Health and Safety
Executive

HSE

Embedding CDM 2015

Four years on

-Vision for the Pre –Con Phase

-Focus on Principal Designer

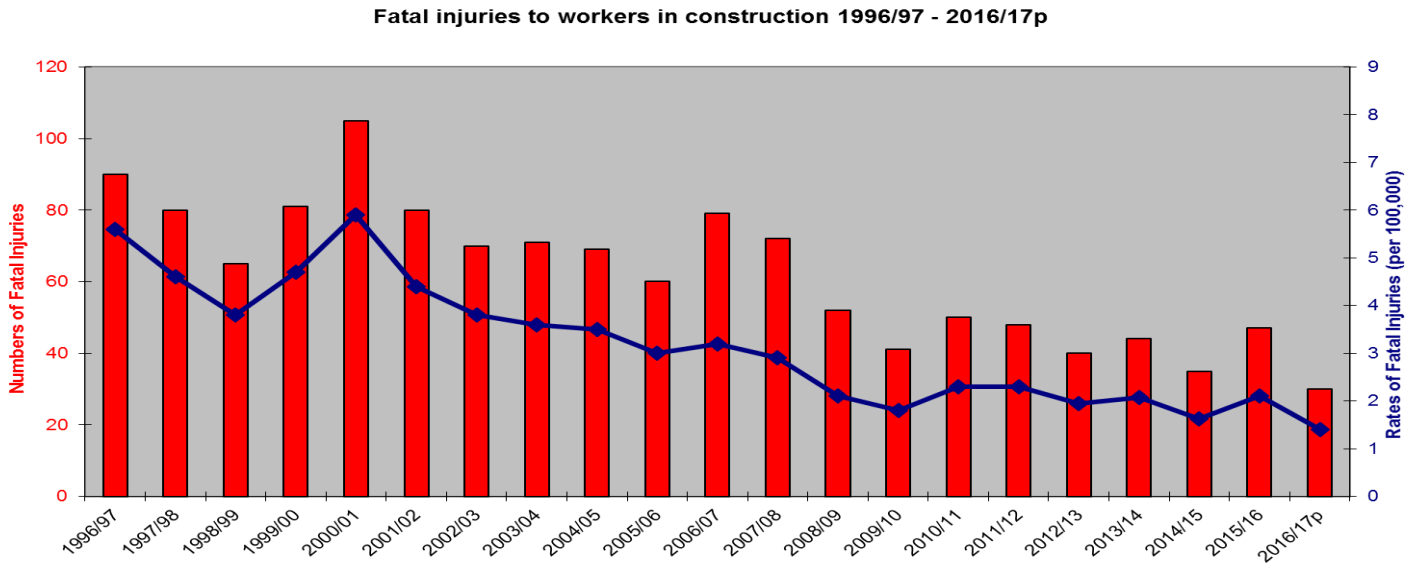
HSE Construction Sector

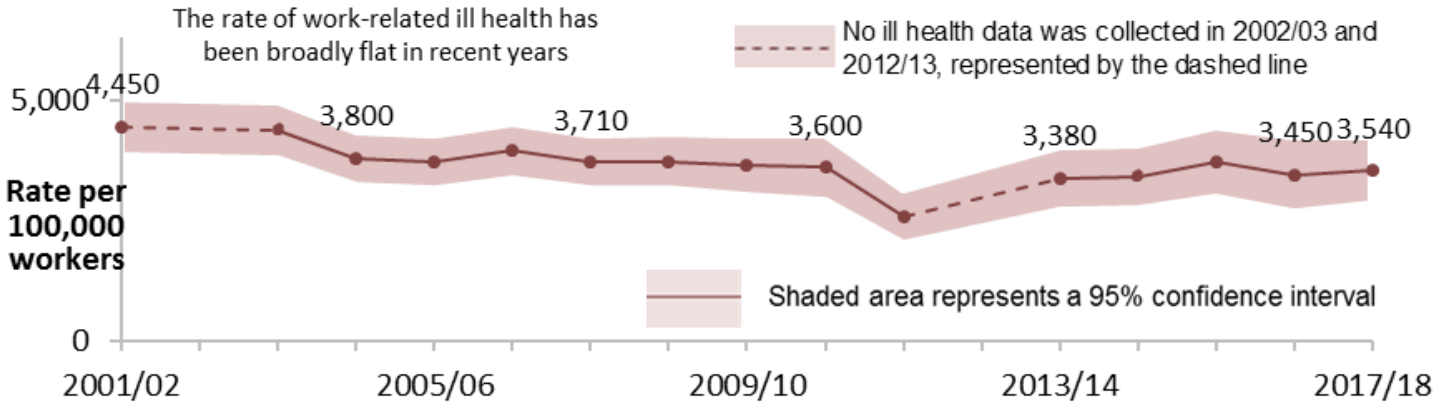
Summer 2019

Embedding CDM 2015

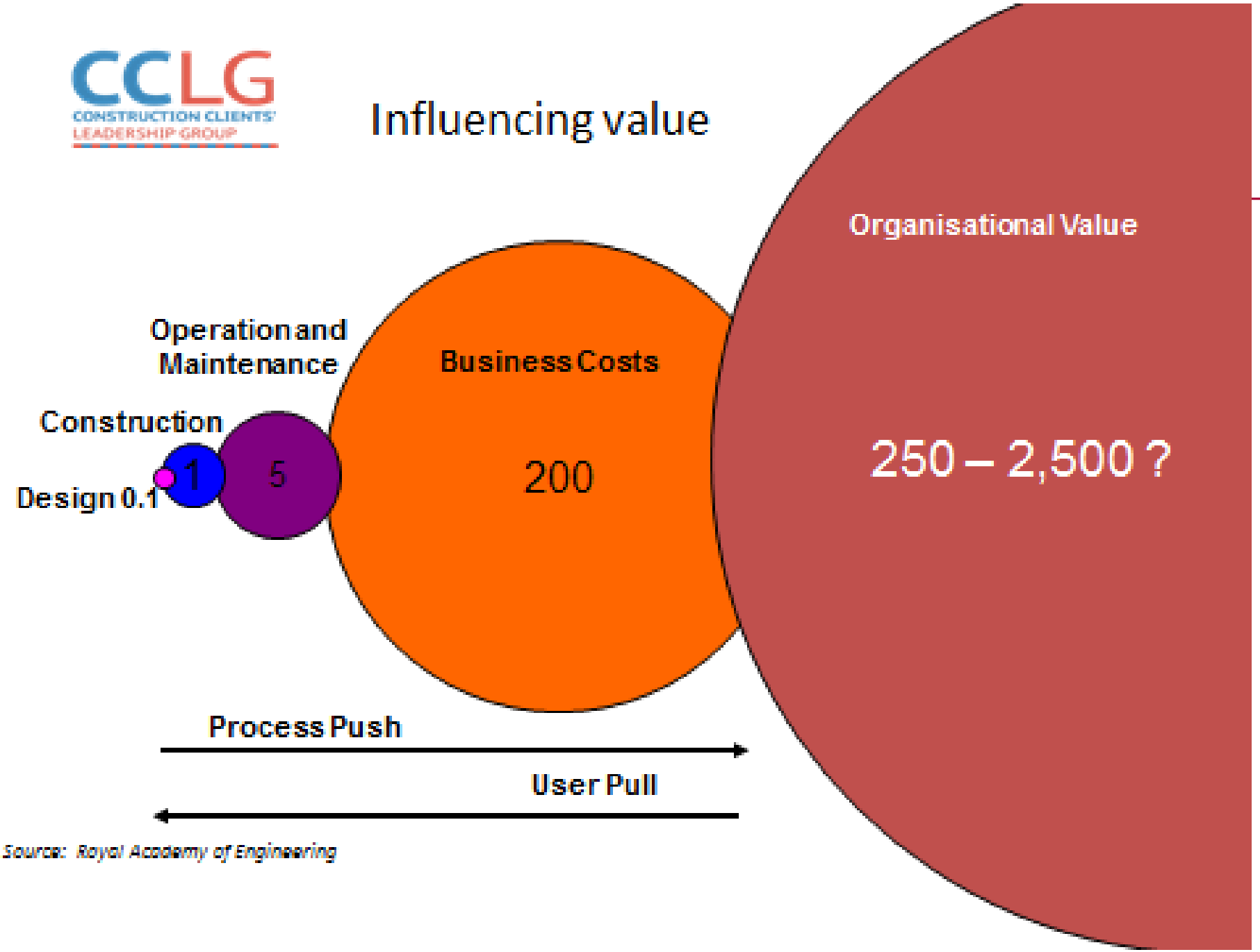
- Three new priorities;
    1. Persuading Clients and their advisers that investment in planning the Pre-con stage will pay off.
    2. Working with Principal Designers to establish good practice
    3. Ensuring that the benefits of digital technologies for H&S are realised – application during design and planning leading to improved outcomes on site.

