



# Project Controls

E X P O

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## Project Controls Expo – 16<sup>th</sup> Nov 2016 Emirates Stadium, London

### Blazing the project controls skills trail

Presented By :

Shane Forth, PMO Director, Oil and Gas, Costain

Catherine Lambert, Product Development Manager, ECITB



Project Controls  
E X P O

# Introducing Shane and Catherine

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**Shane Forth, PMO Director at Costain** has 40 years' experience in Oil & Gas, Nuclear and Power & Process industries. A Fellow of both APM and ACostE and an MSP Registered Practitioner, Shane has an MSc in Project Management from the University of Manchester where he won the Stephen Wearne award for best overall performance followed by national acclaim, winning the APM Geoffrey Trimble award for best Master's post-graduate dissertation. For the last 24 years Shane has provided strategic and functional leadership in Project Management and Controls to major organisations including Costain, AMEC, and Whessoe

**Catherine Lambert at ECITB (Engineering Construction Industry Training Board)** supports the successful, pro-active Industry-wide Project Controls Working Group which has developed quality Vocational Qualifications, comprehensive training standards and an apprenticeship that together provide a training pathway for future project controllers to use to develop a successful career.

# Blazing the project controls skills trail

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## Topic Outline

- Ensuring that we can keep the lights on, heat our homes, provide clean water and travel safely from A to B requires the successful delivery of complex projects involving millions of work-hours and billions of pounds of capital investment.
- Successful project controls is a vital part of delivering this
- Historically there has been:
  1. a lack of technical project controllers
  2. an over-dependence on the use of software to 'control'
  3. a lack of awareness of project controls as a profession
  4. a need to raise the 'standing' of project controls
- 10 years ago, companies joined together to resolve this – to blaze a trail for project controls training and recognition for this essential profession.

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# Blazing the project controls skills trail

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## The challenge

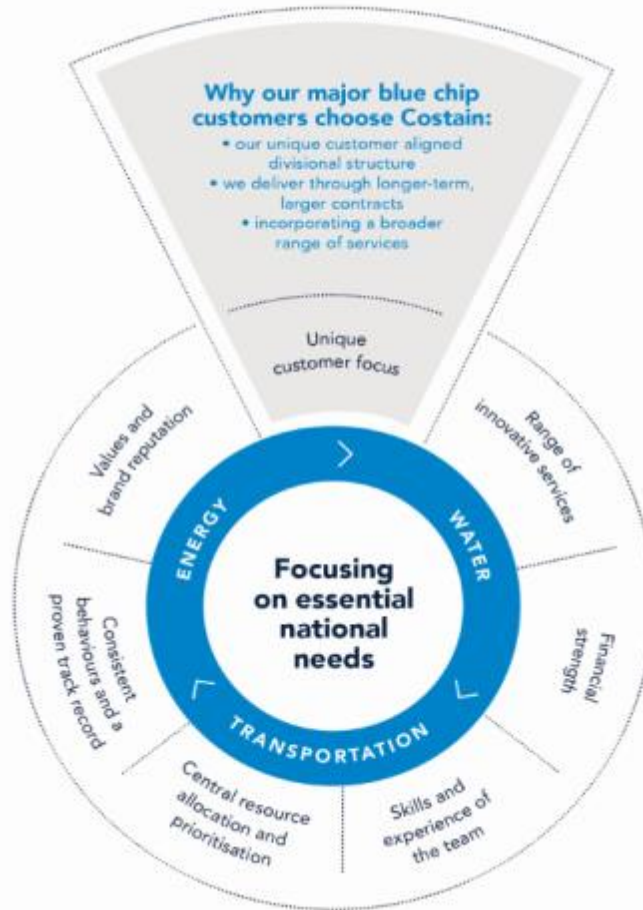
- Emergence of Project Controls Skills Gap - Mid-1990s
- The skills gap
- Rotten bananas – software jockeys
- Causes and Determinants of the Project Controls Skills Gap
- Highlighting the issue: Government reports in this decade

## The actions

- Industry Project Controls Working Group
- 2007: Modern apprenticeship
- Nationally recognised qualifications:
  - Certificate in project controls
  - Vocational qualifications
- Comprehensive training standards
- Trailblazer Apprenticeship standard
  - Development
  - Benefits
  - 2017 launch
- Driving forwards:
  - Higher Apprenticeship at Level 5 or 6
  - Professional accreditation
  - Raising the profile
- Let's work together

# Introducing Costain

Costain [www.costain.com](http://www.costain.com)



Securing a future energy supply...



...maintaining a safe and reliable water supply



...upgrading the transport infrastructure

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## Introducing ECITB



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The ECITB is the statutory skills body for the engineering construction industry in Great Britain. It works closely with employers and the Government to attract, develop and qualify engineering construction personnel to the highest standards, via Employer-led, the ECITB invests £30m a year in providing businesses to train the engineers and:

- Sets industry standards for competence and health & safety
- Works with a wide range of stakeholders
- Is building a sustainable and competitive workforce for the future.
- Has a regionally based network of 172 approved training providers.
- Quality assures training and qualifications.
- Defines and maintains the industry's occupational standards.
- Is accredited as an Awarding Organisation by the Office of the Qualifications and Examinations Regulator and the Scottish Qualifications Authority for the delivery of vocational qualifications.
- Represent the industry's skills needs to Government.

