

# Acquiring 'Competences' to procure low carbon schools

Based on current work for Carbon Trust  
Scotland

Colin J. Ashford

Consulteco Ltd

# Contents – ‘Competences for the procurement of low-carbon impact / productive workplace buildings’

1. Why they are needed
2. An outline of the Competences
3. The ‘Stages’
4. The ‘Competences’
5. The ‘Elements’
6. Production programme
7. Conclusions

# Background

- Since 2005, there has been substantial use of the Carbon Trust Northern Ireland 'Room Data Sheets' (RDS).
- The RDS collect together the key detail and performance specification items relating to each space. The references for all items are given.
- Associated documents include the 'Overarching Technical Brief' (OTB), and explanatory guidance.
- Derived documents include bid evaluation tools.

# Why the 'Competences' are needed #1

- Even though the Room Data Sheets (RDS) only refer to readily available documentation and applicable design / operation standards, there have been many comments to the effect that 'we have never used those standards before'.
- It is very disappointing when interviewing building professionals in their completed buildings to get an answer which is very obviously wrong / or is given to attempt to cover for lack of knowledge.
- Typical Q & A:
  - What STI did you aim for? A = 'Will 15 do you?'
  - What is the thermal weight of the blocks in the walls? A = '4kilo-newtons.'
  - What daylight factor did you design for in this space (RDS required 2% to 5%)? A = 'point 25'.
  - What should be the maximum insolation (amount of beam radiation from the sun)? A = 'We tried to get greater than 50%!'

# Why they are needed #2

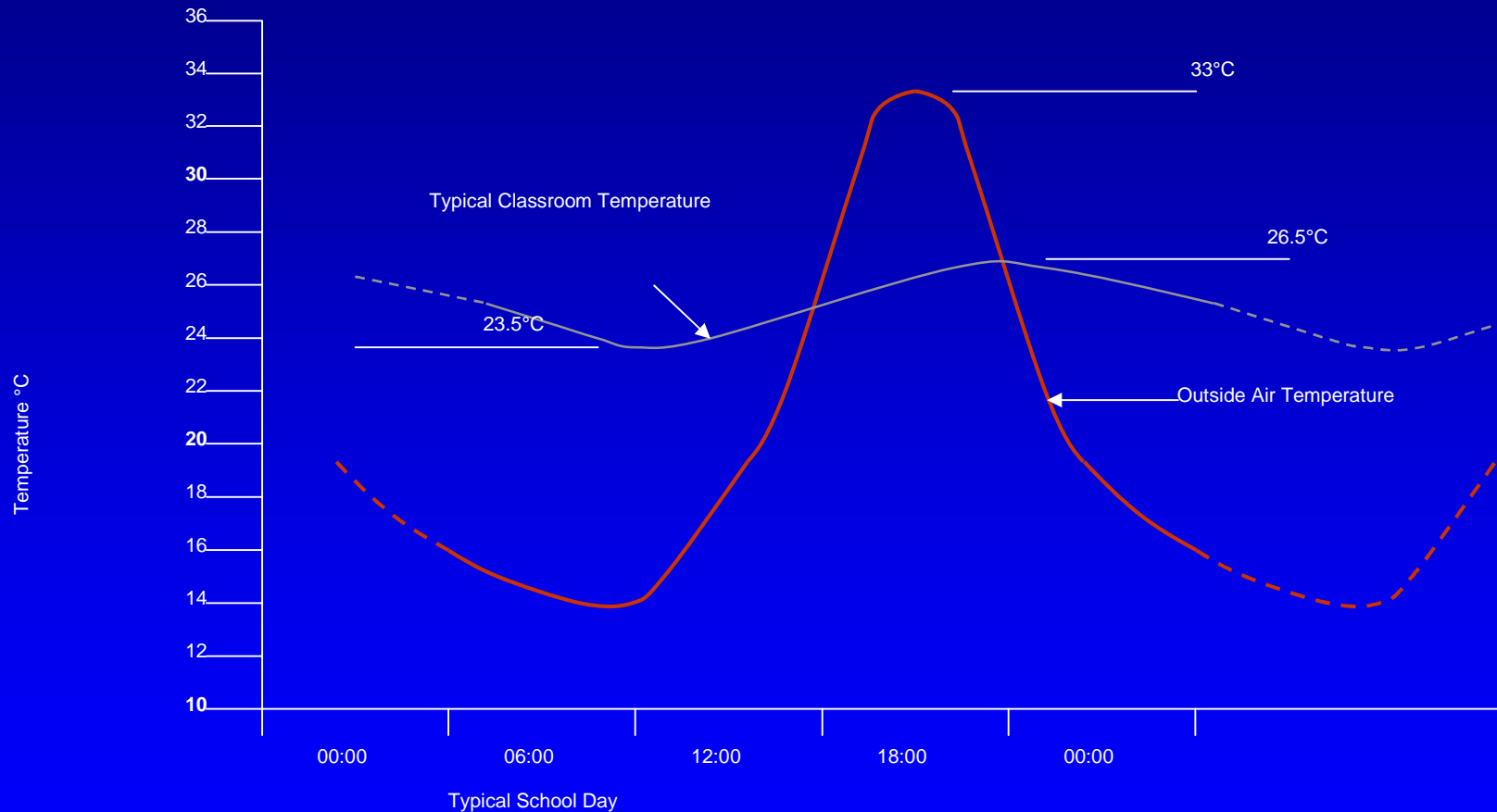
- Persons who have reasonably deep knowledge of many building projects (names of clients / architects / engineers / qs's / builders / FM's etc.) can identify approaches that can be linked to named people / organisations. These can be good features, but can also include 'non-ideal' features.
- Tracking across >130 buildings in the UK and Europe, there were very strong suspicions that some of the features arose from a very good understanding of relevant issues. And the converse.
- In spring 2008, these thoughts were discussed with clients, and with senior members of a professional institution.
- Many design teams did not understand the RDS and OTB! They did not know what the requirements meant! But they had designed many buildings covered by those codes / guidance!!!