Fatal injuries & ill health in workers



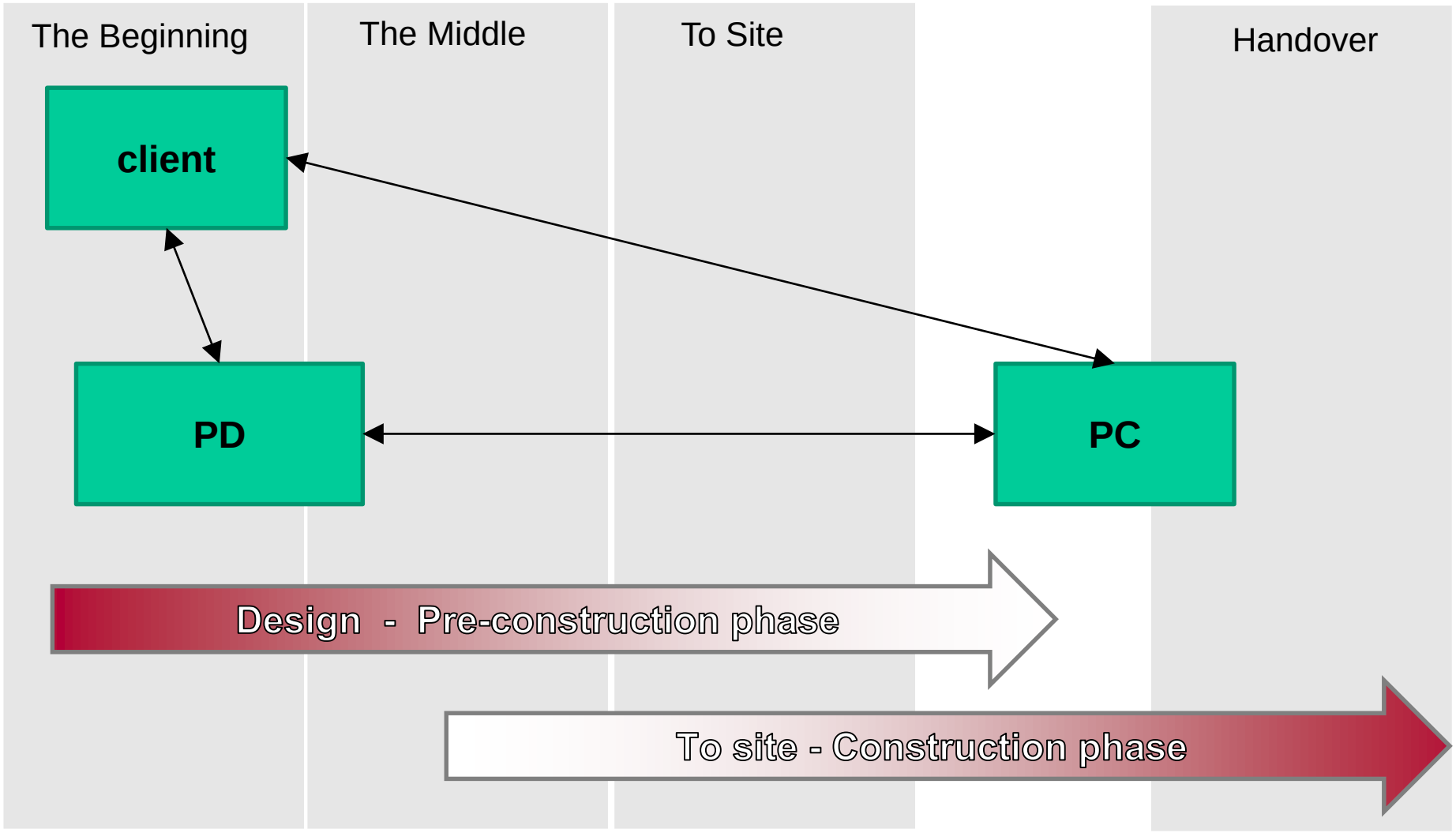


Influencing value

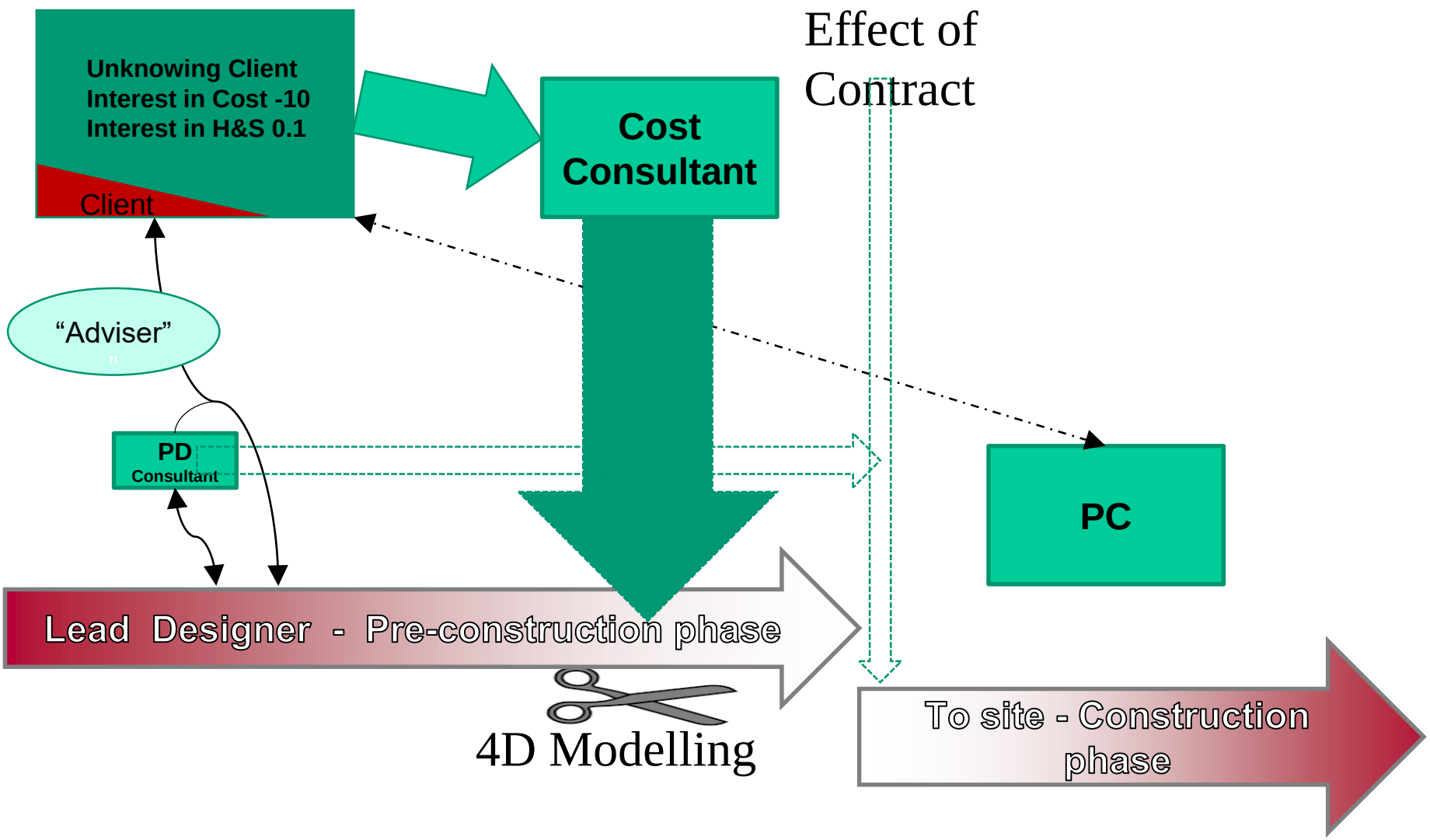


Source: Royal Academy of Engineering

Good Practice for Principal Designers



Current Negatives for Principal Designers



The Beginning

- The Client – Logically and legally it all starts with the Client
  - The Brief
  - PCI
  - EIR – Expectations for BIM
  - Resources, CDE, Digital Twin etc
  - Time
    - Reg 4 (1) a. A client must make suitable arrangements for managing a project, including the allocation of sufficient time and other resources.

The Heart of the PD Role!

