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Engineering is the solution

Prof David Fisk FCIBSE FRIBA

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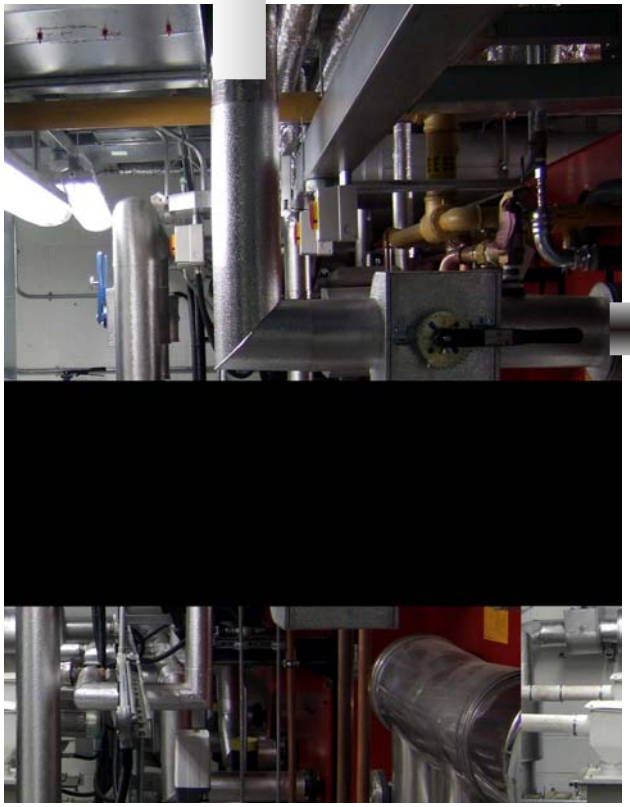
Is services engineering so different?

Everyone else's engineering



Services engineering

Fairyland

'sustainability'

iconic

Eco-

Affordable

Renewable [heat]

Electricity

Excellent

aerothermal

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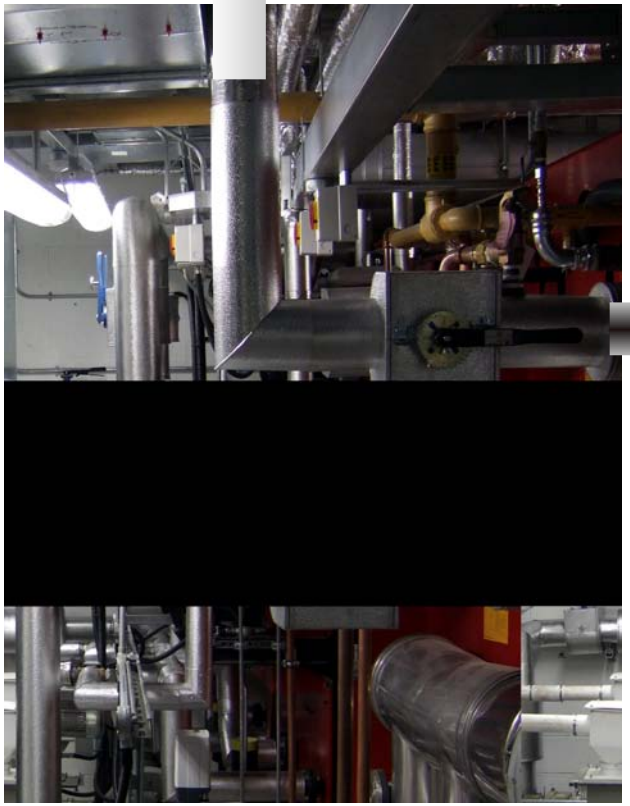
Is services engineering so different?

Everyone else's engineering



Services engineering

Tick Box Engineering

The problem starts when we move from using tick boxes to evaluate what we have done to maximising ticks for minimum effort

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Tick Box Engineering

- *BREEAM: Plant a bus stop*
- *Code for sustainable Homes?*
    - *1 tick a garden*
    - *3 tickets a boiler manual*

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RIBA Sustainability Award

Display Energy Certificate

HM Government

How efficiently is this building being used?