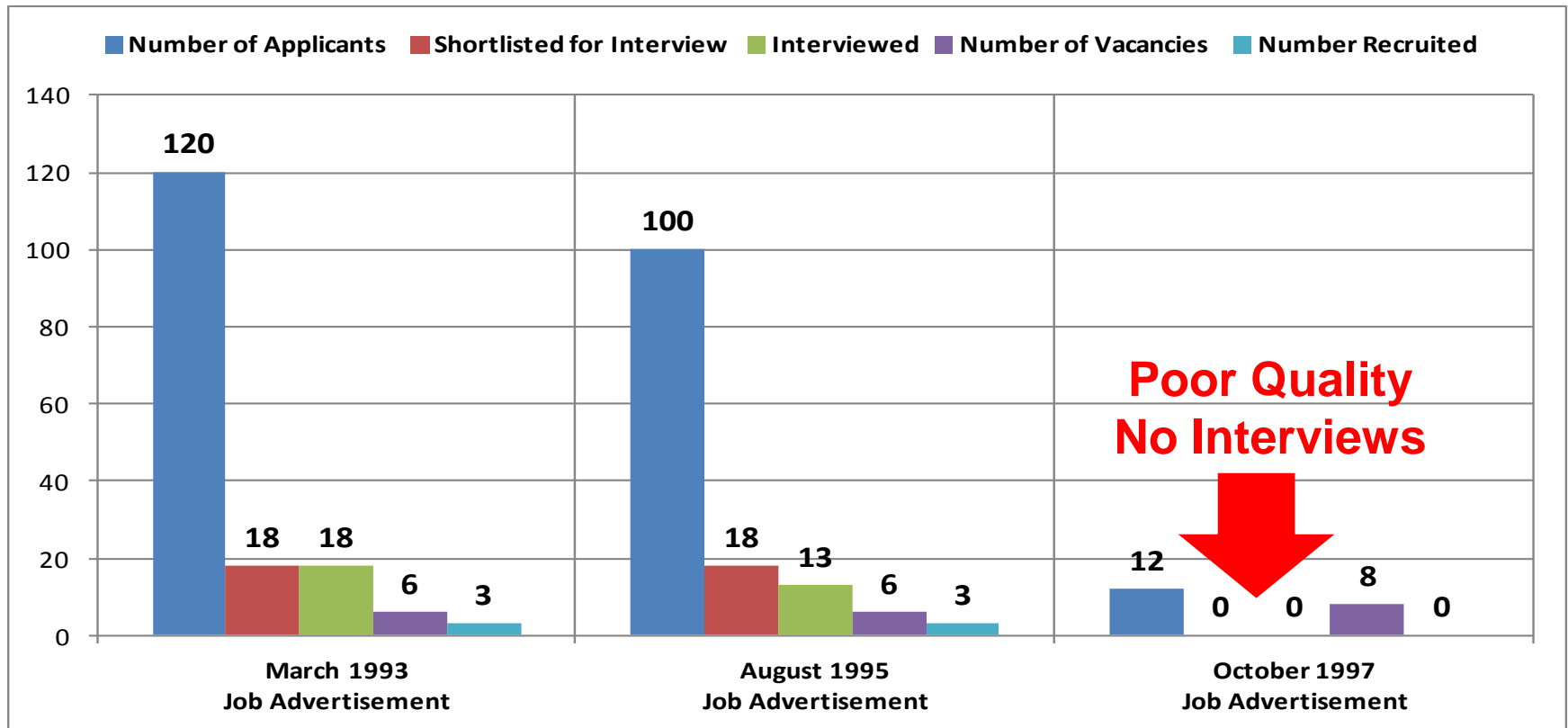
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## Emergence of project controls skills gap, mid-1990s

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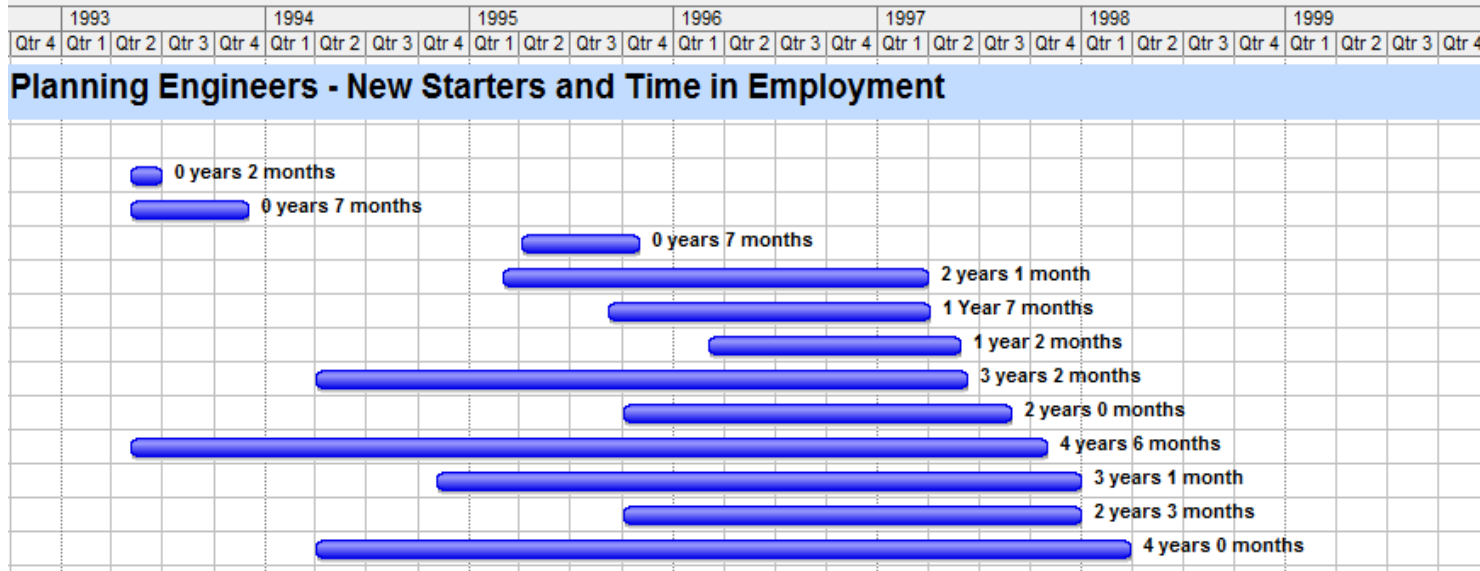
- In the late 1980s and early 1990s, planning engineers were mostly former construction engineers and used traditional manual methods.
- Planning engineers were considered as only needed to satisfy the client - not a priority at a time when relationships were very adversarial.
- Client' had become 'leaner and fitter' - invitations to tender (ITT's) were asking contractors to use computers and project management software **(Cost of this and associated training was £10k per planning engineer)**
- Uncomfortable with the new technology, management felt that the new and additional cost was expensive, unnecessary and made the business uncompetitive when bidding for work.
- By the mid 1990s the use of project management software for project planning had been somewhat reluctantly accepted as the norm.
- A shortage of suitably skilled planning engineers with a mix of the traditional and new skills, and difficulty attracting and retaining them was becoming increasingly evident