BIM Tools

- Model Federation
- Clash Detection
- 4D Modelling

Example – Jacobs - Highways

- Planning a new Road- at the Options stage
- Using a GIS Platform to collaborate
  - *“A major benefit of the digitised, GIS-based SafetyWeb approach has been the creation of one single source of contemporary ‘truth’ that supports compliance with both the CDM Regulations and the ‘Management Regulations’. Traditionally, this information would have been held in several different spreadsheet systems maintained independently by different design disciplines across multiple offices. On a current project, the live system has delivered significant efficiencies for multi-office working with up to 300 staff interacting with the single dataset from throughout the UK and overseas.”* Andrew Finch Operations Director

Plan, Manage, Monitor – the PD Role
The beginning

- What's the Plan?

Survey works
GSI Info
Preparatory works
Site establishment
Identified Hazards and risks
Survey findings
Risk studies

PD Plan

Significant/Major
Areas of risk
Specific risks
Risk factors
Risk Tolerance
Mitigation strategy
Mitigation objectives

Client PCI

PD Gap Analysis

Design Team DRM

Design Information

Identify additional
Risk studies – Mtce & Use
Design Reviews
Temporary works reviews

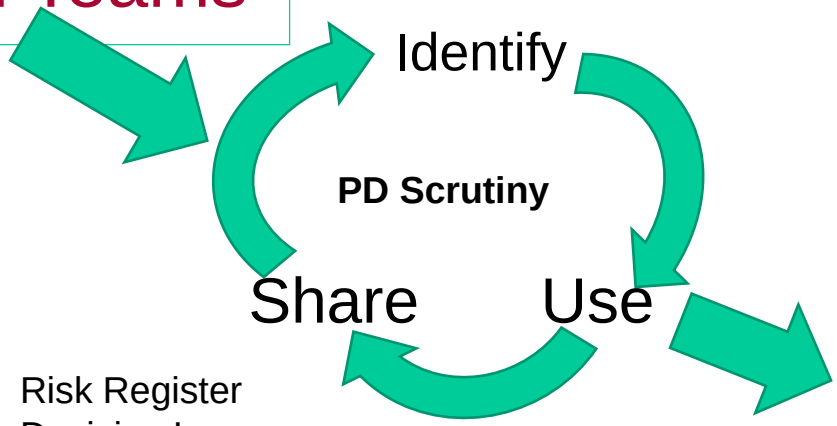
Set Piece
Prelim Hazard Analysis & Safety Review

All Stakeholders
Client
Design team leads
Other disciplines
Principal Contractor
Supply chain
Construction rep
Environmental
FM/End user

