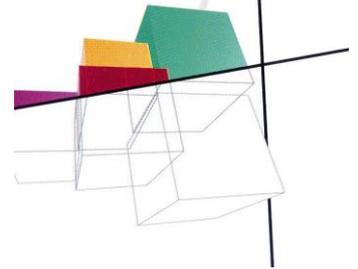
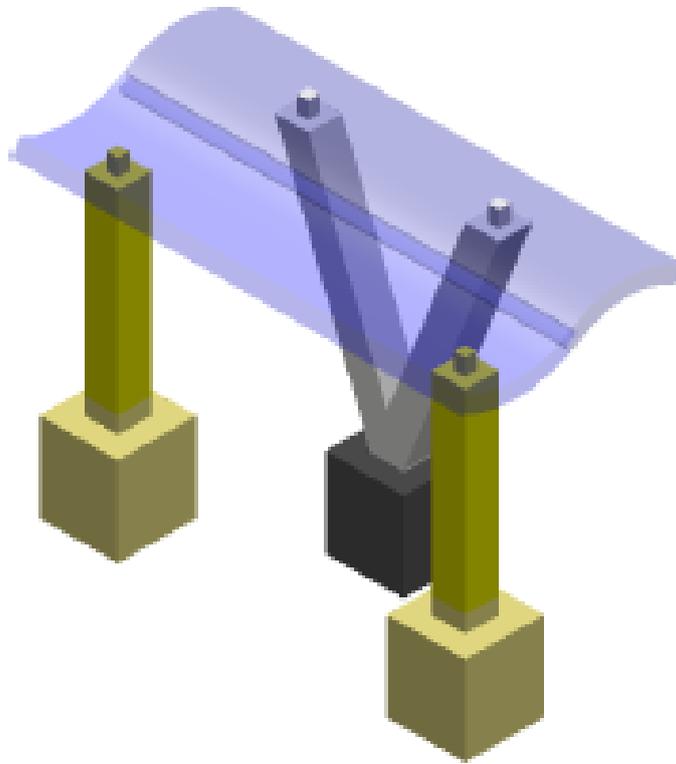


building
to
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the pavillion

notes
to
contractor



CONSTRUCTIONARIUM[®]

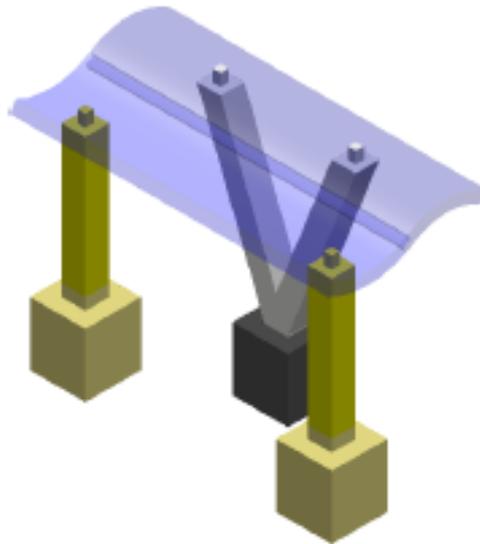
TURNING THEORY INTO PRACTICE

INTRODUCTION

Constructionarium is a hands-on construction experience for students aimed at giving them first hand experience at the practicalities of a civil engineering project by involving them in every aspect of its construction using techniques and skills employed by the industry.

The scope of the project has been designed to allow the students sufficient time to complete all the works with the 6 days of the course. The students will be assessed on the quality of the work, team working, the methodology employed, project management, timely completion and budgetary control.