# Emergence of project controls skills gap, mid-1990s





# Emergence of project controls skills gap, mid-1990s



## Retaining new starters proved almost impossible through the 1990s

- Between 1993-1996 I recruited 12 permanent staff planning engineers
- They had all left for agency positions by early 1998
- Average time in employment was only 2 years 1 month
- Nine handed in their notice in 1997, a staff turnover rate of 50%**

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## Project controls skills gap

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In June 2001 a research project sponsored by the DTI produced the following report:

***“An evaluation of the projected future evolution of the workforce and key skills needs within the engineering contractors sector of the Oil Gas and Chemical Industry”***

Input to the report was from 21 companies including Air Products, AMEC, Bechtel, CEL, Costain, Fluor, Foster Wheeler, Halliburton, Jacobs, MW Kellogg, Kvaerner, Parsons, Simon Carves, Stone & Webster

**Main findings with respect to project controls were:**

- The most frequently occurring current vacancies included **Project Planning/Control**
- Hard to fill agency vacancies included **Planning Engineers** and **Quantity Surveyors**
- Vacancies which had existed for 12 months + included **Planning & Cost Engineers**
- **Senior Planners** are valuable resources not readily available from the external market
- There is an urgent need to develop these particular skills and plan for succession throughout the organisation
- There were demographic problems due to previous downturns

**Main problem was not enough suitably skilled people**

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## Project controls skills gap

### Critics can't find the logic in many of today's CPM schedules

*Users want software with flexibility, but is it true CPM?*

- ENR, May 2003, reported on a meeting at which four scheduling experts lamented the state of scheduling and what they saw as widespread abuse of powerful software to produce badly flawed schedules, that look good but lack mathematical coherence or common sense. They described this as:
- The article included a quote from Russell J. Lewton, construction manager for the Weitz Co LLC, Des Moines:

*'Among the young guys, computers have made it easy to slap together something that looks right, but there is a thought process that must be involved, and it is hard to tell in many contemporary schedules if the thinking has happened or not.'*



Korman et al (2003)

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## Project controls skills gap

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### ***'Rotten bananas in a Software Paradise***