# Top problems to be addressed

1. **Summertime overheat**
2. Poor acoustics
3. Poor ventilation
4. Daylight glare leading to 'Blinds down – lights on'.
5. Marketing induced mis-use of available capital funds.
6. Overheating with under-floor heating.
7. Condensing boilers not condensing.
8. Lack of knowledge of basic building physics – eg wanting natvent heating energy  $<60\text{kWh/m}^2\cdot\text{year}$ .

# Thermal comfort in summer

Overheat metric – IAT 6.5°C less than OAT mid afternoon



Output from BMS 15<sup>th</sup> July 2006

English Classroom 6

# Classroom ventilation

- Surveys used hand-held instrumentation to measure atmospheric carbon dioxide (CO<sub>2</sub>).
- Very common to find CO<sub>2</sub> levels in teaching areas above 2,000ppm during the heating season.
- At 2,700ppm CO<sub>2</sub>, cognitive function drops by 5% to 10%.
- A significant number of measurements were above 3,300ppm CO<sub>2</sub>. Pupils lazing back, mouths hanging open, and significant body odour.

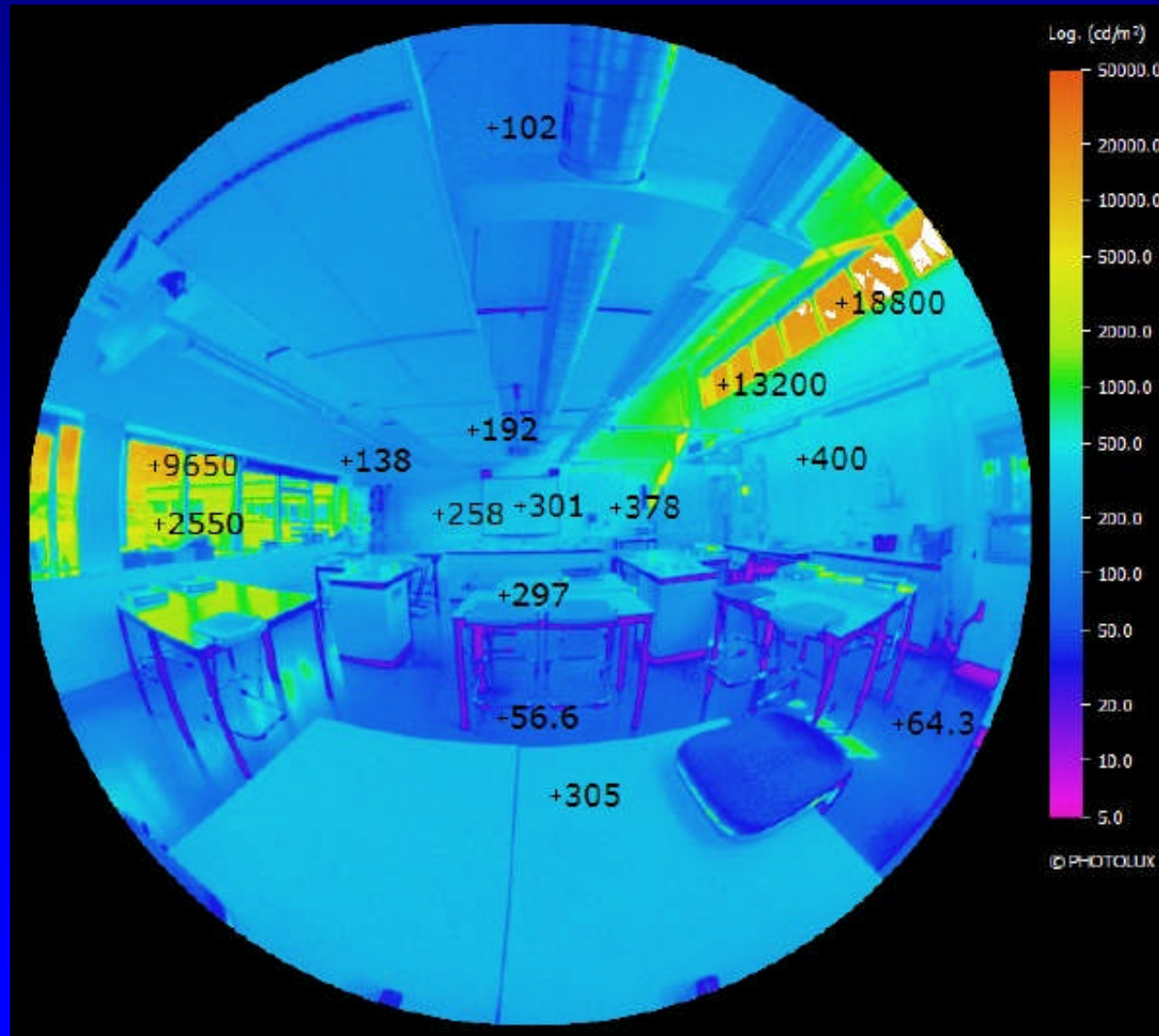
# Top problems to be addressed

1. Summertime overheat
2. Poor acoustics
3. Poor ventilation
4. **Daylight glare leading to 'Blinds down – lights on'.**
5. Marketing induced mis-use of available capital funds.
6. Overheating with under-floor heating.
7. Condensing boilers not condensing.
8. Lack of knowledge of basic building physics – eg wanting natvent heating energy  $<60\text{kWh/m}^2\cdot\text{year}$ .

