

**ATKINS**

# ACED Conference

Creating Realism in Student Projects



# Introduction

## Matthew Curtis – A brief synopsis

- Previous experience:
  - Started work for Atkins, Rail Division (2004)
  - 2 years BTEC Civil Engineering, day release (2004 – 2006)
  - 2 years HNC Civil Engineering, day release (2006 – 2008)
  - 2-D and 3-D CAD City and Guilds
  - MEng Civil Engineering, full time (2008 – 2012)
  - Summer placement student at Atkins Rail (2008 – 2012)
  - 18 months continuous site experience (Basingstoke AIU)
  - Various secondments to Permanent Way design, Geotechnical design, Metronet structure assessments, re-signalling contracts



# Introduction

## Matthew Curtis – A brief synopsis

- Current work (post degree):
  - Design of an RC buried box carrying skew traffic and rail loads
  - Lead designer role for CASR P&D project , renewing points heating infrastructure. Inherited project suffering budget and time difficulties.

# Objectives

Highlight and describe the following:

- Differences between industry and student culture
- Differences between industry and student projects
- Similarities between industry and student projects
- Potential adaptations to student projects to improve realism

# What is realism?

Or more accurately, what is my view of realism...

- The application of technical knowledge within an environment that has been created to emulate as closely as possible, the culture and working practices within industry.
- The objective of realism in project work appears to be the opportunity for students to gain exposure to the expectations of industry and a realisation of the attributes required to be a successful engineer.

# What is realism?

## Key Attributes

I have observed some of the following key attributes in engineers that have been displayed during project work, often many at the same time:

- Technical knowledge
- Awareness of design issues – ‘the big picture’
- Time management
- Work ethic
- Embedded safety approach - awareness of risks and mitigations
- Decision making skills
- Team and individual working without close supervision
- Listening skills
- Adaptability and openness to new concepts
- Ability to cope work in high pressure environments

# Industry vs. University

## What are the differences?

### General Course Feedback

- Teamwork events sporadic, became an inconvenience rather than learning experience
- Poor timekeeping
- Poor professional standards and behaviour during lectures i.e. talking
- Relevant issues not usually embedded in teaching i.e. sustainability and energy use
- Safety and risk reduction did not appear to be embedded throughout units equally
- Vague structure to some units
- Balance of the carrot and the stick, only evident at the end of the degree

# Industry vs. University

## What are the differences?

### Final Project

- Little opportunity to verify project information and collated data – work structure issue
- Superficial work in lots of areas rather than a focus on excellence in fewer areas
- Assessment criteria and deliverables not clearly defined – a glass cage?
- Poor role definition and no defined leadership/management
- No project processes stipulated and poor communication of administration requirements



# Industry vs. University

## What are the differences?

### Final Project - Continued

- Outcome relies heavily on others with no sanctions for poor performance
- More mentorship throughout design process in industry
- Promoted as a competition between students – should be working as a team
- A test of ability to adapt to the conditions rather than a learning experience
- Not much targeted feedback after the project to aid improvement

# Industry vs. University

## What are the similarities?

### Final Project

- Vague definitions of deliverables and project information in industry
- Project procedures followed – implemented from experience
- Working with team mates of unknown ability/personality forces adaptation
- Helping others to achieve a collective goal
- High pressure atmosphere
- Natural leaders surface
- Exposure to all of the key attributes listed previously

# Creating the 'Industry Environment'

How could this be achieved?

## General

- Professional standards lectures covering key attributes – from industry provider?
- Project management lectures - cost and time budgeting
- Industry specific optional units – aid employability and focus on chosen area if known
- More dedicated teamwork projects throughout the course

# Creating the 'Industry Environment'

## How could this be achieved?

### Final Project

- Set the project up more like an industry project
  - Clearly set out roles, responsibilities and processes
  - Clearly set out the deliverables – need to be more realistic
  - Identify a Project Manager to co-ordinate project tasks
  - Identify an Engineering Manager to integrate the teams and design issues
- Make the project more relevant and up to date
  - Input from industry when creating the project
  - More emphasis on current events i.e. sustainability and water use
- Use of industry processes such as 'Design Principles' to help guide students

# Creating the 'Industry Environment'

## Design Principles

- 1) We have fully understood customer requirements, assessed these as being reasonable and translated them into a clear basis of design.
- 2) We have assessed what resources (e.g. key people, skills, accommodation and tools) are required and confirmed they are available.
- 3) We have understood our scope of work within the project lifecycle and the work breakdown structure and deliverables are well defined.
- 4) We have understood and communicated roles and responsibilities for our own operations and those of the customer and any third parties such as a regulator.
- 5) We have put in place suitable processes for managing change, risk and information flow.
- 6) We have put in place suitable processes to ensure that our deliverables meet the design requirements.
- 7) We will capture lessons learned during the project and feed these back in to our design processes.



# Atkins' Design Principles

## Start the job right

## Do the job right

## Finish the job right

Understanding and clarifying the project

1. We have fully understood customer requirements, assessed these as being reasonable and translated them into a clear basis of design.
2. We have assessed what resources (e.g. key people, skills, accommodation and tools) are required and confirmed they are available.
3. We have understood our scope within the project lifecycle and have split this into appropriate phases. The work breakdown structure and deliverables for each phase are well defined.
4. We have understood and communicated roles and responsibilities for our own operations and those of the customer and any third parties such as a regulator.



