



# Project Controls Expo

## 09/10 Nov London 2011

Future of Project Controls based on lessons learned  
in the last decade

# Speaker Profile

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- Michael Higgins, born in 1979, 1 wife to be, 4 children, 1 dog and a people carrier.
- BAE Systems 1996 – 2004
- BMT Sigma 2004 – 2007
- Thales 2007 – 2009
- Eurocopter 2009 – 2011
- Xacom Ltd 2011 – not too sure yet

# Introduction

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- Where did we come from – some history
- Lessons along the way
- Some good practice
- What's in store for the future?
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# Where did we come from?

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- Project Management has been practiced since early civilisation.
  
- Until 1900 civil engineering projects were generally managed by creative engineers, architects and master builders
  - Vitruvius (1<sup>st</sup> Century BC)
  - Christopher Wren (1632-1723)
  - Thomas Telford (1757-1834)
  - Isambard Kingdom Brunel (1806-1859)
  
- It was in the 1950's that organisations started to systematically apply project management tools and techniques.
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# Vitruvius (1<sup>st</sup> Century BC)

Rome ballista of  
1/2 talent caliber



# Christopher Wren (1632-1723)

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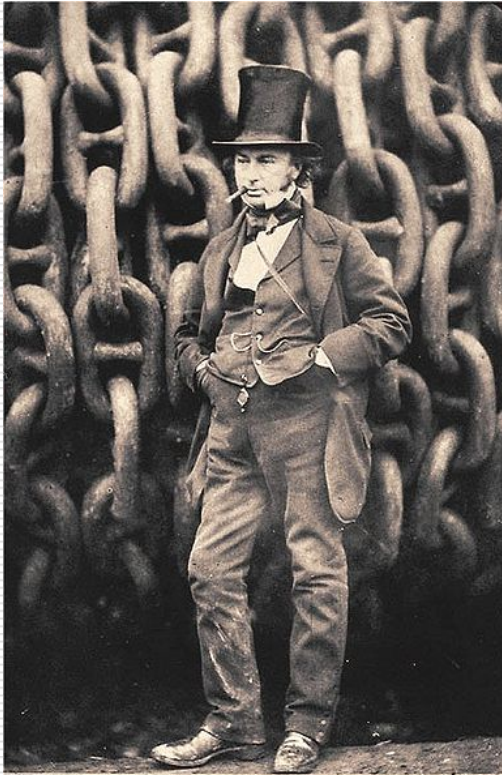
# Thomas Telford (1757-1834)

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# Isambrad Kingdom Brunel (1806-1859)

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# History

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- Project Management developed from several fields of application including civil construction, engineering, and heavy defense activity.
  
- Two progenitors of project management are:
  - Henry Gantt
  
  - Henri Fayol

# History

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- ❑ The 1950s marked the beginning of the modern Project Management era.
- ❑ Two project scheduling mathematical models were developed:
  - Critical Path Method (CPM).
  - Program Evaluation and Review Technique (PERT).
- ❑ These techniques were quickly adopted by many private enterprises.

# History

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- ❑ In 1956, the American Association of Cost Engineers was formed.
- ❑ AACE released the Total Cost Management Framework in 2006.
- ❑ The International Project Management Association (IPMA) was founded in Europe in 1967
- ❑ In 1969 the Project Management Institute (PMI) was formed in the US.
- ❑ In 1972 the Association for Project management (APM) was established.

# Lessons along the way

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- Planning & Scheduling
- Communication
- Culture

# Some good practice

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**WARNING CONTENT MAY OFFEND**

# Planning & Scheduling

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- There is still poor planning and scheduling today
  - Planners and schedulers are seen as, and in some cases are data inputters to a toolset.
  - There seems to be a lack of foundation scheduling understanding, basic principles.
  - Engineers, Designers, Planners and Schedulers do not tend to communicate to develop the schedule.
  - The schedule drives the majority of other techniques so is critical this is an accurate reflection on how the work is planned to be carried out.

# Communication

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- There still seems to be a problem with information flow through an organisation and its projects.
- Software now has the capability to reduce poor information flow, once an organisation has invested into it
- So where are we going wrong?
  - Are we not listening?
  - Are we not understanding?
  - Are we making sure everyone hears what they want to hear?

# Culture

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- Many organisations claim to have a 'Project Control' culture.
  - Yes some organisations do particularly in the US and Australia.
  - However, experience in the UK suggests there are elements of a culture in place.
    - Toolset; or
    - Process; or
    - Training; or
    - Metrics
  - Sometimes we get a combination helping towards a culture.



