Task

Form a group of **five to six** people. Your task is to construct a temporary bus shelter according to the following specifications:

- **SCALE**-Your bus shelter should be constructed to accommodate 5-6 people (1:5). Max height is 600mm. Max base size is 400mm x 800mm
- **CONSTRUCTION**- It should demonstrate the knowledge of skeletal frames and its joints. It must clearly define all building components such as **roof, column**, **walls** and **floor**. The structure should be elevated at least 50mm from the ground.
- **FORM** - Choose ANY 2 combinations of the following forms for the bus shelter.



- **JOINTS** -The joints should be constructed to reflect actual joints. For example, if a group chooses recycle steel materials for the frame, the joints should be made to resemble bolts and nuts etc. You are not allowed to use inappropriate materials for joints such as rope for steel.
- **MATERIALS**- You are encouraged to use recycled materials such as newspaper, pet bottles, cans, etc. However, the chosen materials must relate to its function. For example, roofing materials should not be made from newspaper.
- **OTHER DESIGN CONSIDERATIONS**- This is just a minor component however; the shelter should be light and portable.
    - Resistant to weather.
    - Allows easy access in and out from the shelter
    - Shelter **SHOULD NOT BE OVERLY DESIGN** and must conform to the design criteria.
- **TEST-**The completed shelter will be tested to withstand lateral forces. In actual situation, from wind and earthquakes or any horizontal forces.
- **Analysis on the design, construction progress and test results** are to be provided in the form of an A3 bound report.
- Students are encouraged to use annotated sketches / diagrams to explain the **construction, joints, forces, structural movement experienced** during the testing of the shelter.
- Photographs of the shelter should also be incorporated into the presentation report.

Submission Requirement

- 1:5 scale model of the shelter (students name and ID should be clearly included on the model)
- A3 bound report complete with visuals, sketches and inclusive of the detailing and progressive documentation of your project.
- Visuals / Photos used in the submission must be clear and well communicated.
- Sketches are meant to provide visual documentation and communication. Therefore sketches are required to be neat, clear and annotated.
- Assumptions can be made through reference from book/drawings. DO NOT PLAGIARISE.
- Softcopy (CD) is required to be attached with the hardcopy.

Assessment criteria

The assessment for the **shelter construction** will be based on your:

- Ability to apply the **knowledge of skeletal construction and its joints** to actual construction and design
- Ability of the shelter to take the load applied in the specified duration.
- Creative design elements within the given requirements
- Understanding of appropriate materials to suit the functions of the shelter

The assessment for the **report** will be based on:

- The quality of the documentation of visuals sketches, drawings and load and forces detailing of the construction elements.
- Clarity of the analysis on success / failure of the shelter.

Marking criteria

Marks shall be distributed as follows:

(1) Group Component & Peer Evaluation (will be calculated to 30%)

Marking criteria	Marks %	Acquired TGC	Fail	Poor	Satisfactory	Good	Excellent
UNDERSTANDING OF SKELETAL CONSTRUCTION & ITS JOINTS • The use of frame components- interpretation of columns, beams, roofing structure etc • Joints	40						
STRENGTH OF SHELTER Ability of the model to take the total load applied in the specified duration.	20						
DESIGN • Originality & practicality • Weather resistant • Easy access	10						

MATERIALS • Appropriate materials/ recycled materials are used to suit the functions	**10**						
ANALYSIS REPORT • Quality of the documentation of visuals sketches, drawings and load and forces detailing of the construction elements. • Clarity of the analysis on success / failure of the shelter.	**15**						

	Assessment Criteria
Group (30%)	**UNDERSTANDING OF SKELETAL CONSTRUCTION & ITS JOINTS** • The use of frame components- interpretation of columns, beams, roofing structure etc. Joints (40%)
	STRENGTH OF SHELTER Ability of the model to take the total load applied in the specified duration. (20%)
	DESIGN • Originality & practicality • Weather resistant • Easy access (10%)
	MATERIALS • Appropriate recycle materials are used to suit the functions (10%)
	ANALYSIS REPORT • Quality of the documentation of visuals sketches, drawings and load and forces detailing of the construction elements. • Clarity of the analysis on success / failure of the shelter. (15%)
	PEER EVALUATION • Individual performance of a group member in a group. (5%)
	(Total 100% will be converted to 25%)

References

1. Chudley, R. 2006, *Construction Technology*. 4thedition. Pearson and Prentice Hall.
2. Lyons, Arthur, 2004. A. *Materials for Architects and Builders*. 2nd Edition. Oxford. Elsevier Butterwort-Heinemann
3. Seeley, Ivor H.1995, *Building Technology*. 5th edition. Basingstoke, Hants: MacMillan
4. Ching, Francis D.K. 1991. *Building Construction Illustrated*. New York. Van Nostrand Reinhold.
5. Simmon, H. Leslie, 2001. *Construction: Principles, Materials and Method*. 7th Edition. New York. John Wiley & Sons.
6. Zannos, Alexander. 1987, *Form and Structure in Architecture: The Role of Statistical Function*. Von Nostrand Reinhold Company, New York

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Remarks:

1. The Project Brief is to be distributed to the students in the first week of the semester.
2. Any changes to the Project Brief shall be communicated (in writing) to the Programme Director and the approved revised version must be communicated to the students