THE PAVILION



BASIC STRUCTURE

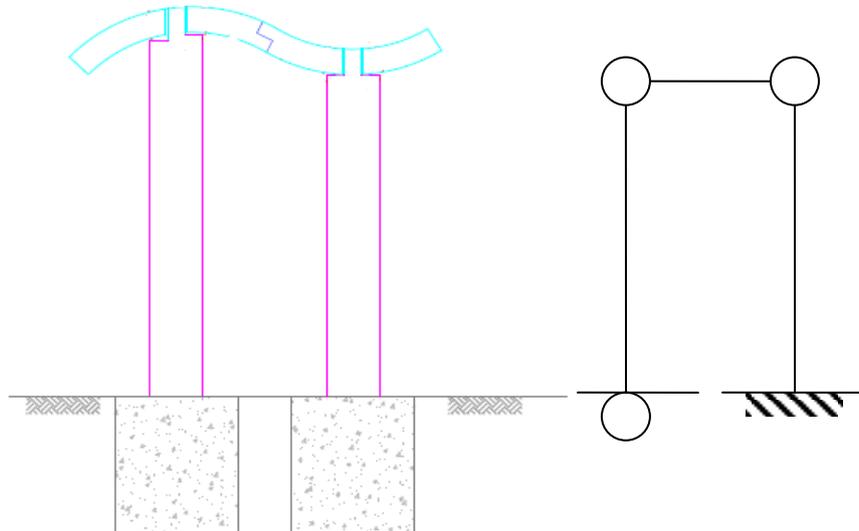


Figure 1: End Elevation

Figure 2: Simplified Structure

- The structure will be 4m long, 2m wide and 2.3m high.
- The double curved roof will be constructed from 2 pre-cast concrete arches, tied at the centre.
- Each section of the roof will be supported in two places. The rear section will be supported on a 'Y' shaped column and the front section of the roof will be supported by two vertical columns. The supporting columns shall meet their section of the roof at the highest and lowest parts of the roof arch respectively. The connections shall be pinned
- The front, vertical, columns shall provide a moment fixed connection into the structure. The rear 'Y' Column shall be a pinned connection, see figure 2. This also provides lateral bracing to the structure.
- The front foundations, requiring to take a transferred moment, shall be a reinforced concrete foundation, the remaining foundation will only have minimal reinforcement to prevent cracking around the cast in pocket.

SETUP AT THE START OF THE WEEK

The site will be reasonably level and with sufficient space to construct the structure and allow for the precasting operations. All the tools and materials required over the course of the week will be on site at the beginning of the week, with the exception of the concrete which will be ordered in as to suit each groups programme.

1 WHAT THE STUDENTS WILL HAVE TO DO

- Consider careful programming to ensure that all the works can be completed within the time scale available, particularly allowing enough time for the concrete to gain sufficient strength before assembly. – *as a guide, precast elements shouldn't be lifted until the second day after casting*
- Develop method statements and risk assessments to articulate their understanding of the tasks to be carried out
- Consider requirement for temporary works to enable all the elements to be safely installed
- Set out the foundations
- Excavate and level the foundations to ensure all the elements fit together correctly
- Construct the formwork for the precast elements
- Fix the reinforcement based on drawings provided
- Pour concrete into precast moulds and allow sufficient time to cure
- Erect shuttering for in-situ elements
- Provide temporary propping to ensure safe erection of the precast elements
- Install the precast elements, ensuring that they are within the required tolerance to enable all the sections to fit together
- Enjoy the experience

2 NOTES TO THE CONTRACTOR

2.1 Materials

Concrete

- Foundations (for precast columns) $3 \times 0.3695\text{m}^3 = 1.109\text{m}^3$
- Foundations (for insitu columns) $2 \times 0.4055\text{m}^3 = 0.811\text{m}^3$
- Precast 'Y' Column
- Precast vertical columns $2 \times 0.195\text{m}^3 = 0.39\text{m}^3$
- Insitu columns $2 \times 0.159\text{m}^3 = 0.318\text{m}^3$
- Roof 1.2m^3

Reinforcement: requirements for this are set out in the bar bending schedule, in addition to this tying wire and reinforcement chairs and cover spacers will be required to suit.

Timber: Large quantities will be required to form the precasting beds, and the formwork for all the precasting and in-situ elements. Standard 18mm plywood should be used for the majority of the edges, however thinner plywood will be required to form the curved shuttering of the roof. Timber will also be required to form the louvres for the 'Y' column. Additional timber will be required to brace the foundation shuttering within the excavation.

2.2 Plant, tools and equipment

- Excavator for foundations.
- Crane or equivalent for lifting the precast elements into place
- Setting out equipment sufficient for the job, minimum being dumpy level and staff and tape measures stakes and string.
- Netlon fencing (or equivalent) and stakes to cordon off the working area.
- Hammers, Nails, Forks and Shovels, Saws, Steel Fixers Nips, etc, etc ,etc
(*every things required to carry-out the tasks*)
- Full PP&E for all students (*students usually supply their own working boots*)
- Concreting compacting and finishing tools
- Duct Tape, embed items etc.

2.3 Suggested Programme

Activity	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Plan programme, write risk assessments and method statements	X					
Setting out		X				
Excavate Foundation		X				
Shuttering and rebar for foundations		X				
Make precasting bed		X				
Formwork & rebar for columns			X	X		
Formwork & rebar for roof			X	X		
Pour concrete for foundations			X			
Pour concrete for columns			X	X		
Pour concrete for roof				X		
Lift columns into place					X	X
Erect temporary works				X	X	
Lift roof into place						X
Louvres and finishing						X

This item isn't mentioned elsewhere so you need to elaborate/explain

2.4 The Two Variant Schemes

The original scheme constructs the entire building out of precast concrete with the exception of the foundations. A variation of this can easily be introduced, whereby one or both the vertical columns are constructed with in-situ concrete. This has the educational benefit of showing the students the different approaches required and the effect this has on programme.