PD Manage and Monitor
The middle

- Design Tasks
- Design Teams

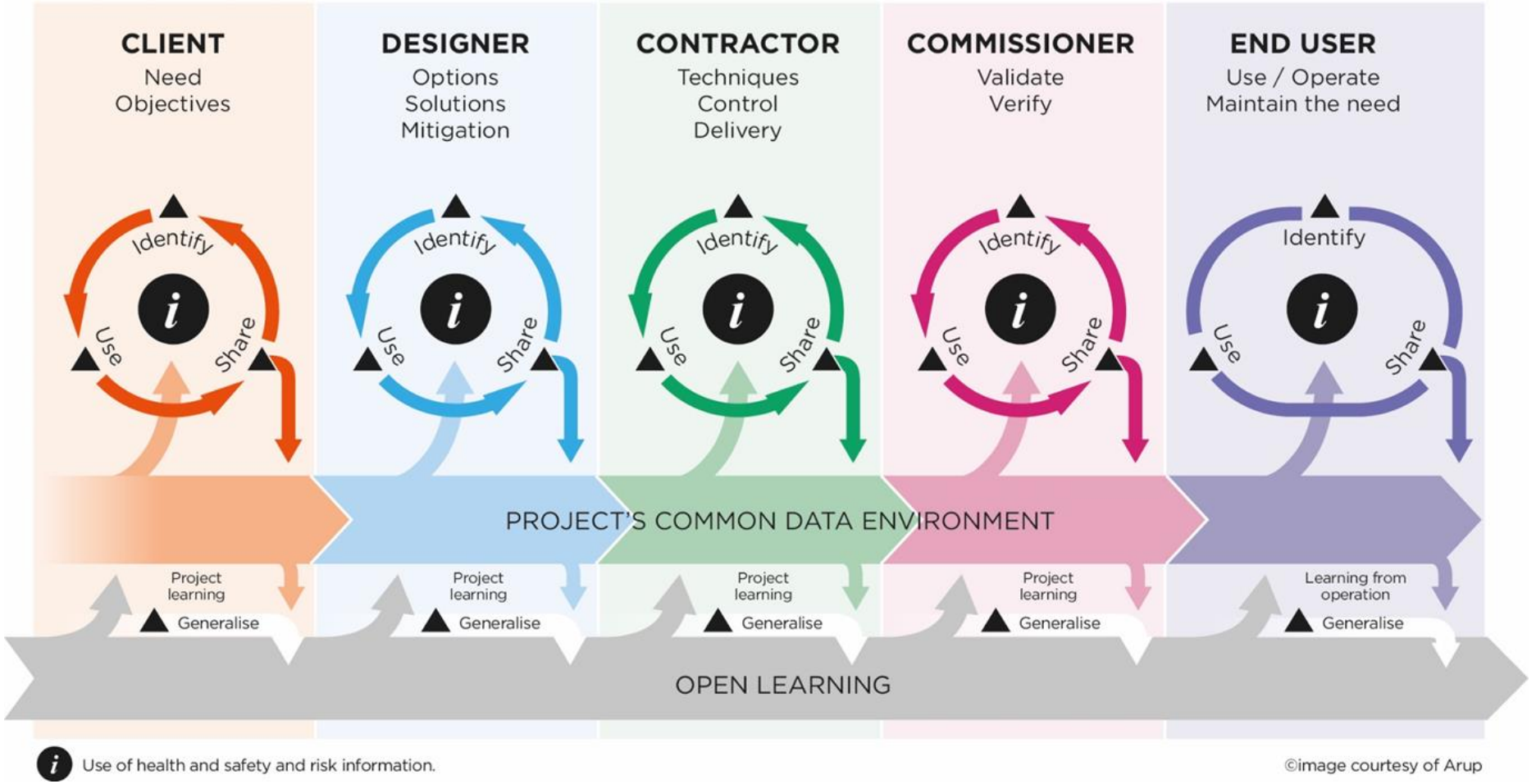
Significant Risks
Critical information
Design assumptions
Mitigation decisions
Residual risks



Risk Register
Decision Log
Assumptions
Temp works schedule
Refer back to client
Risk Studies & review meetings

- Design Outputs
  - BIM Tools
  - Federated Models
  - 4D Animations
  - Clash detection (to the max)
  - Risk schedules
  - Critical mtce & Use info
  - Temp Works

PAS 1192-6:2018



PD Role - Key Functions

1. Identify and track significant risk
2. Scrutinise quality of treatment of risk
    1. Elimination
    2. Reduction
    3. Control through subsequent design
    4. Information
3. Co-ordinate other designers mitigation
4. Handover designs which can be constructed safely

Going Deeper
The Principles of Prevention

(a) avoid risks;

(b) evaluate the risks which cannot be avoided;

(c) combat the risks at source;

(d) adapt the work to the individual, especially regarding the design of workplaces, the choice of work equipment and the choice of working and production methods, with a view, in particular, to alleviating monotonous work, work at a predetermined work rate and to reducing their effect on health;

(e) adapt to technical progress;

(f) replace the dangerous by the non-dangerous or the less dangerous;

(g) develop a coherent overall prevention policy which covers technology, organisation of work, working conditions, social relationships and the influence of factors relating to the working environment;

(h) give collective protective measures priority over individual protective measures; and

(i) give appropriate instructions to employees.

Risk Information – in Design

- Once the risks have been considered, the level of detail in the information provided to those who need it should be proportionate to the risks remaining. Insignificant risks can usually be ignored, as can those arising from routine construction activities, unless the design worsens or significantly alters these risks. L153 para 83

- PAS 1192-6:2018 Use of Symbols and Risk Registers

Design Symbol
- Key Design Decisions
- Design Assumptions
- Critical Information
- Major Risks

Not risk ranked, a narrative

Risk Symbols - Register
- Specific risk named
  - Fully assessed
  - Specific mitigation stated
  - Who is responsible

Prioritised and managed

Plan, Manage, Monitor – the PD Role
To site – the Construction Phase

- What's the Plan?