# My worries

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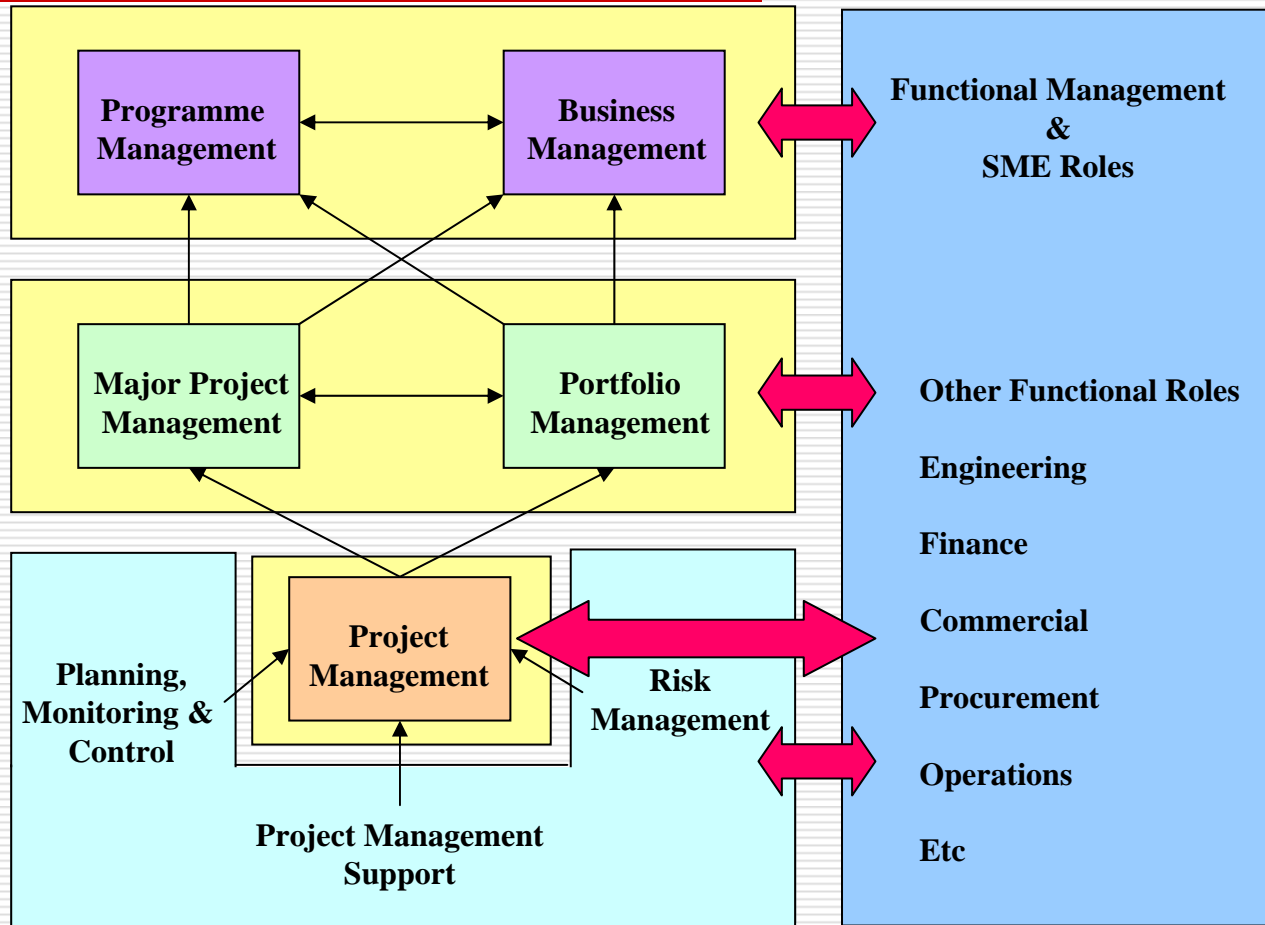
- The UK does not have as disciplined approach to contracting as some other continents
- Unless stated in the contract it is unlikely an organisation will invest in project controls
- Basic, core principles are being lost due to the advancement of technology
- Currently no Chartered Project Management/Project Control status available