HMCS
Manchester Civil Justice Centre
1 Bridge Street West
MANCHESTER
M3 3FX

Certificate Reference Number:
0509-0872-6610-6600-2103

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

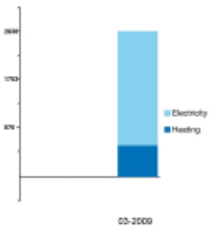
More energy efficient

A 0-25
B 26-50
C 51-75
D 76-100 — 88 — 100 would be typical
E 101-125
F 126-150
G Over 150

Less energy efficient

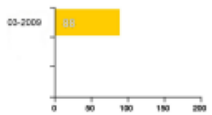
Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods



Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 35348
Asset Rating: Not available

	Heating	Electrical
Annual Energy Use (kWh/m²/year)	80	107
Typical Energy Use (kWh/m²/year)	136	106
Energy from renewables	0%	0%

Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: ORCALC V1-05-02
Property Reference: 299058620000
Assessor Name: Graham Child
Assessor Number: LCEA023278
Accreditation Scheme: CIBSE Certification Limited
Employer/Trading Name: Banyard Consulting Ltd
Employer/Trading Address: The Old Harpsichord Factory, 2A Bradbourne Road Sevenoaks Kent
Issue Date: 09-03-2009
Nominated Date: 06-03-2009
Valid Until: 05-03-2010
Related Party Disclosure: Not Applicable

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

How long will informed clients tolerate disappointing outcomes?

Display Energy Certificates

At least they measure what actually happens…

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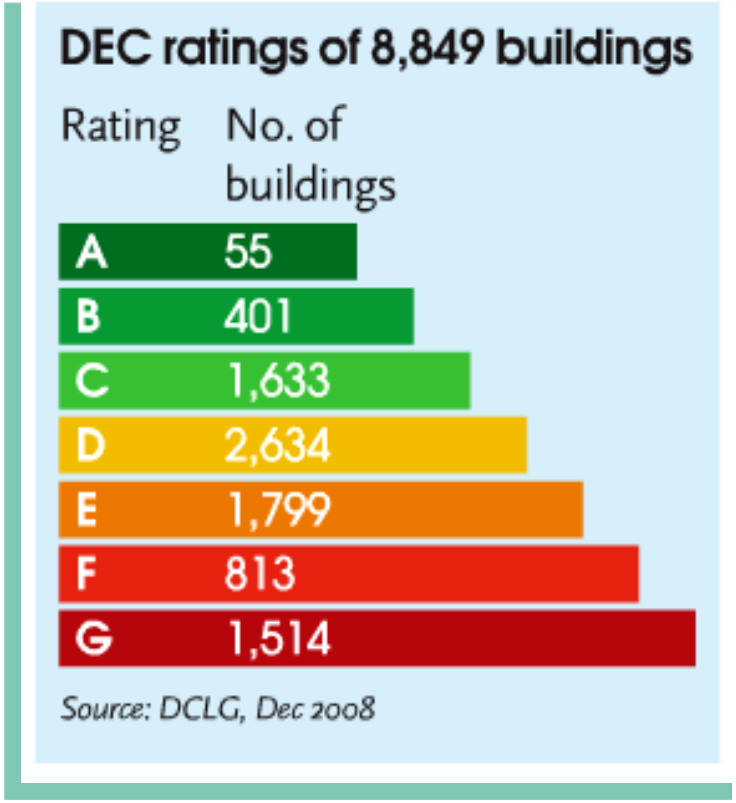
Display energy certificates



