

School of Electrical & Electronic Engineering

Preparing for a team project

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Background

- Embedded Systems Project (ESP)
 - Major 2nd year student-centred activity – first introduced in 2004-05.
 - Students work in small teams of 4 to 5 throughout semester 2.
 - Design and build a microcontroller-based product.
- Evaluation
 - Students encountered a number of problems in carrying out their first team project.

Aims of the EBL Project

- To develop student skills in:
 - Team working
 - Project planning
 - Group presentations
- Structured series of EBL activities:
 - Organised as part of semester 1 tutorial scheme
 - Group sessions facilitated by tutors
 - Tutors monitor and assess student progress

EBL Scenario

- Based on a hypothetical decorative tile company, Baked Earth.
- The company has become aware of inconsistencies in the quality of a new high-temperature glaze.
- Working in partnership with Euro-Tunnel Kilns to find solutions to the problem.
- Need to measure temperature profile in the kiln using portable temperature sensors.
- Agency for Consultancy in Electronics (ACE) has been commissioned to design the electronics.

The Problems



- Problem 1
 - Design a circuit for a thermistor sensor to interface with a PIC microcontroller system



- Problem 2
 - Review the choice of sensor – thermocouples



- Problem 3
 - Produce a viable project plan



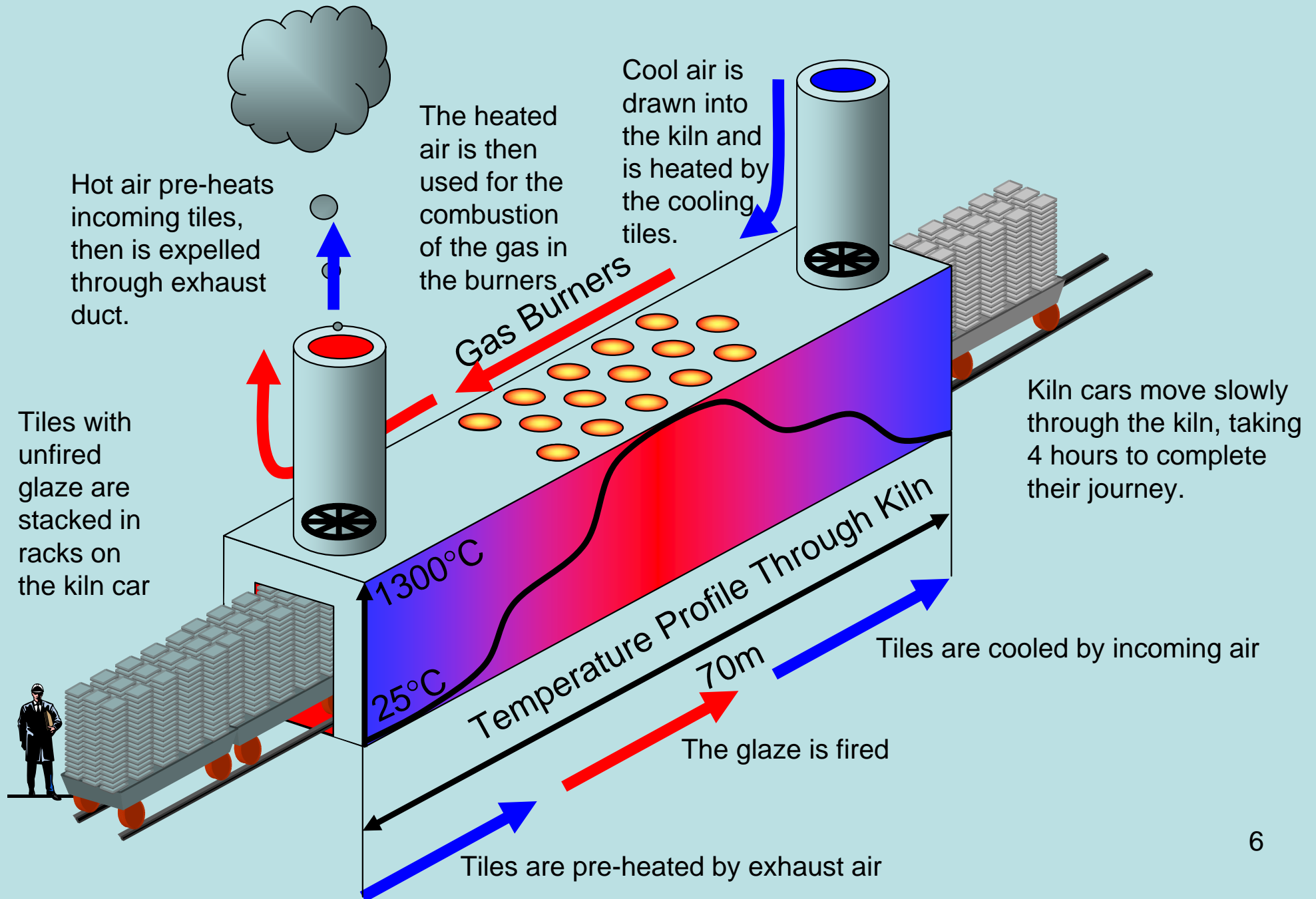
- Problem 4
 - Redesign the sensor amplifier – practical considerations