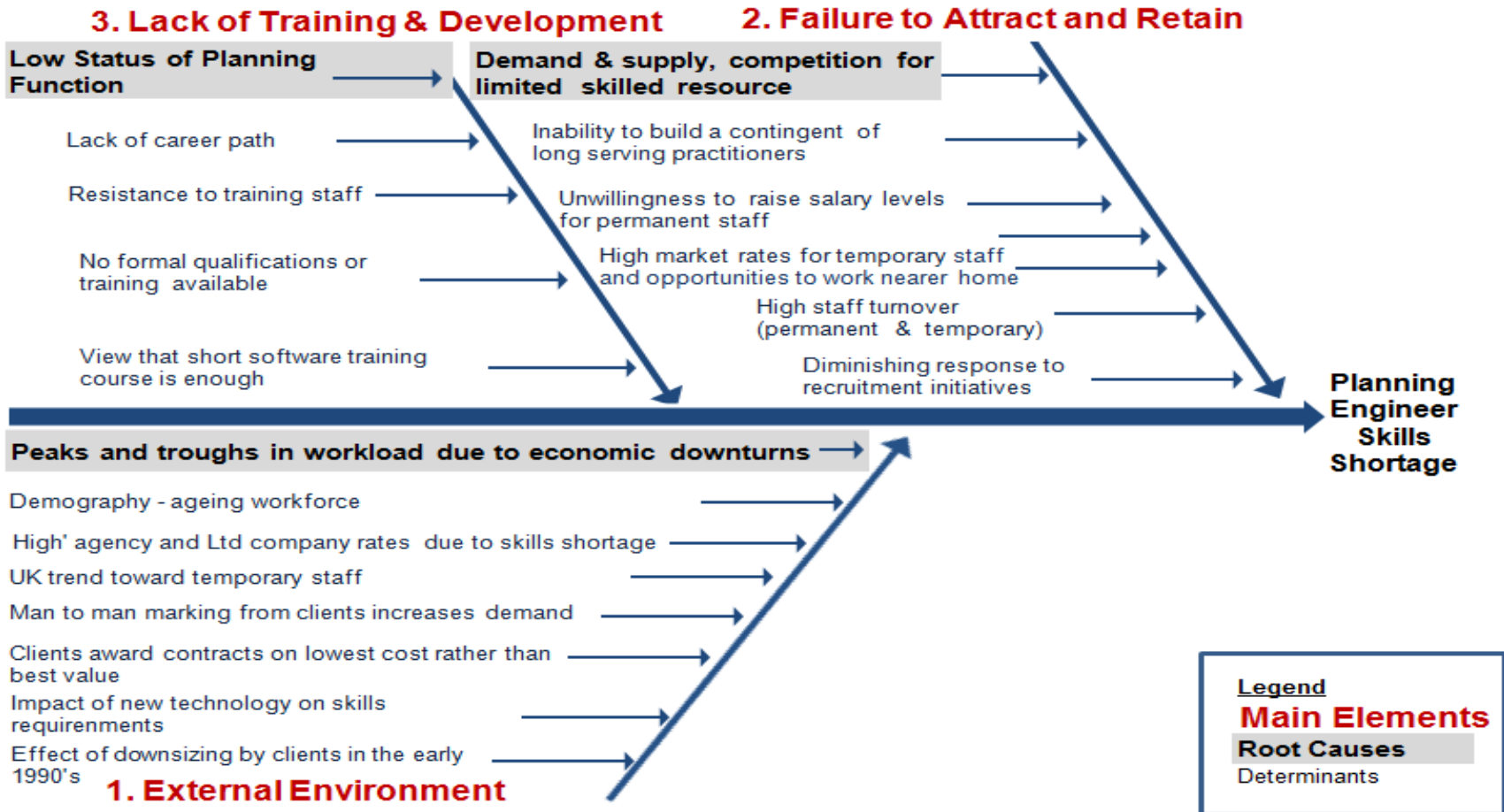
*We might liken the current condition of schedule analyses to fruit we buy at the market. We have all had the experience of buying fruit that looks to be in excellent condition, only to get home and find it is rotten to the core. In the era of Enron we have seen this trend carry over to accounting reports not worth the paper on which they are written.*

*Unfortunately the field of construction planning today presents a landscape that is littered with too many 'rotten banana' schedules. Whilst the majority of schedules in use today present tools for planning and scheduling projects, too many of today's schedules fall into the 'rotten bananas' category.*

*Frequently these 'rotten banana' schedules appear to be in excellent condition from the outside. However when we look at the actual content of these documents and files, we find that the schedules are flawed, if not useless.*

Wickwire et al, 2003

# Causes and determinants of the project controls skills gap

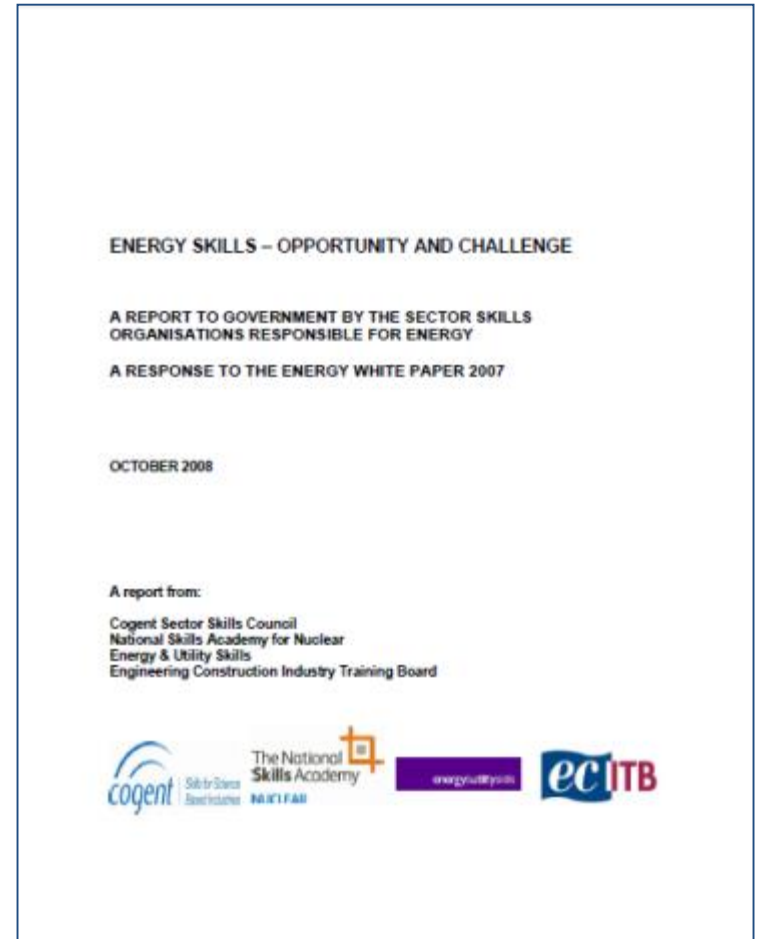


## Government reports: a wakeup call for industry

***‘Energy Skills, Opportunity and Challenge’.***  
(Cogent Sector Skills Council et al, 2008)

***‘Experienced project planning and control professionals are also in short supply with a shift to self-employed status for these people’***