# Lessons along the way

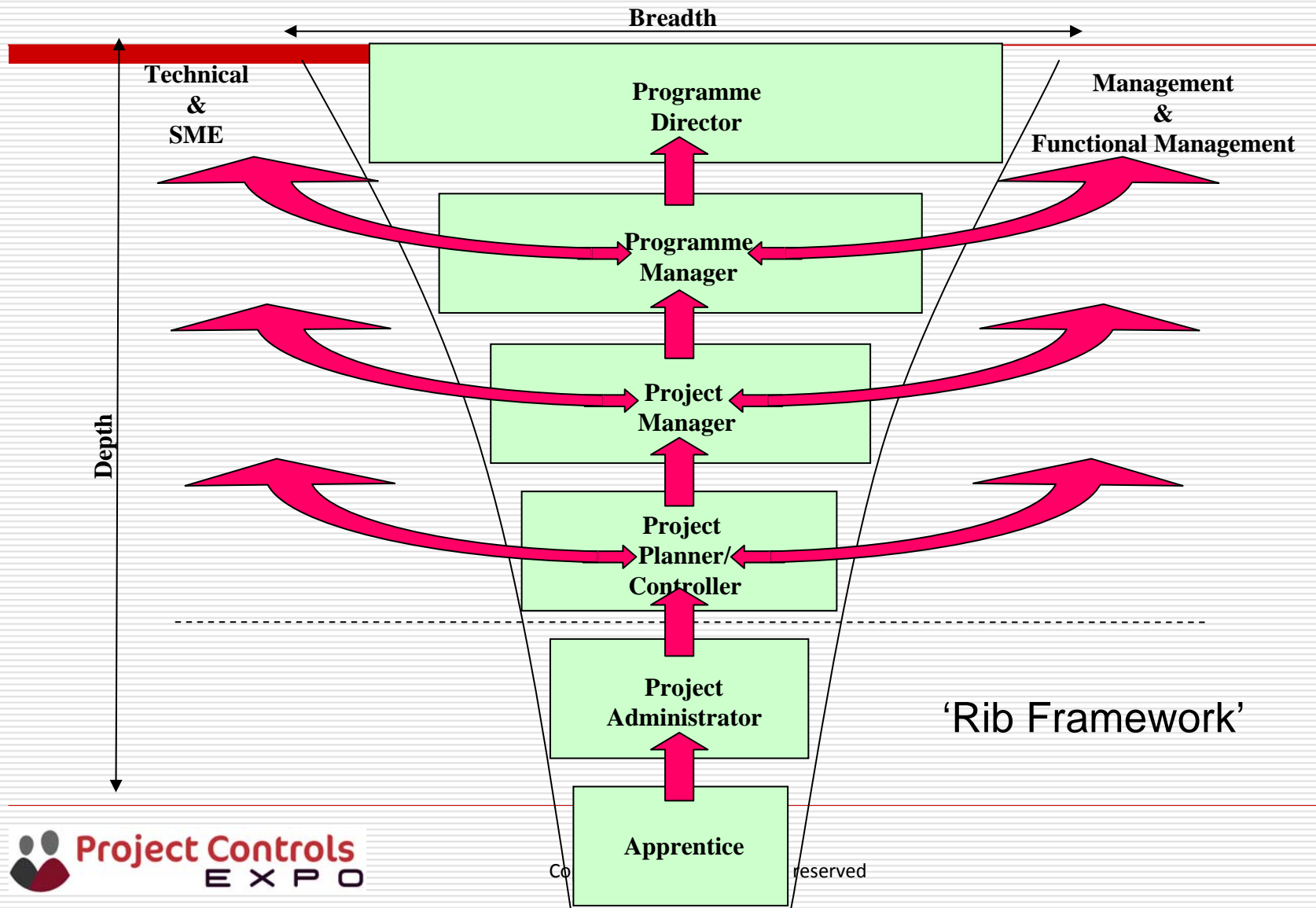
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**IT'S NOT ALL OFFENSIVE**