- Problem 5
 - Prepare a group presentation

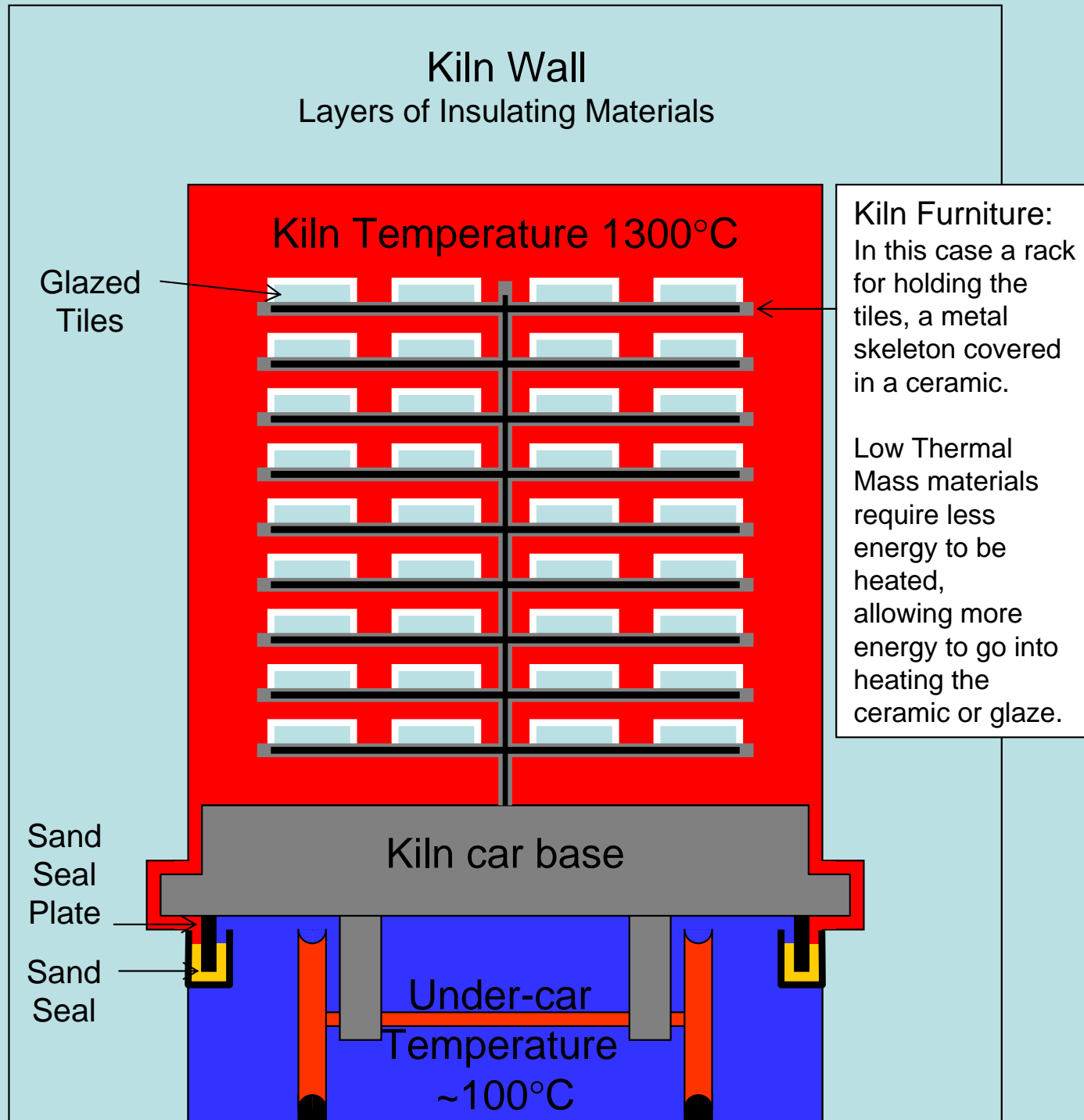


Euro-Tunnel Kilns - Gehenna Series

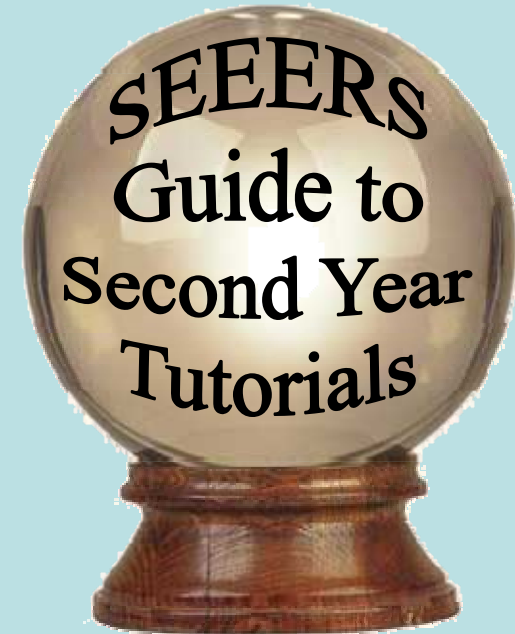


Euro-Tunnel Kilns:

Gehenna Kiln Car



Student (& Staff!) Support



- Supporting Documents
 - Problem sheet summaries
 - SEEERS Guides
 - Tutor cover notes and supplementary material
- Supporting Lectures
 - Introduction
 - Searching skills
 - Working in groups
 - Project planning
 - Presentation skills
- SEEERS Guides to:
 - Second Year Tutorials
 - Manchester Steps
 - Small Group and Team Work
 - Searching for Information
 - Project Planning
 - Group Presentations
 - The Marking Scheme

Manchester Steps

Make the problem explicit

Assess existing knowledge

Need to know

Course of action

Home in on resources

Enquiries and/or Experiment

Share results

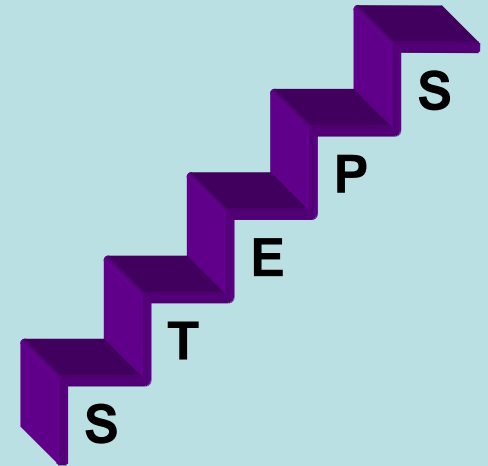
Theorise

Evaluate

Report, Repeat, Refine, Reflect



The University
of Manchester



Assessment

Individual Assessment (IA)