### Prepare the Basis Of Design

Record the agreed requirements and deliverables that are needed to achieve the customer's aspiration

Define the technical tasks, techniques, methods, tools & disciplines to be applied in order to deliver the best possible solution given the project's constraints

Clarify the interdependencies in the project so that each work stream fully understand their responsibilities and the consequences of their decisions on each other

Define the review, checking and information/data storage and transfer systems to be adopted

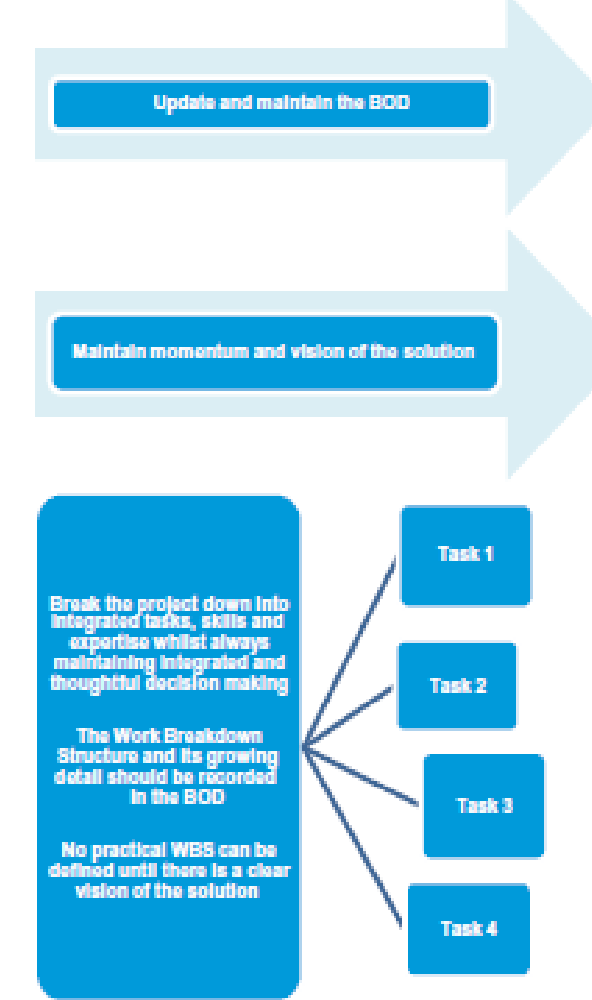
Clarify the key milestone dates for the project

Highlight any lessons and techniques that have been obtained from similar projects

Define any critical review and stage gates that need to be achieved

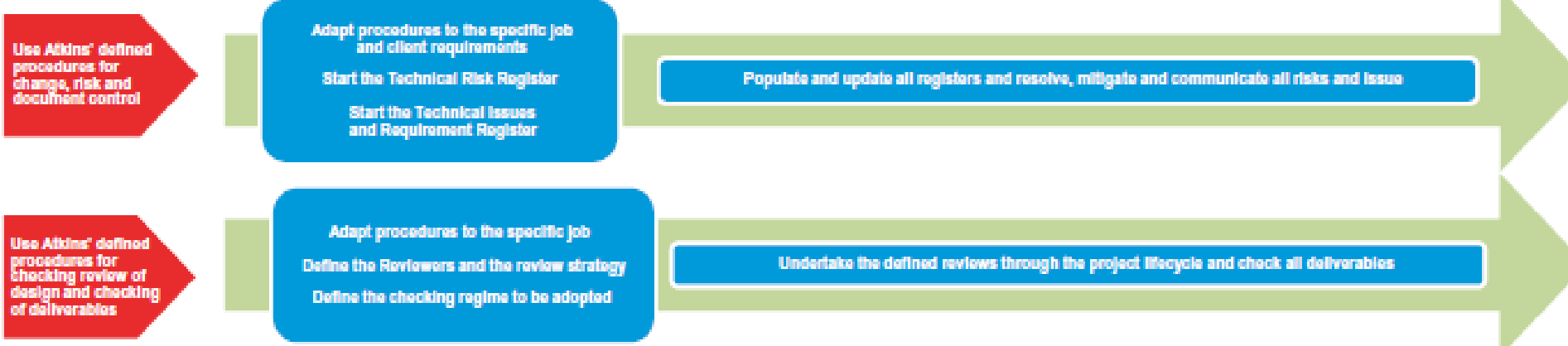
Ensure a clear vision of the way to deliver the customer's aspiration has been communicated to the entire team

Maintain and update the BOD through the design as greater clarity and detail emerges



Quality control measures to assist in undertaking the project

5. We have put in place suitable processes for managing change, risk and information flow.
6. We have put in place suitable processes to ensure that our deliverables meet the design requirements.



Enhancing and improving the business

7. We will capture lessons learned during the project and feed these back into our design processes.



“ .....best possible solution given the project constraints”

# The End

Thank you for listening, any questions?