# Career Paths



# Career Development



# Competency Framework

**Knowledge and Experience**  
Individual carries out self assessment and validates with line Manager

**Current Role**  
Profile defined for current job role

**Progression Role**  
Typical profile for next progression role

**Information**  
Configuration information for individual

**BLUE**  
Current level is better than that required

**Competencies**  
Required to be effective in Project Management

**GREY**  
Current level is equivalent to that required

**Levels 1-4**  
Performance criteria for assessment against each competency

**RED**  
Current level is less than that required

Competency	Current Self Assessment				Levels Required for Current Role				Levels Required for Progression Role			
	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
<b>Context</b>												
Project Environment												
Req Management & Business Case												
Project Management												
Programme & Portfolio Management												
Close												
<b>Planning</b>												
Strategy & Plan												
National Design												
Order management												
Risk and Opportunity Management												
Quality Management												
Health Safety and Environment Management												
<b>PROJECT EXECUTION</b>												
3.0 Scope Definition Management												
3.1 Scope Definition Management												
3.2 Requirement Management												
3.3 Estimation												
3.4 Resource Management												
3.5 Risk Management												
3.6 Budget and Cost Management												
3.7 Procurement, Reporting & Issue Management												
3.8 Contract Value Management												
3.9 Configuration Management												
3.10 Change Control												
<b>PROJECT GOVERNANCE</b>												
Project Reviews												
Governance, Methods and Procedures												
<b>DISCIPLINES</b>												
Contract Management												
Management												
Planning												
Support												
Report												
Lead Sales												
<b>LEADERSHIP</b>												
Communication												
Teamwork & Delegation												
8.3 Leadership												
8.4 Conflict management												
8.5 Negotiation & Influencing												
8.6 Performance management												
8.7 Professional Behaviours												
8.8 Learning and development												
<b>OPERATIONAL</b>												
Operational Excellence												
Customer Support												
Performance - Project Close												
Business Planning (inc S&OP)												
Improvement												

# Integrated Processes

## Process Overview

## Process

## Lower Level Process

**Process Overview**

**What is it?**

"How to organise the work and resources to achieve the requirements of the project and authorise Control Account Managers to commence detailed planning"

Much of the organisation preparation will have been undertaken at the pre-contract stage. This stage deals with the process following the signature of the contract. From contract authorisation to start work, forming the project organisation, work to be undertaken, and setting up initial control account plans to allow subsequent detailed planning.

**What Does it do?**

- A Sales Order or series of Sales Orders will initiate the process to commence post-contract work developing the data used during tender bid and contract award. The result of this phase will be a series of initial Control Account Plans, providing the authorisation to undertake detailed planning.
- A project may comprise one contract or several individual contracts placed over a period of time, but each project can only have one Work Breakdown Structure. This structure must span all the individual contracts and is denoted as the Project Work Breakdown Structure. This is applicable whether the project is to be undertaken entirely by COU or in partnership with other companies.
- Each contract will have its own unique structure identified as a Work Breakdown Structure (WBS), each WBS will have an accompanying Dictionary to define the scope of work.
- All authorised work will be clearly defined using the framework of the WBS.
- The project organisation responsible for performing and accomplishing the authorised work will be identified, and is referred to as the Organisational Breakdown Structure (OBS).
- The WBS will be integrated with the OBS to establish the Responsibility Assignment Matrix (RAM) and to identify the primary management control points which control cost and schedule performance measurement. These are referred to as Control Accounts.
- The Control Accounts will be managed by members of the project organisation having direct responsibility for accomplishing the work and managerial control over those performing the work. This role is known as the Control Account Manager (CAM).
- Initial Control Account Plans will allocate defined Control Accounts with budgets to the appropriate Control Account Managers. This enables the team to commence planning to lower levels and also allows long-lead time work to begin. Ultimately, the formal set of Control Account Plans form the basis of the Performance Measurement Baseline.

**Who is involved?**

CAN	FIN
S	S

• Authorise, Advise, Approve, Administer or Other

• Lead or Co-Ordinate the effort required to produce or issue the WBS Process (Work Product)

• Provide Support (Data, Advice, Administrative or Other)

**Process Overview**

**Objective(s):**

**Participants and Responsibilities**

CAN	FIN	COOR	SCR	PH	PO	MD	CR
S	S	S	S	S	S	S	S

• Authorise, Approve, Verify or signature of formal authorisation required

• Lead or Co-ordinate the effort required to produce or issue the WBS Process (Work Product)

• Provide Support (Data, Advice, Administrative or Other)

**Process Summary**

This process activity sheet describes the preparation (or revision) of the Contract Work Breakdown Structure (WBS). The WBS provides a common manager framework for all programme management decisions, definition and authorisation of work, allocation of resources, and performance measurement against a contract. There is only one WBS for a contract and it must include all the authorised work.

A WBS facilitates a top down planning methodology that commences at the contract level and is progressively broken down into its components elements. It is a hierarchical product oriented breakdown of the contract that defines and divides the major items to be produced, relating them to each other and to the product.