# Whitecross Classroom – fisheye view



# Whitecross classrooms – brightness map

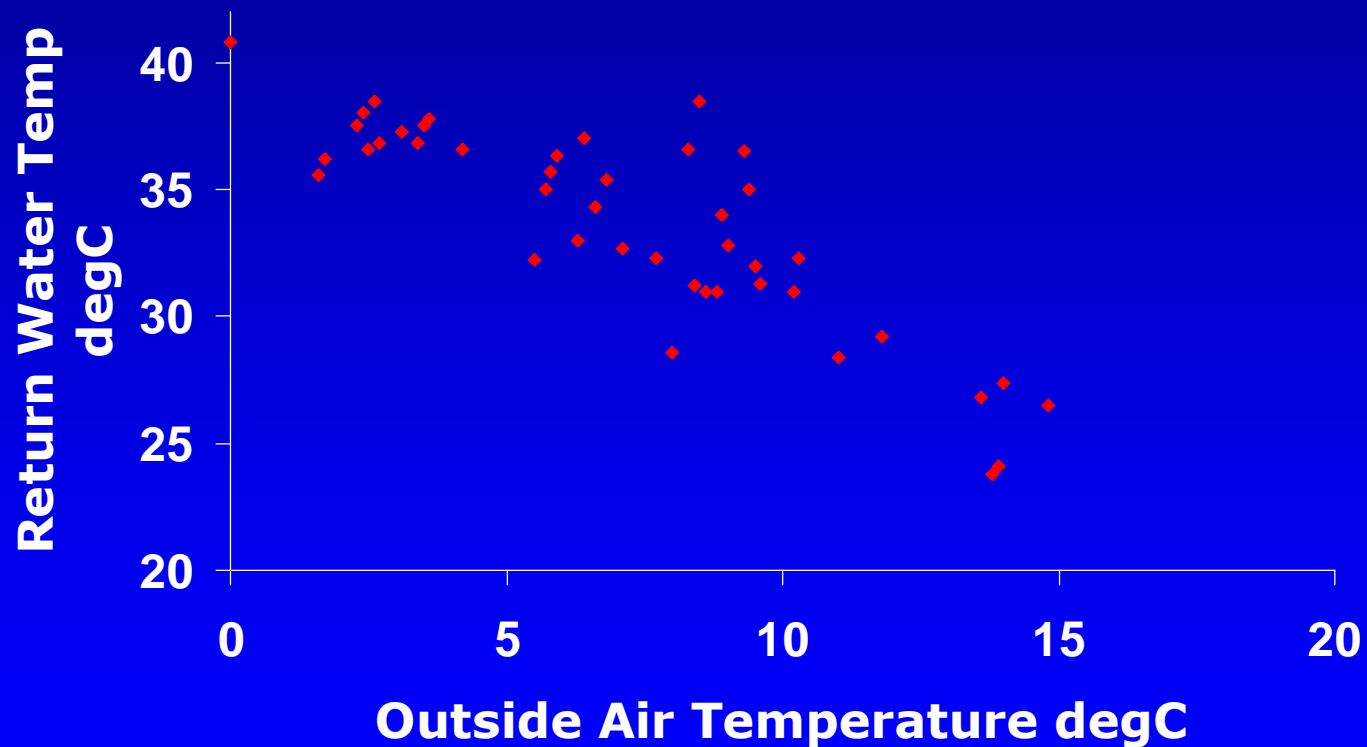


# Top problems to be addressed

1. Summertime overheat
2. Poor acoustics
3. Poor ventilation
4. Daylight glare leading to 'Blinds down – lights on'.
5. Marketing induced poor utilisation of available capital funds.
6. Overheating with under-floor heating.
7. **Condensing boilers not condensing.**
8. Lack of knowledge of basic building physics – eg wanting natvent heating energy  $<60\text{kWh/m}^2\cdot\text{year}$ .

# Condensing boiler operation

## Small Office - 1988



# Top problems to be addressed

1. Summertime overheat
2. Poor acoustics
3. Poor ventilation
4. Daylight glare leading to 'Blinds down – lights on'.
5. Marketing induced mis-use of available capital funds.
6. Overheating with under-floor heating.
7. Condensing boilers not condensing.
8. Lack of knowledge of basic building physics – eg wanting natvent heating energy  $<60\text{kWh/m}^2\cdot\text{year}$ .