***‘New qualifications and apprenticeship programmes have been developed by the ECITB to address the problem. However, additional investment is needed to build capacity in the training providers more quickly’***

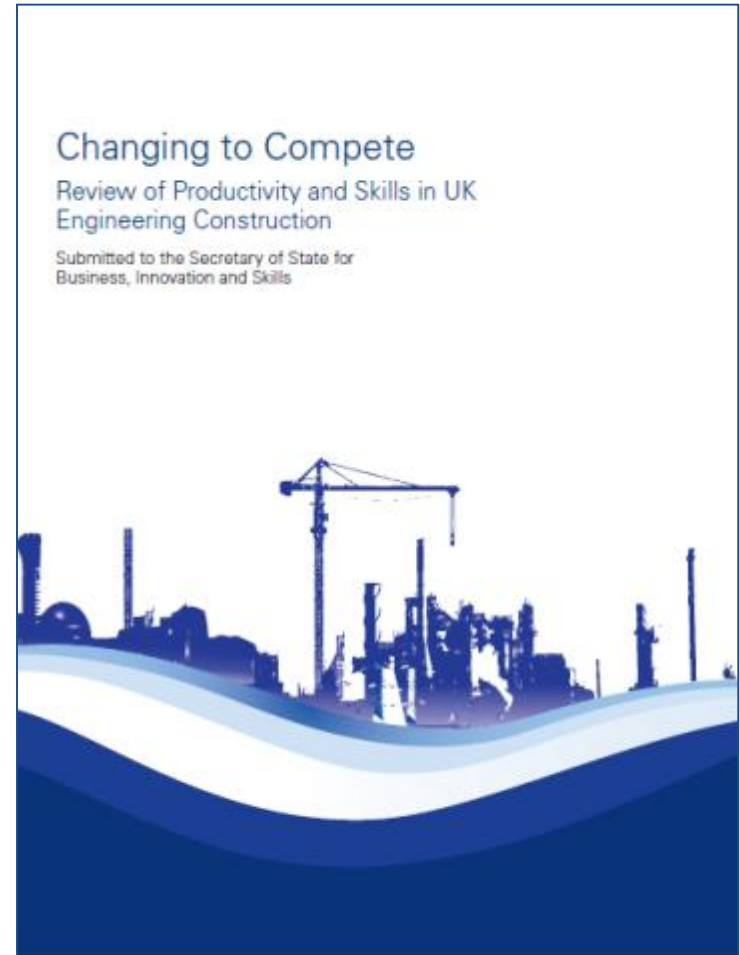




## Government reports: a wakeup call for industry

**‘Changing to Compete’** (Gibson, 2009) a review of UK productivity and skills in the Engineering and Construction industry, produced for the UK governments Department of Innovation, Universities and Skills (DIUS)

***‘There are, however, concerns about the quality and number of supervisory staff available as well as the availability of some craft trades, experienced planners and project managers’. ... ‘current shortages seem particularly to be an issue in project management, planning, engineering design and high quality welding’***



# Action: an industry project controls working group (PCWG)



In September 2002, BCECA Project Control Managers Committee was formed at the request of member companies HR departments to find a solution to the shortage of project controls staff and discuss whether a combined effort on training new staff would be useful.

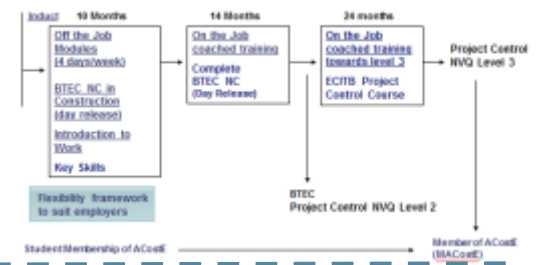


## National Working Group June 2006 to July 2007



- Developed national apprenticeship framework
- Obtained government funding for employers
- Developed support material for in company training at NVQ Level 3 (graduates)
- Unable to source development and delivery "Off the Job" Project Control training in South East

### 4 Years



## North East Working Group March 2007 to July 2008



- Recruitment of apprentices
- Innovative and collaborative approach
- Development of Off the Job training material and review by employers
- Development of On the job training material (project control workbooks) and review by employers
- Training of employers line managers (coaches)
- Specified requirements for development of Foundation Degree (FdSc)
- Publicity including major launch event

The main aim of these workbooks was to create the industry standard...

It focuses the vehicles with signatories...

It is a list of tasks and activities to be completed by the apprentice...

**Assignment G2 - scheduling practice**

The assignment requires you to create a Gantt chart for the project...

1. Identify the activities and their durations...

2. Draw the network diagram...

3. Calculate the early start, early finish, late start, and late finish for each activity...

4. Calculate the float for each activity...

5. Identify the critical path...





# Action: 1<sup>st</sup> Project controls apprenticeship (2007)

## ECITB DEVELOPMENT UPDATE

### MEETING A NEED NEW PROJECT CONTROL QUALIFICATION

The ECITB has launched a pilot Project Control Apprenticeship scheme to address skills shortages in this area. In September, 25 employed status learners in the North East began working towards their Project Control NVQ Level 2 - they'll complete an HNC/3 in Project Control Support and a BTEC National Certificate in Construction as the way.