**Process Steps and responsibilities**

**Entry Conditions**

- Authority to progress via Gate Review

**Inputs**

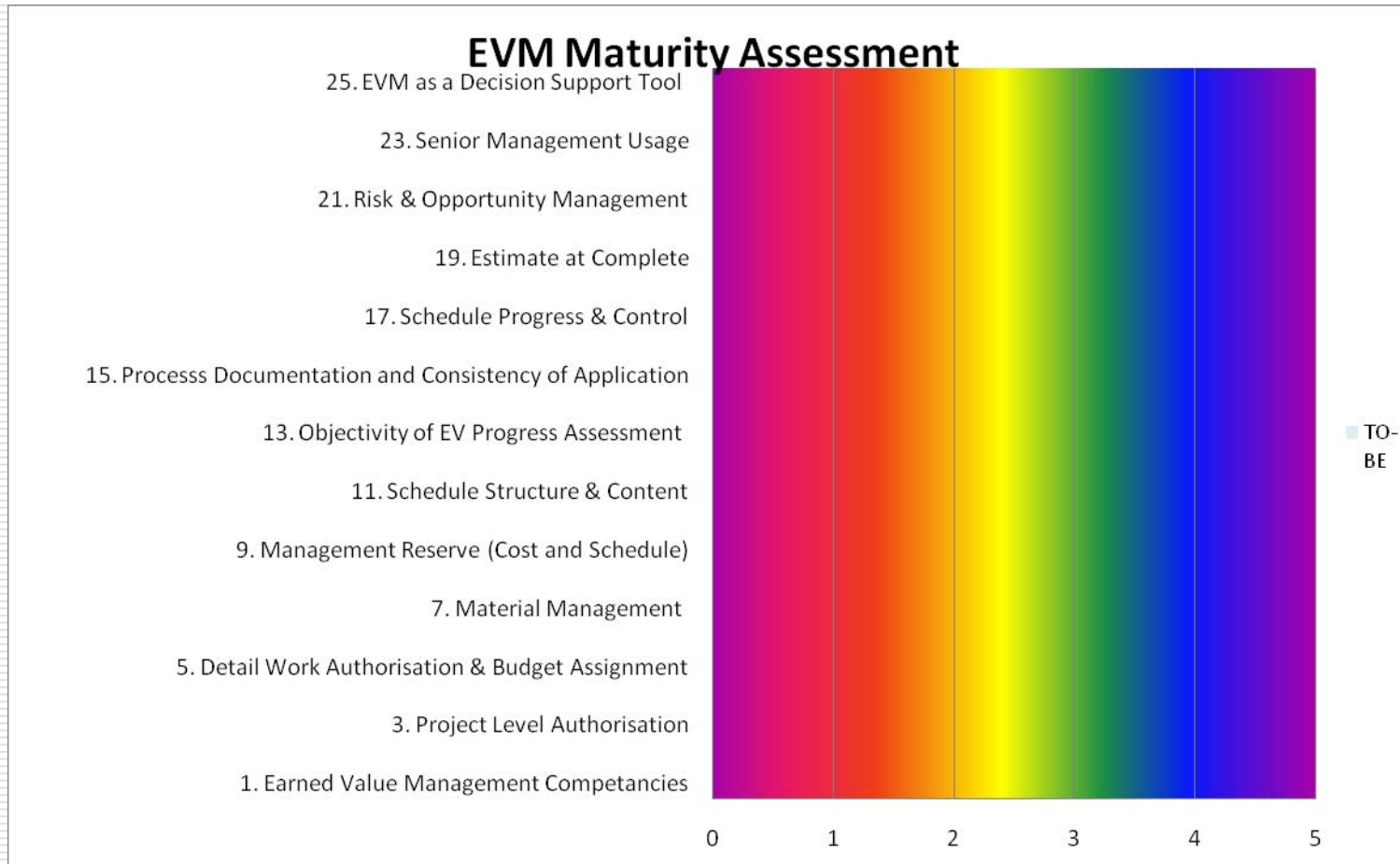
- Customer Documentation (Contract Terms & Conditions, Schedule, Technical Specification and the Statement of Requirements etc)
- Bid Material (Plan, WBS, Estimate)
- WBS Numbering Convention
- Sales Orders
- References to external standards

**Task / Task Description**

Task	Task Description	Player / Mechanism	Guide / Procedure
1.	Prepare the draft Level 2 Programme Work Breakdown Structure in accordance with the Project contract(s) and requirements. (Level 1 is programme level, Level 2 is the immediate breakdown beneath Level 1)	Project Organisation	WBS Guidance
2.	Review the Level 2 WBS and confirm acceptability	CAMS	

