

A CULTURAL DIVIDE?

DIFFERENT MODES TO TEACH CONSTRUCTION MANAGEMENT

THE CONSTRUCTIONARIUM

THE PERI CONSTRUCTION EXERCISE

PROJECT-BASED LEARNING

Presented by **Professor David Lloyd-Smith** on behalf of
Dr Angelo Ciribini (University of Brescia, Italy),
Dr Sunday Popo-Ola and Alison Ahearn (Imperial College London)
and **Prof. G. Girmscheid** (ETH, Zurich)

Industry-centric learning

- Constructionarium - build to an existing design
- Peri Design Exercise – design to meet client brief

- Constructionarium – industry teachers
- Peri Design Exercise – industry judges (jury)

- Constructionarium – decisions for management
- Peri Design Exercise- decisions for management



Peri Exercise:

designing and planning the construction of a building using system formwork



Time needed is 75 hours per person (for a team of five), depending on the team's background knowledge.

Special value placed on brief and concise presentation of work.

Can be extracurricular or used as basis for classwork.

Short description of task 2012|2013



WHAT STUDENTS DO IN A PERI EXERCISE:

1. Building site equipment

- 1.1 Determine all **necessary specific values**.
- 1.2 Choose all necessary **equipment** items.
- 1.3 Draw a plan of the **construction site setup**.

2. Bid documents for concrete and reinforcement work

- 2.1 List all positions titled concrete and reinforced concrete, with **hourly** estimates and material **costs** with reference statements.
- 2.2 Create a bid for the concrete and the reinforced concrete work.

3. Choice of procedure / calculation

- 3.1 Comparison of **slab formwork** systems: MULTIFLEX –versus- SKYDECK
- 3.2 Comparison of **wall formwork** systems: TRIO 270 –versus - MAXIMO 270

4. Formwork solutions

- 4.1 Do formwork solutions for the walls: formwork system TRIO 270 (left side of the building) and MAXIMO 270 (right side of the building).
- 4.2 Do formwork solutions for the slabs using system you choose in (above) section 3.2 Choice of procedure/ calculation.

5. Details of construction implementation

- 5.1 Create a solution for a central waste storage room (about 18 m²). Make sure that it is easily accessible.
- 5.2 Plan a ground and wall structure of the waste storage room. Make a sketch and give reasons for your solution.
- 5.3 Create different options of wall fastenings for the stair landings. Give reasons for your choice.

6. Construction development plan

- 6.1 Create a rough draft.
- 6.2 Create a detailed plan for the first floor [British English: ground floor] of the office building.

2012|2013

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RULES OF THE PERI COMPETITION

Student **group size**: up to 5 people.

Language: English or German.

Entries **page limit**: 100 pages (including plans and layouts).

PERI takes publication rights (but cites authors' names).

Last date of entry: **31 July 2013** (date of postmark).

Jury of construction specialists (renowned in field).

Jury selects **five teams for finals**, from the **document entries**.

Finals held in Weissenhorn, Germany in November 2013 over 3 days, with evening program designed for the students.

Final competition involves **presentations** to the jury.

Constructionarium: the technical challenge



Ravenspurn Oil Rig



Naples Airport Underground
station



The Gherkin



East Reef Pier



Millau Viaduct

Constructionarium: the management challenge

- recruiting
- industry benefits
- test design ideas at smaller scale
- identifies “tricky” processes
- builds academic/industrial relationships



Industry-centric learning

- Constructionarium - INTERPRET others' design
- Peri Design Exercise – INTERPRET client's brief
- Const'n'm – management know-how essential
- Peri– management know-how essential
- Const'n'm – real-time but not flexible delivery
- Peri - less time constraint but more flexible

Difficulties of problem-based (active) learning

- Requires management and engineering lecturers to act together;
- Requires co-operation from industry engineers
- Requires sponsorship from industry (large)
- Requires realistic resources (cranes; diggers; terraformed land; portacabins; travel to site or to finals; access to well-checked designs)
- Requires intense timetabling

Active learning and management

Management learning is better when tied to engineering practice: learn in context

Management learning is better via interaction with industry engineers: learn “attitudes”

Management theory makes more sense to students who have experienced management problems in projects with real risk of failure

**Engineering achievement
Engineering delight
Aesthetic delight
Engineering learning
Engineering fraternity**



CONSTRUCTIONARIUM

Imperial engineering vision changing UK engineering education

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