Andy Brown is involved in Product Development & Occupational Standards for the ECITB. "There's a definite need to create a clear route to Chartered/Overseas status. After the ECITB launched the National Occupational Standards in Project Control and the Level 2 and 3 qualifications two years ago, the industry requested entry level qualifications. So we did a bit of work to develop the new Project Control Support National Occupational Standards and a Level 2 qualification. Realisation of the learners is the result of a huge effort and commitment by companies with offices in the North East who have worked together to generate this programme."

The ECITB's Head of Apprenticeship Programmes, Ian Fowell, said, "This is an excellent example of how the ECITB responds to the needs of the industry. Support within the industry was vital to this."

Apprentices on the pilot scheme are employed by AMEC, Alan Thomas, Siemens UK and K House International from Toronto, as well as Alpha Plus from Yorkshire & Manchester who have committed employees to the programme.

AMEC Project Control Manager Shane North has recently completed three years as Vice President of the Association of Cost Engineers and also sits on the panel of ECCE, so he is fully aware of the benefits of taking on and training school leavers and the need for the continued development of its Project Control Managers. "Companies have clearly recognised the need to recruit new, and train and develop existing, project control staff to perform the planning, estimating and cost control functions and help ensure the successful delivery of ongoing and future projects."



### project control

## The North East launch of Project Control support standards and Level 2 NVQs

by Nigel Hibbard\*

The North East launch of the Project Control Level 2 NVQ and associated project support standards took place at Darlington Football Club in October and was enthusiastically attended by around 80 people.

During the stimulating seminar the importance of the Project Control NVQ Levels 2, 3 & 4 qualifications to UK plc, became clear when it emerged that the level of expenditure on new plant in the process industry in the North East alone through to 2015 will give rise to 16,000 new jobs, many of which will be in the project control disciplines.

There has been less of an emphasis on science and maths-based subjects in colleges over the last decade, mainly because of the broad-optimisations of the process-industry big players. This state of affairs has been further compromised by a frequently changing Government funding strategy for further education. The challenge now is to provide people with the skills that are needed by industry.

The general feeling is that the Level 2 & 3 NVQs and similar occupational qualifications are closer to what industry needs, and are a pragmatic way of providing the currently available labour force with the required skills. The big concern now is whether there will be a sufficient uptake in training capacity in time to meet the process industries' urgent needs.

Using the North East position as a yardstick, there will be 80,000 additional jobs required in the UK process industry by 2015, a significant proportion of which will require project control skills.

The launch seminar was chaired by Robin Davidson of Workstation Management Services Ltd who in his introduction highlighted that:



The speakers (left to right): Robin Davidson, Nigel Spencer, Al Loughran, Andy Brown, Richard Dodd, Shane North, Howard Mullison

- all major capital programmes had been controlled using project control methodology for the last 10 to 15 years;
- the methodology had grown up and matured in the oil and gas sector, before branching out into other industries;
- industry now suffers from too many 'grey heads' and it was felt the Level 2 would be a vehicle to attract younger people in order to improve the project control engineer's age profile.

Richard Dodd, ECITB (Standard-setting body) project manager for delivery of the new standards, outlined his feedback from the Level 3 & 4 Launch in 2005 had identified UK industries' requirement to provide a visible career path for the project control profession, with the opportunity to start people straight out of school or convert craft technicians into the profession. This clearly marked career path would encourage people to stay within the profession and develop through to chartered or

certified status. The new Level 2 qualification provides the entry point.

Richard related how, in the first place, he had to obtain funding from SEDA/QCA, assemble a team of cross-sector project control professionals and representation from the ACofE (the professional body for project control), deliver the standards, gain approval of the standards, and then develop the subsequent qualification package. The qualification gained accreditation in August of last year. Richard also highlighted a number of observations that could be made of all the NVQ standards and qualification structures and stressed that, whilst ECITB are the custodians of the standards, they and the qualification structure are in the public domain.

The standard Level 2 standards and qualification consist of 13 units. The qualification requires 11 (8 mandatory) to be completed using the assessment of evidence, each unit being made up of Performance, Scenario Knowledge criteria, all of which must be demonstrated by the evidence.

Nigel Spencer, Head of ECITB's



The Project Control apprentices after receiving their Award Student Membership Certificates at the North East launch

Employment status, via the ACofE. What ACofE is trying to do is to build the link between the NVQ programme and Chartered status: this was the focus of Howard's presentation.

Dr Stan Higgins of NERC (North East Process Industries Cluster) gave a very upbeat picture of the North East process industries' current status, noting that a forecast of growth for five years ago had been largely met, with recent turnover exceeding this year. Project control people will be needed directly within the industry and to supply those businesses that the NVQ is key to giving the industry the quality of services and skills needed to

run of employment in areas where work permits were hard to get. In this instance, a well-qualified resource will always be preferred, and if the skills are underpinned using the NVQ framework, it gives real strength and validity to that individual's capability and credibility.

More launch seminars are planned in 2008 in the North West, London and the South and possibly one in Scotland. These will be aimed at enabling feedback from the Apprenticeship Programme in the North East.