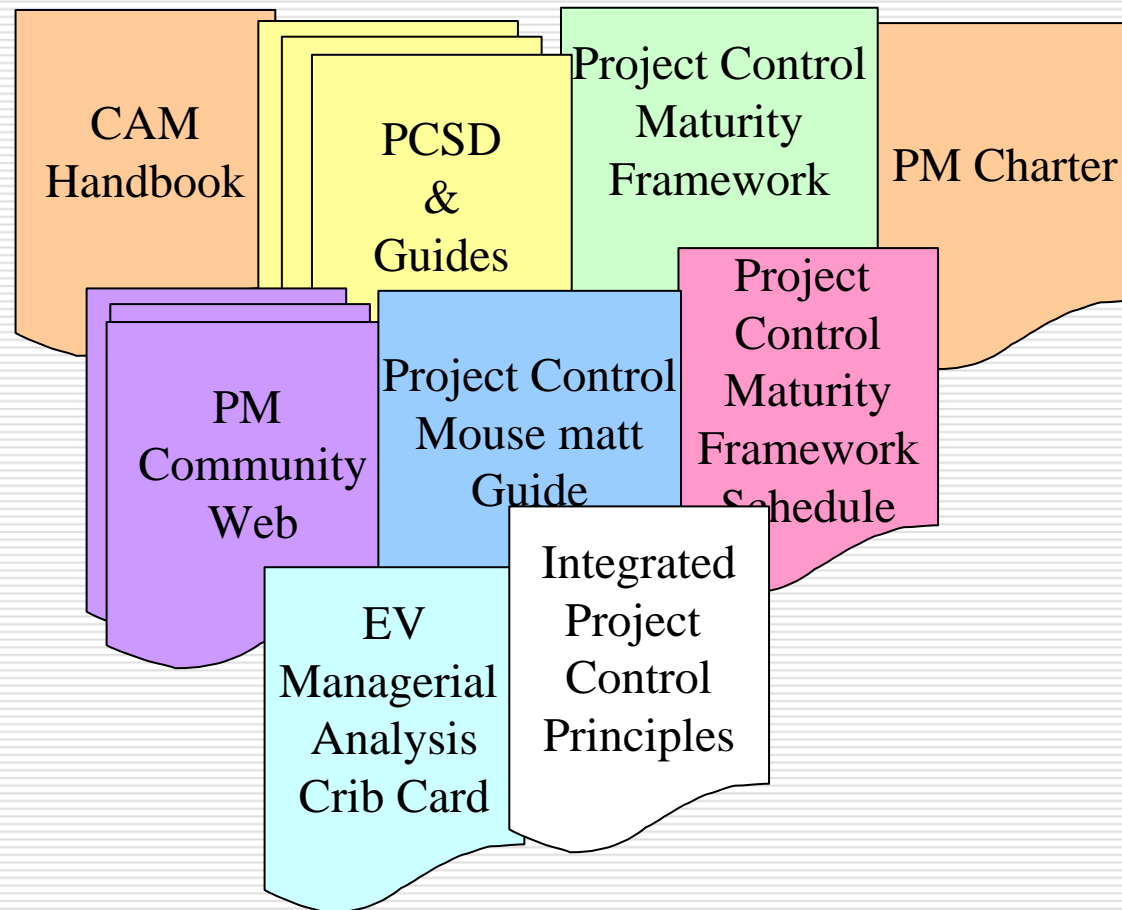
Develop the Level 2 WBS down to Control Account level (i.e. the level where elements of work

# Maturity Assessments



# Communication

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# Training

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- Process & Toolset
  - E-Learning
  - Simulation workshops
  - General Overview Material
  - Mentoring
  - Coaching/ 1-2-1 guidance

# What's in store for the future?

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- Integrate Design, Engineering and Project Control together
- Enable more accurate and realistic % complete claims via mobile devices
- Enable corporate social type networking
- Specialist outsourcing and remote working will become more common
- Simulation and e-learning type training becoming more available

# Integrate Design, Engineering and Project Control together

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- ❑ In September 2009 Paul Morrell provided a report on the potential future use of BIM.
- ❑ The final report was presented in March 2011
- ❑ The Government Construction Strategy was published by the Cabinet office on 31 May 2011.
- ❑ The report announced the Governments intention to require BIM on its projects by 2016.

# Software

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- There is already existing software products on the market ready to support BIM, on such product is Costos:
  - Makes full use of all the benefits you can get by using the 3D model of your project
  - The quantity takeoff of your project can be massively accelerated and the accuracy you can achieve is unprecedented.
  - Create your Bill of Quantities directly on your 3D model and see how it is built up while your estimate progresses.