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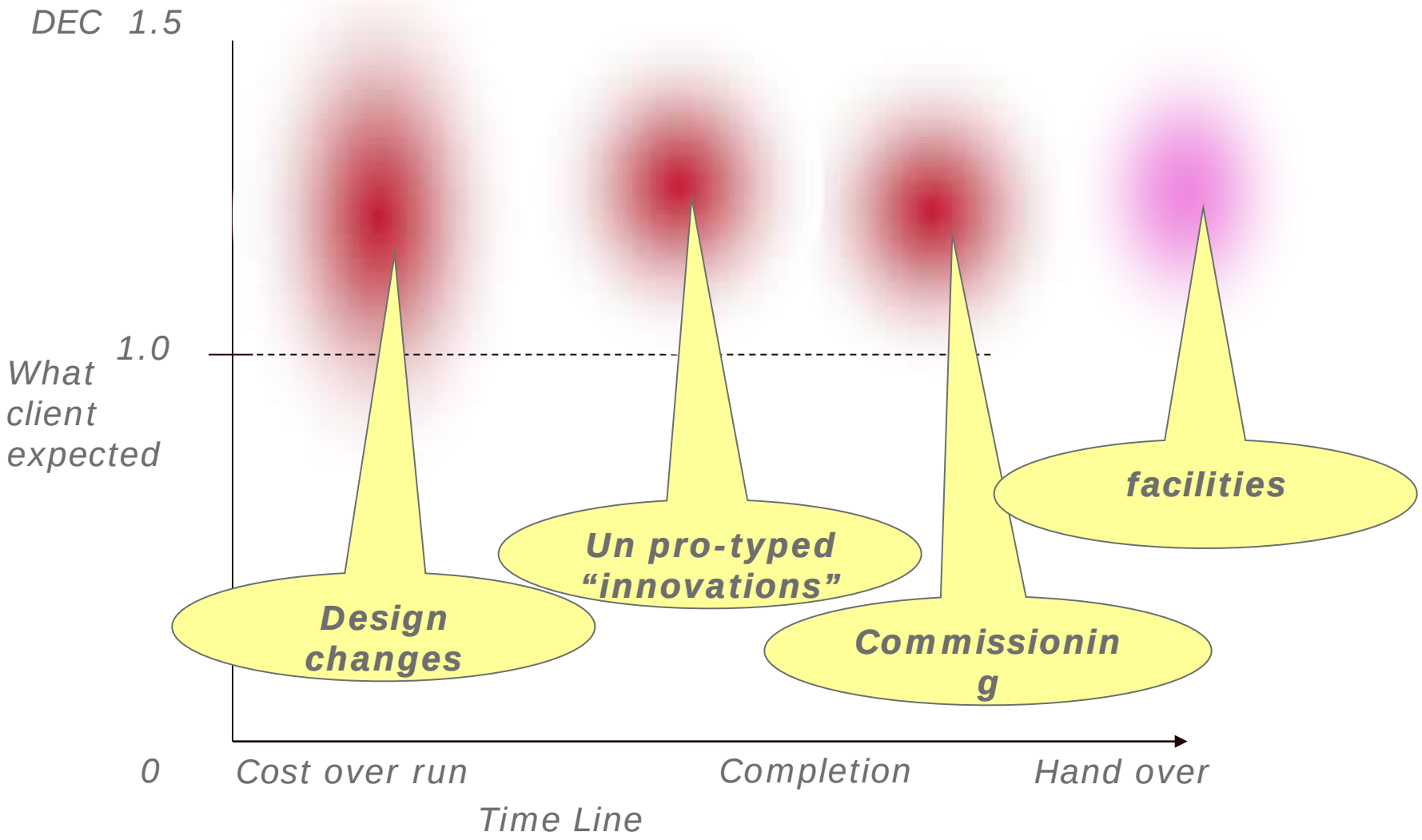
Display Energy Certificates – where did it go wrong?



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Display Energy Certificates

The Problem: Pushing on a String?

Similar results found in user surveys

UBT's findings

Why buildings often fail to deliver

The design intent has not been managed through the procurement process and into use

Buildings are being used more than the designers anticipated

Systems are too complicated and baffle the users and management

Controls don't work and things are left switched on

The basis for the design is often flawed; we just don't have the right type of guidance

Continuity of delivery has been fragmented, with work packages, partial services – or should that be "incomplete services"?

Too often interfaces between the parts are handled poorly – with outsourcing and value engineering reducing resilience and stripping away finesse

Engineering *delivering* a DEC

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Engineering a DEC: method 1 – Design margins

Aim for B to be sure to get a D

DEC ratings of 8,849 buildings

Rating	No. of buildings
A	55
B	401
C	1,633
D	2,634
E	1,799
F	813
G	1,514

Source: DCLG, Dec 2008

Not that wrong – its how Tower bridge can take a 44 ton truck

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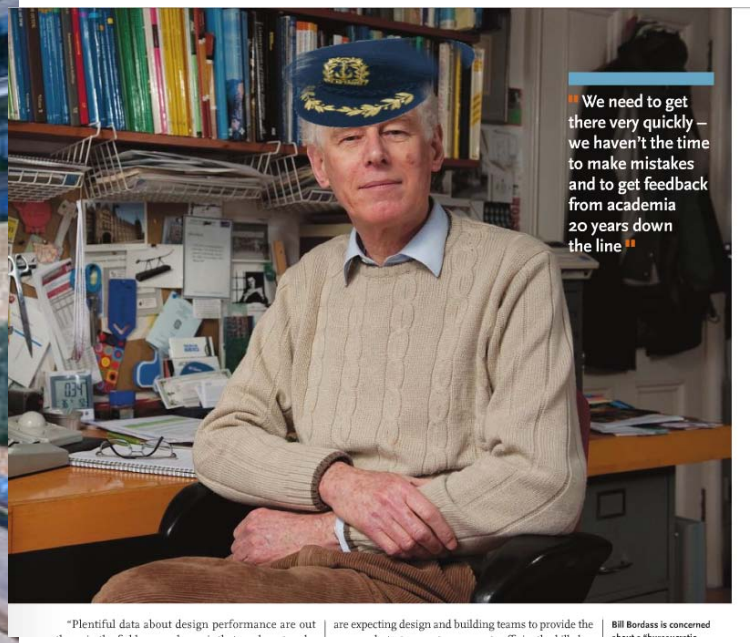
Engineering a DEC: method 2 - Ship Trials



"Plentiful data about design performance are out | are expecting design and building teams to provide the | Bill Bordass is concerned

Used by Wessex water with BuroHappold – recommended by Bordass !