ECI means no surprises
Design for Temp works completed
Critical sequences identified
Info for H&S File identified

Plan

Significant/Major
Areas of risk
Specific risks
Risk factors
Risk Tolerance
Mitigation strategy
Mitigation objectives

Model federation

Clash detection

Design Team Risk Reviews

4D Sequences Modelled

IN ORDER TO : Optimise construction performance
Review programme
Identify minor off site build opportunities
Check logistics requirements
Spot sequencing issues
Detail temp works review

Set Piece Constructability /Rehearsal Review

All Stakeholders
Client
Design team leads
Other disciplines
Principal Contractor
Supply chain
Construction rep
Environmental
FM/End user

4D Planning in action

IDENTIFY

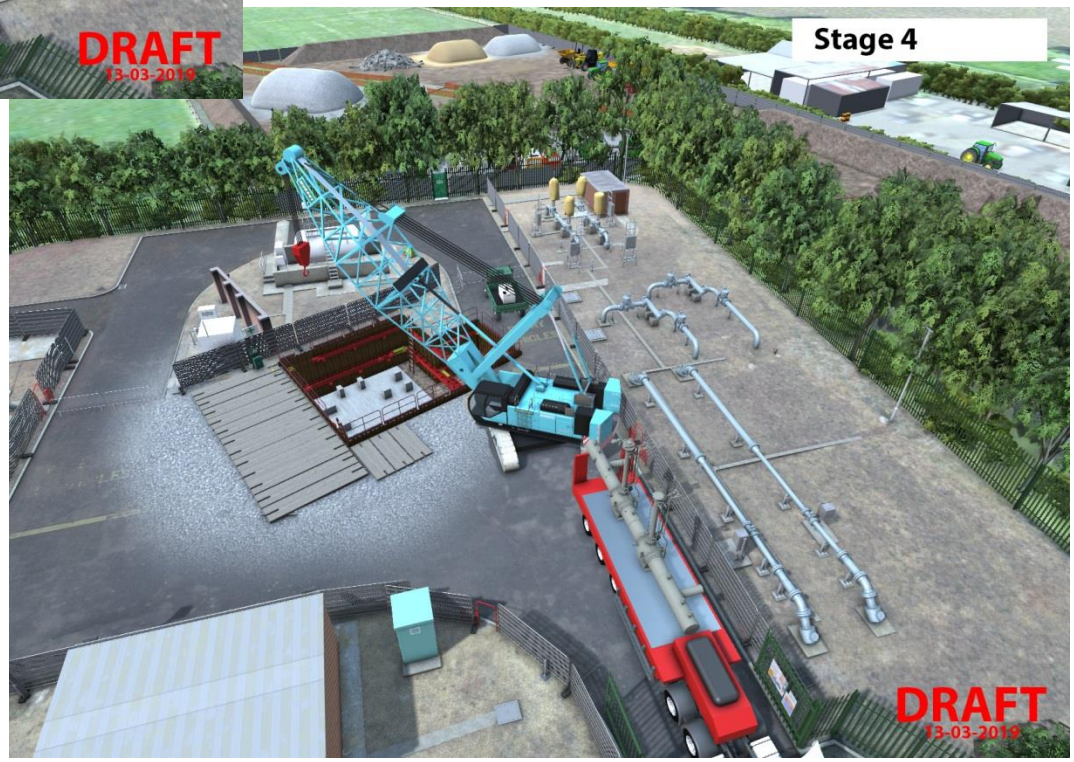
REDUCE

COMMUNICATE

WE CAN NOW BE MORE THOROUGH AND CONFIDENT

HSE

Acknowledgements to Premtech and National Grid



These are models created by Premtech (PD for Design phase) for National Grid to facilitate rehearsal events.

Feed Forward from Digital Rehearsal

Plan, Manage, Monitor – the PD Role
Commissioning and Handover

- What's the Plan?

Commissioning Risk review
Test and Commissioning Plan

PD Plan

Significant/Major
Areas of risk
Specific risks
Risk factors
Risk Tolerance
Mitigation strategy
Mitigation objectives

Identify critical information

To identify
Critical information for re furb and demolition
Critical information for cleaning and Mtce