# Material Auto Select

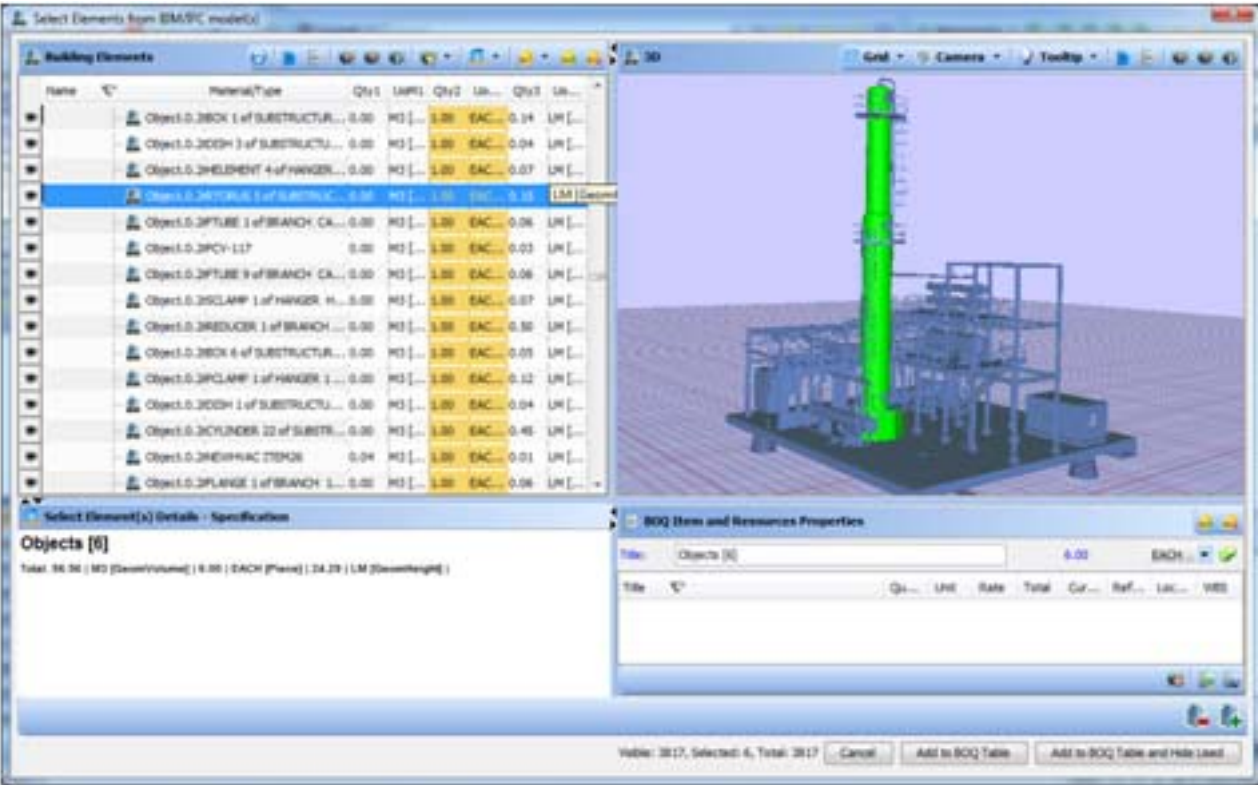
The screenshot displays a software interface for selecting elements from a BIM/IFC model. The main window is titled "Select Elements from BIM/IFC model(s)". It features a 3D view of a building structure on the right and a table of model elements on the left. The table lists various air terminal components, including their names, material types, and quantities. Below the table, there is a section for "BOQ Item and Resources Properties" which shows the selected item's details and a summary table.

Name	Material/Type	Qty1	UoM1	Qty2	UoM2	Qty3	UoM3
<b>Dds_BardHa.Ifc</b>							
<b>Air Terminals</b>							
1.10.4	GV2007	0.10	M3 [...]	163.00	EAC...	0.00	
1.12.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.13.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.14.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.15.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.16.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.17.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.18.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.19.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	
1.22.4	GV2007	0.10	M3 [...]	1.00	EAC...	0.00	

Title	Quantity	Unit	Rate	Total	Currency	Reference	Location	WBS 1	W...
<b>Assemblies [EACH]</b>									
Air terminal and base, copper, 1/2" dia x 12", over 75' h	163.00	EACH	101.30	16,511.90	USD	RSMEANS	Building.b.1.1	3 - AIR TERMINALS	

# Estimating



# Real-time Cost Viewer

The screenshot displays a software interface for viewing BIM/IFC models in real-time. The interface is divided into three main sections:

- Model Elements:** A table listing various building components and their properties.
- 3D View:** A 3D rendering of a building model with a tooltip for a selected element.
- BOQ Item and Resources Properties:** A table showing the Bill of Materials (BOQ) for the selected element.