Each tutorial the students' contribution are assessed:

0: Absent

1: Unacceptable

2: Poor

3: Average

4: Very Good

5: Excellent

Project Mark (PM)

Presentation:

25% Preparation

25% Delivery

25% Content

25% Questions

$$SM = PM \left(\left(\frac{IA - AIA}{2AIA} \right) + 1 \right)$$

Delivery

- 2005-06
 - 131 students in 24 groups of 4-6
- 2006-07
 - 147 students in 29 groups of 4-7
- 2008-09
 - 130 students in 24 groups of 4-6

Evaluation Method: Integrative Evaluation

... combining a number of evaluation tools to gain insight on the students learning experience ...

- Confidence Logs (1&2)
 - Modest but significant improvement in relevant skills
- Observations of Tutorials and Presentations (All)
 - Varying degrees of tutor or student led discussion
- Student Process Questionnaire (1)
 - Deep (28.3) & Surface (22.9) Learning Attitudes (10-50)
- Learning Resource Questionnaire (1&2)
 - Internet, discussions with students and tutors
- Perceptions of PBL (1)
 - Very much in favour of PBL, particularly teamwork aspect
- Post Course Questionnaire (All)
- Focus Groups/Group Discussions (All)

Evaluation Results: Post Course Questionnaire

What did you learn from SYT?

- Team Working
- Project Planning and Management
Problem Solving
- Presentation
- Research

What did you not like about the SYT?

- Not enough credit for the work
- Competing workloads
- Some – dysfunctional teams
- Not enough detailed information

What would you like to see changed about the SYT?

- Increasing credit
- Reducing Workload
- Better Teamwork
- More Information

Other Comments

- Some – very supportive of the initiative
- A few – use tutorials in a different way

2005-06 Delivery

Delivery as described

- Good feedback from students and staff that engaged in activity and evaluation
- Concern that it was a significant amount of work for no credit

BUT ...

- Attendance very poor
 - From 92% down to 45%
- Some groups opted out of presentation altogether
- Seen as optional and easy to ignore

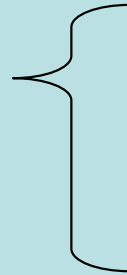
2006-07 Delivery

Added:

- 1 Credit
- Teamwork Workshop
- Reflective Essay
- 'Ask the Consultant' sessions

Response: (Attendance 85%)

- Some resented that it made the activity difficult to ignore
- Some appreciated, but found activities difficult
- Some vocally felt insulted that they were being taught about teamwork
- Seen as an additional burden at a busy time of year
- Live sections didn't work and were too late in project
- Keen students sent lots of e-mails



2007-08 Delivery

Dropped:

- Teamwork Workshop
- Reflective Essay
- Hardcopy SEEERS guides
- Components Show and Tell

Response: (Attendance 92%)

- Avoid initial poor reaction
- Useful but burdensome
- Too much soft-skills handouts
- Confused students

Compressed to 6 weekly
tutorials, finished in week 8

- Increase intensity of activity
- Avoid peak workloads
- Could make earlier

Feedback:

- low response but positive

Some Telling Quotes

We need a lecture on <blank> before we can do it!

Overall good practice
for next semester

Overall this was a great experience and was placed at a good time in the semester as it would really overcome my presentation weaknesses before more serious presentations such as for placement opportunities, and it has really helped in boosting my confidence.

Overall, an excellent exercise giving a good introduction to the team skills needed for the ESP project including experience of potential pitfalls and problems.

Acknowledgements

HEFCE Curriculum Innovation Fund

Higher Education Funding Council for England

IET Academic and Industrial Accreditation

Institute of Engineering and Technology

CEEBL www.manchester.ac.uk/ceebl

Centre for Excellence in Enquiry-Based Learning

HEFCE: CETLs Programme

Centre for Excellence in Teaching and Learning