### Seminar sponsors (in sequence of appearance)

ACofE: the project control learned body. Tel: 01230 164 798, Lee Stone, 5 Midlewick Road, Sandbach, Cheshire, CH11 1 3L. [www.acofe.org.uk](http://www.acofe.org.uk)

PRIME: the project control NVQ and standards user group, an ACofE 500, and supporter of the seminar. Tel: 01810 345 423. Contact via the ACofE or [www.prowac.org.uk](http://www.prowac.org.uk)

ECITB Standards and Awards: the sector skills council for the engineering and construction industry. Tel: 01923 260 000. Blue Coat, Kings Langley, Herts. [www.ecitb.org.uk](http://www.ecitb.org.uk)

AMEC INDUSTRIAL: a major supplier of

300 apprentices  
100 currently  
enrolled

## Action: ECITB Certificate in Project Controls



### ECITB Offshore Project Control Programme

- Adapted learning from the apprenticeship programme
- Pilot: Up to 16 attendees from AMEC, Wood Group, Petrofac and PSN (typically Graduates with 3-4 years experience)
- 9 modules (based on PC Apprenticeship scheme, but with more complex project scenario)
- Individual assignment and group assignments

- Evolved and improved
- Thorough introduction to project controls through assignments and practical case study work

TO DATE

500 learners

64 companies



### In development

- Nuclear sector companies in PCWG
- Jointly developing a tailored version for project controllers working in nuclear

# Companies galvanised into action (2012)

Threat of withdrawal of qualifications

Skills gap still persists

Project Controls Working Group (PCWG) reformed and reinvigorated

1. Agreed a definition of project controls occupation
2. Identified a career pathway
3. Agreed main competencies
4. Updated the vocational qualifications
5. Developed comprehensive training standards
6. Started to raise the profile of available training:
  - Articles in project controls professional
  - Case studies into career map



## Gaps, needs and solutions: industry perspectives on planning

by Dr Rachel Odams, Head of Corporate Affairs, ECITB

didn't realise there was such a skills shortage: 1. LACK OF TRAINING & DEVELOPMENT 2. FAILURE TO ATTRACT AND RETAIN

### education & training

Standards and skills – addressing future education & training needs of professional project controllers

by Dr Rai

ECITB

A training, it

## Developing tomorrow's talent

Industry collaborates to create new vocational pathway for project controllers

by Catherine Lambert, Engineering Construction Industry Training Board (ECITB)

Managers in the engineering construction industry know the critical importance of planning and project controls to the success of projects. The costs associated with project controls have risen significantly in recent years. People have registered for the Project Controls Apprenticeship, giving a major boost to the engineering and construction industry. Last year saw a record 63 registrations in three new Honing the vocational route ECITB Certificate in Project Controls This ECITB Certificate covers all aspects of project controls. This is a City & Guilds certificated programme.

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## PCWG agree robust vocational qualifications

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- Industry-led working group reviewed and updated the national VQs
- Refreshed and technically focused these VQs prove competence in the work place
- The candidate
  - must provide a portfolio of “evidence’ i.e. work related examples
  - Is assessed externally by suitably experienced assessors

### VOCATIONAL QUALIFICATIONS

Nationally recognised QCF diplomas that give evidence of your competence and knowledge. Developed jointly with companies, these vocational qualifications test an employee’s performance, application of knowledge and understanding of their occupation in the workplace. There are several qualifications available:

**Level 2** Diploma in Project Control, Estimating, Planning and Cost Engineering.

**Level 3** Diploma in Project Control Practice,  
**Level 3** Diploma in Estimating Practice,

**Level 3** Diploma in Cost Engineering Practice,  
**Level 3** Diploma in Planning Practice.

**Level 5** Diploma in Project Control Practice,  
**Level 5** Diploma in Estimating Practice,

**Level 5** Diploma in Cost Engineering Practice,  
**Level 5** Diploma in Planning Practice.

Audience: Newcomers, existing and experienced project controllers

Duration: 12 months+



# PCWG create comprehensive standards for training

- A set of standards that detail the skills and knowledge needed
  - Comprehensive and detailed
  - Trainers and companies can use them to develop their own training
  - Training courses are quality reviewed and approved by ECITB on behalf of the industry
- Link to the vocational qualifications
  - Project controls, estimating, planning and cost engineering
  - Levels 2, 3 and 5

ID	Learning Outcome	ID	Enabling objectives and key learning points. <i>On completion of the training, the learner must be able to:</i>	Assessment Criteria links
1	Understand the processes for risk, opportunity and uncertainty management and analysis	1.1	Describe what risk is, its importance and the consequences of poor risk management, including: <ul style="list-style-type: none"> <li>a) Link between effective risk management and project deliverability</li> <li>b) Importance of assumptions</li> <li>c) Relationship between assumptions and risk</li> <li>d) Relationship between scope and contingency</li> <li>e) Importance of developing and maintaining a related stakeholder communication plan</li> </ul>	LO1.1 IO4.1
		1.2	Explain the characteristics of, definition* of and difference between the main terms used in risk management, including: <ul style="list-style-type: none"> <li>a) Risk</li> <li>b) Opportunity</li> <li>c) Threat</li> <li>d) Uncertainty</li> <li>e) Describing risk</li> </ul> <p>*Can be tailored for specific industries (touch on APM / PMI definitions as appropriate)</p>	
		1.3	Describe the key aspects of a risk management plan, including: <ul style="list-style-type: none"> <li>a) Defined process</li> <li>b) Regular monitoring</li> <li>c) Methodology</li> </ul>	IO3.4 LO1.1

# Raising the profile: real people, case studies

[www.ecitb.careers.org](http://www.ecitb.careers.org)

Accessible version Feedback?