To facilitate
Risk assesssments by FM

Co-ordinate commissioning

H/O information checklist

Check as built info/models

As built models and H&S File

For
Facilities manager
User
Building Fire Safety Managers

The Digital H&S File

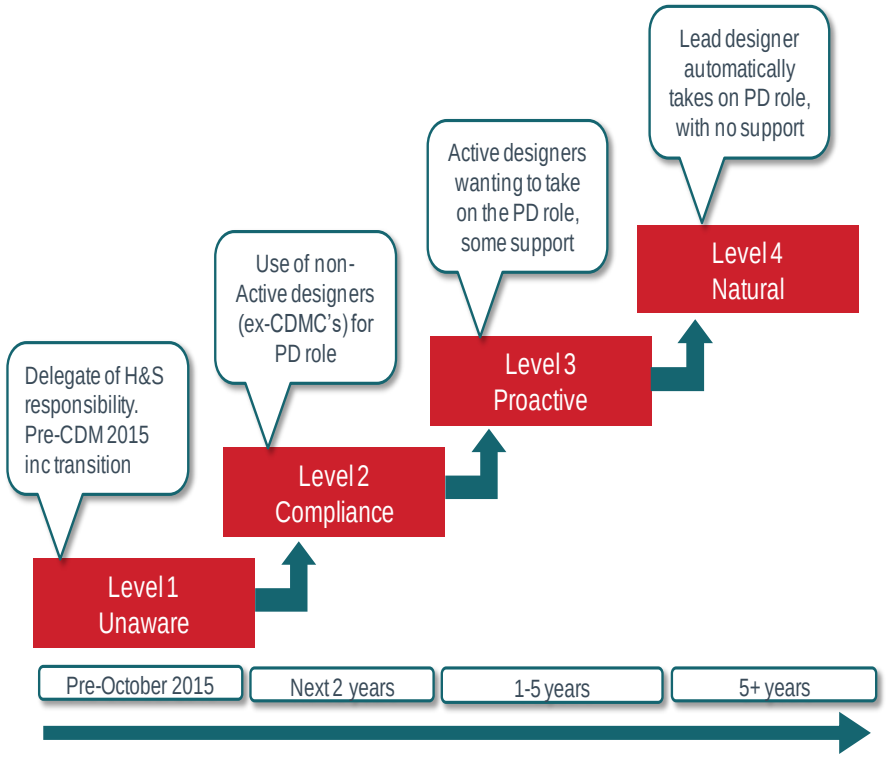
Structured H&S Information:

- Compliant 007G H&S File
- Pertinent O&M data
- Readily accessible to end user
- Clarity through visualisation
- Pre Construction Information ready for future projects.

Metrics for the Pre Con Phase

1. Nos of escalated risks eliminated, reduced, controlled through subsequent design
2. Have design solutions used multiple mitigation strategies, eg considered substitution, HF review, technical innovation
3. Quantity and quality of model federation and clash detection – not just spatial clashes
4. Nos of RFI's returned to design team
5. Attendance/participation of key stakeholders at design reviews
6. Level of feed forward detail of constructability/rehearsal review
7. Quality of PD Plan - included all the green ovals
8. Assess quality of mitigation against Principles of Prevention
9. Engagement level of Client in risk management
10. Engagement level of PC/supply chain in ECI

Hulland PD Maturity Scale (Created by Richard Hulland in 2016 for internal training course)



Level 1 Unaware

- Client dis interested
- Documentation still refers to CDM-C's
- CDM-C not involved in design process early enough
- Focus is on producing the paperwork, not on mitigating risks
- Role is contracted out

Level 2 Compliance

- PD role fulfilled by an individual consultant
- Client role minimal in defining risk management standards
- Client complies but does not understand benefits of investing in design
- Mostly a paperwork process
- PD does not exercise adequate control over the pre- construction phase
- PD does not hold other designers to account

Level 3 Pro active

- PD role fulfilled by an organisation, but may be over reliance on one individual
- Client guided by PD to define effective risk management process
- Client recognises need to invest more in co-ordinating and maximising return from the design phase
- PD has opportunities to exercise oversight over other designers
- PD uses BIM tools to support the function
- Co-ordination between phases is emphasised
- PD is very visible on project documentation, clearly understood as a key leader in the pre- construction phase

Level 4 Natural

- Client is integrated with PD in planning the design phase
- Clients extra investment in design risk mitigation is championed
- PD is the lead design organisation bringing a wide range of expertise to bear, facilitated by a skilled individual
- Risk mitigation is a dominant process in the pre- construction phase
- PD effectively uses a project Common Data Environment to communicate to all parties and produce CDM documentation
- All designers and consultants work well with PD as health and safety leader in co-ordination in the design phase
- Liaison and coordination between phases with the PC is effective and comprehensive
- PD has significant influence with PC throughout the construction phase