**Model Elements Table:**

Name	Material/Type	Qty1	UoM1	Qty2	UoM2	Qty3	UoM3
Stütze-001	Reinforced Concrete	0.03	M2	0.08	M3	2.70	LM
Doors		178.92	M2	77.00	EAC	493.80	LM
Furniture		125.93	M3	253.00	EAC	161.60	LM
Railings		0.43	M2	12.00	EAC	9.60	LM
Roofs		682.62	M2	261.93	M3	734.90	LM
Slabs		2,56...	M2	769.94	M3	575.00	LM
Decke-001	Reinforced Concrete 300 ...	528.36	M2	158.51	M3	120.00	LM
Decke-001	Reinforced Concrete 300 ...	521.36	M2	156.41	M3	119.00	LM
Decke-002	Reinforced Concrete 300 ...	500.36	M2	150.11	M3	112.00	LM
Decke-002	Reinforced Concrete 300 ...	516.00	M2	154.80	M3	112.00	LM
Decke-002	Reinforced Concrete 300 ...	500.36	M2	150.11	M3	112.00	LM

**3D View Tooltip (Decke-001):**

- GeomVolume: 158.51 M3
- GeomArea: 528.36 M2
- Perimeter: 120.00 LM
- Type: Reinforced Concrete
- Material: Reinforced Concrete 300 mm

**BOQ Item and Resources Properties Table:**

Title	Quantity	Unit	Rate	Total	Currency	Reference	Location	WBS 1	WBS 2
Assemblies [M3]									
Beam casings; Columns	770.10	M3	140.53	108,222.72	GBP	SPON	Buerogebe...		
Reinforced in situ ready mixed designated concrete; Isolated foundations	770.10	M3	102.76	79,135.89	GBP	SPON	Buerogebe...		

Visible: 699, Selected: 7, Total: 699

Buttons: Close, Add to BOQ Table, Add to BOQ Table and Hide Used

# Visual Cost Reporting

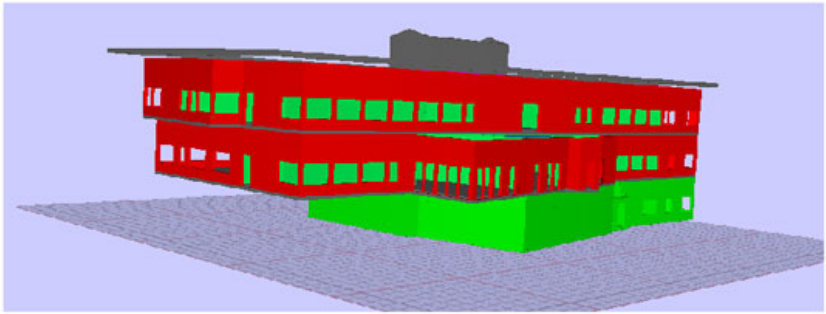
Project 3D Cost Visualization Report - Print Preview

File Navigation Zoom Help

100%

Project 3D Cost Visualization Report 26-Nov-2010

### Basement Cost Visualization



Offered Price: € 170,039.30, Total Cost: € 144,533.41

Code	Title	Quantity	Unit	Rate	Markup	Offered Rate	Total Cost	Offered Price
10	Work: 337 average thick, tapering, one side	3,845.16	M2	110.09	74.80521	129.52	€ 422,762.87	€ 497,368.08
20	Plan in situ, ready-mixed designated concrete, isolated foundations	404.04	M3	102.10	7,279.90	120.12	€ 41,262.74	€ 48,532.64
30	Work to floor, over 300 mm wide: 150 mm x 150 mm x 12.50 mm thick, hatched/iron	1,896.63	M2	47.61	15,935.07	56.01	€ 90,268.72	€ 106,233.79
50	2" SS 304L SS PIPE, INSIDE, COMP TNL	517.88	LM	37.46	3,423.68	44.07	€ 19,400.87	€ 22,824.55

CostOS Estimating Report System © New Open Mind Technologies

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# Simulation, e-learning and WebEx class

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- Project Control simulation training is also available which is more interactive and closer to a practical experience of learning.
- There is already a multitude of E-learning providers and many organisations have already taken this route.
- WebEx class training

# Enable more accurate and realistic % complete claims via mobile devices

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- An Engineer completes their task, takes a picture and sends it through to the planner/scheduler:
  - Reduces the need for the planner/scheduler to 'chase up' the engineers input
  - Could provide 'real time' progress of the project
  - Mobile devices also allow for sharing the schedule across multiple stakeholders in multiple locations

# Enable corporate social type networking

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- Sharing experiences of programmes on a live interaction
- Communicating with other Project Control staff and learning more about the organisation
- Instant messaging to pose questions or help to solve a problem

# Index

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- ❑ <http://www.prendo.com/simulations/project-control-schola/>
- ❑ <http://www.nomitech.eu/cms/en/c/index.html>
- ❑ Body of Knowledge 5th edition, Association for Project Management, 2006
- ❑ David I. Cleland, Roland Gareis (2006). *Global project management handbook*. "Chapter 1: "The evolution of project management". McGraw-Hill Professional, 2006
- ❑ Own texts and developments