Competences for the procurement of low-carbon impact /  
productive workplace buildings

# THE COMPETENCES

# Competences – an outline

- It is very surprising that there are no stated competences for the procurement of buildings. Compare this to the BIFM who defined their competences in 1999 and reviewed them in 2003.
- The 'Competences' have five stages, linked to the RIBA 'Plan of Work' / OGC Procurement guide 03.
- Under the Stages are 26 Competences.
- Under the Competences, there are approx 160 'Elements' that define skills and experience requirements at detail level.

# The 'Stages'

- There are five 'Stages'
- They are:
  - 'Client requirements'
  - 'Design'
  - 'Construction'
  - 'Operation'
  - 'Contracts'
- These stages are mapped to the RIBA 'Plan of Work' and the OGC (Office of Government Commerce) Procurement Guide 03.

# The 'Competences'

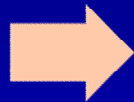
- There are 3 to 11 competences under each stage. For example, the 'Client requirements' have the following competences:
  - Functional definition (of the building)
  - CSR / Sustainability
  - Audit
  - Planning
  - Client values
  - Productive workplace
- These map to RIBA stages A to C, or OGC Procurement 03 'Business justification', Procurement Strategy', and 'Design brief and Concept Approval'.

# The 'Elements'

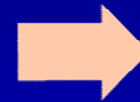
- By way of example, the 'Elements' under 'Audit' in the Competences above, are (provisionally):
  - CSR skills – familiarity with standards and approaches
  - Reporting level – ability to produce authoritative reports
  - Impartiality – able to withstand pressures such as from political and commercial sources.
  - Technical skills – broad existing capability, plus the ability to define when external help is needed.
  - Communication skills – able to communicate effectively by the written word, and verbally.
- Each 'Element' to be described in 5 to 20 lines.
- There will be a scoring framework to identify degrees of conformance.

# 'Competences' 1-3

STAGE: Client needs  
RIBA (A-C)



STAGE: Design  
RIBA (D-H)



STAGE: Construction  
RIBA (J-K)

- Function
- CSR
- Audit
- Planning
- Client values
- Productive workplace

- Massing
- Passive Design
- Productive Workplace
- Design Integration
- Low Carbon Impact
- Compliance with Client Requirements
- Whole Life Costs
- Maintainability

- Compliance with Design
- Components
- Commissioning
- Handover

# 'Competences' 4-5 (+6)



# Production programme

- The 'Stages' defined now. Believed robust.
- The 'Competences' – now robust / stable. Were 'locked down' early January 2009 when all the 'Elements' titles were placed.
- The 'Elements' – defined by mid-March 2009. Will be regarded as stable when the assessment tools such as the 12 'Matrices' are completed.
- The 'Matrices' are a derived document.
- The 'Competences' are due for large-scale trial use for one year, with critical comment welcomed. Starting April 2009.

# Initial use of the 'Competences'

- Large scale trial use on the Scottish Government's construction programme from summer 2009.
- A large government building in England.
- Subject to a final decision in April 2009, will be available for use outside Scotland – to anyone prepared to offer critical comment.

# Training for the 'Competences'

- Informal discussions with a professional institution identifies the need for 400 to 600 designers / consultants to be trained at a significantly higher level, and with a different skills set, compared with current low-carbon consultants.
- Basis of a current training programme for selected consultants in Scotland. 2 days initial training + 1 day every two months.
- The Scottish training is a test-bed for wider use in an accredited training programme.

# Conclusions - general

1. From a range of sources, there is evidence of a finite extent of skills within teams procuring buildings.
2. Client requirements are not adequately identified on some projects.
3. The end results include
  1. Buildings that do not perform as the client wished,
  2. Impairment of educational performance.
4. The solution is to check for adequacy of competences within procurement teams, and thus identify where help is needed.
5. Training will be needed to overcome these gaps in knowledge.

# Conclusion

Unless procurement teams have an adequate extent of 'Competences' related to schools specification, design, and operation, we have little chance of achieving low-carbon impact schools that are fit for purpose!

**THE END**

Presentation by Colin J. Ashford,  
Consulteco Ltd.

Tel: (Home) 020-8468 7785

Mobile: 07956 121037

Email: [colin@ashford.me.uk](mailto:colin@ashford.me.uk)