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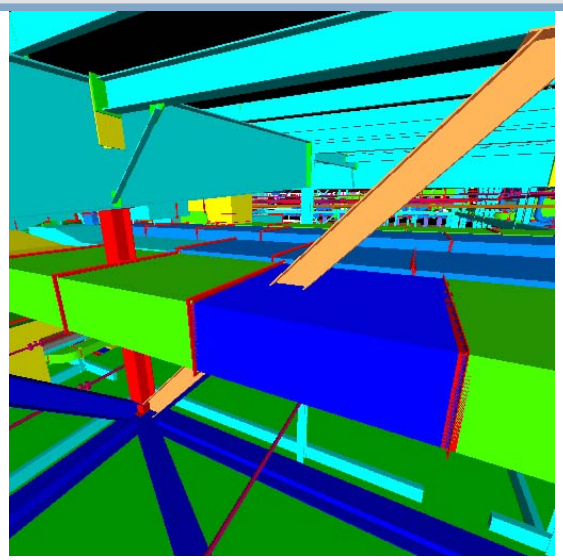
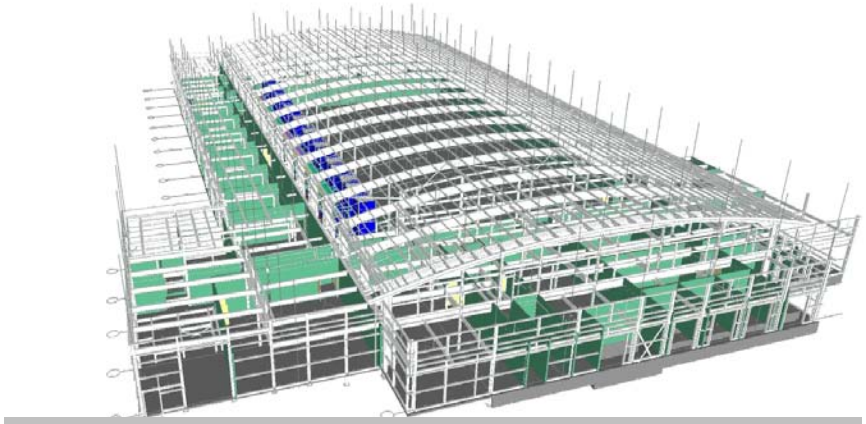
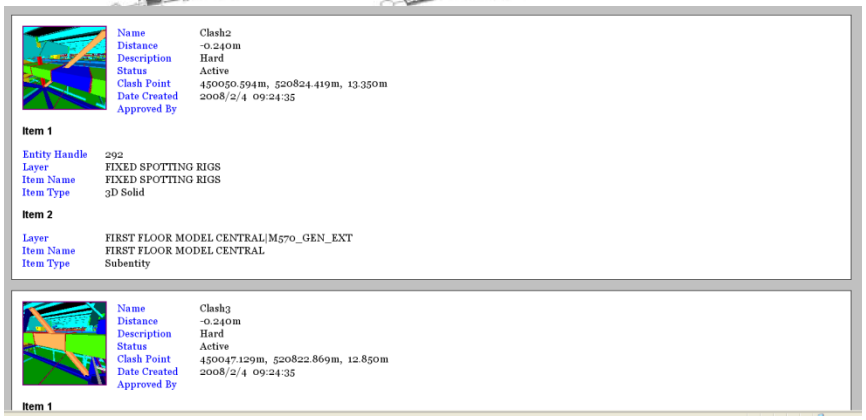
Engineering a Dec: method 3 – Computer aided engineering



Automated Clash Detection

Already used in structural engineering to avoid services clashes





Rapid Design Reporting

BIM Collaboration Tools – Clash Detection

LAING O'ROURKE bim INTELLIGENT THINKING INTELLIGENT CONSTRUCTION

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Conclusions

Engineering is the solution

OK keep the tick boxes

But get the client to add DEC's to the brief

= Real Engineering
= Real Effect