**ecITB**  
Engineering Construction Industry Training Board

**Engineering your future**

The ECITB provides professional advice, information, skills development and qualifications to help individuals within engineering construction and anyone interested in a career within the industry to succeed. You can find out about careers in the engineering construction industry by selecting the most suitable option below:

- COMPLETED EDUCATION**  
I have recently left or will soon be leaving education and am interested in a career in the engineering construction industry
- CAREER PROGRESSION**  
I am interested in progressing from my current role in the engineering construction industry
- CHANGE OF ROLE**  
I am interested in transferring my current skills and experience into a role in the engineering construction industry
- INFORMATION**  
I would like to view information about the roles available in the engineering construction industry

**CASE STUDIES** (21 available)

- Kirsty Brown  
Planner
- Chris Seddon  
Head of Cost Control
- Peter Ogden  
Head of Planning

# New UK Government - apprenticeship reforms

- The 2012 Richard Review of Apprenticeships' reviewed how apprenticeships in England can meet the needs of the changing economy.
- The resulting 'implementation plan' set out the government's approach to changing apprenticeships based on the feedback received from the Richard Review consultation.
- In what is a major programme of reform, groups of employers (trailblazers) lead the way in carrying out the changes to apprenticeships, working together to design apprenticeship standards and assessment approaches to make them world class
- From 2017/18, all new apprenticeship starts will be in accordance with the new requirements
- The Trailblazer programme is committed to reaching three million apprenticeship starts in England by 2020.

 HM Government

## The Future of Apprenticeships in England

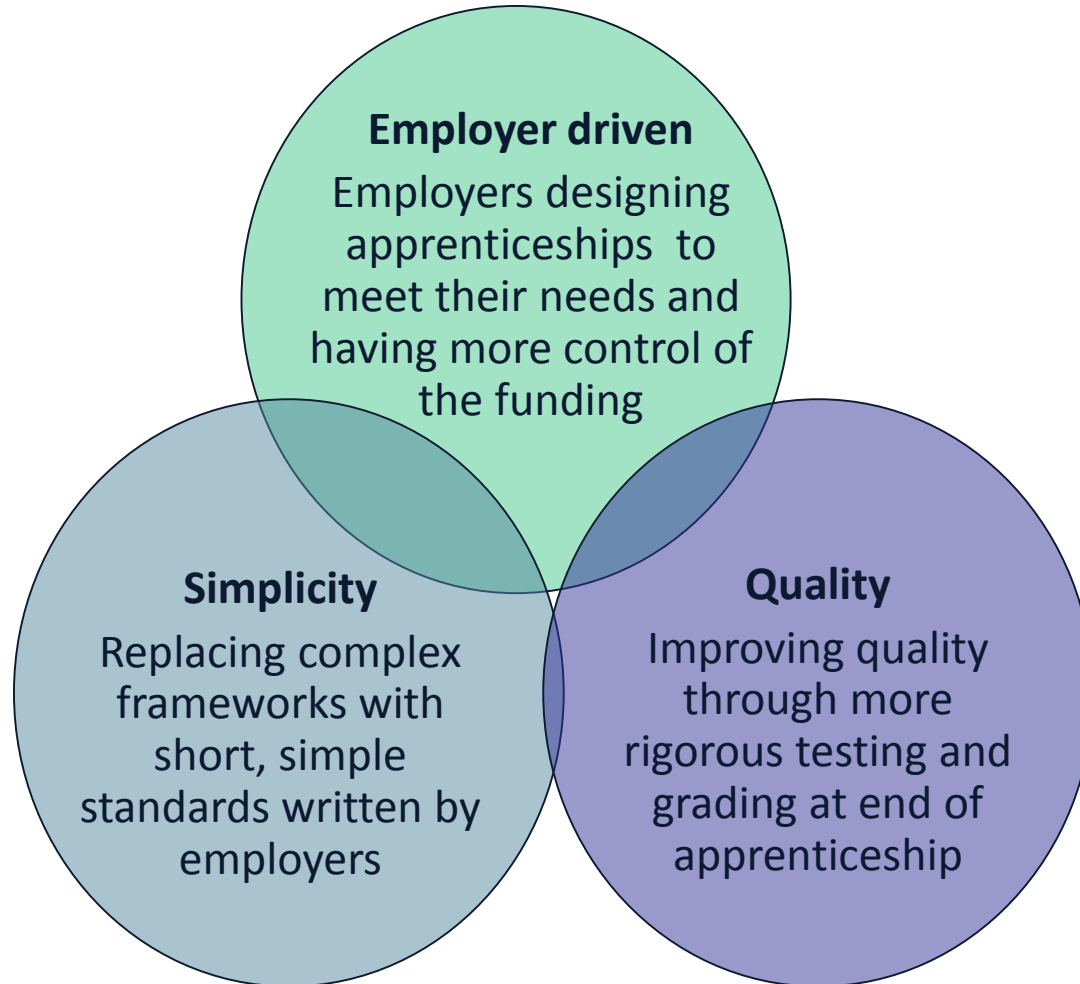
Guidance for Trailblazers – from standards  
to starts

December 2015

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# UK Government apprenticeship reforms

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## Great opportunity: Employer-led trailblazer group

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- Chaired by Costain PMO Director Shane Forth, the employer-led group includes **almost 50 employers** from oil, gas, nuclear, defence, water, highways and rail sectors, as well as professional and sector bodies (including ACostE and ECITB), academia, and training organisations
- The Project Controls Technician employer-led group satisfies the government requirement for the **need to involve small businesses** in the process (should normally mean at least two employers with fewer than 50 employees)
- Summary
  - The Project Controls Technician Standard (Level 3) was approved by the Minister on 14 June 2016
  - The End-Point Assessment has been submitted and is approved pending minor modifications
  - Launch of the Level 3 Project Controls Technician Apprenticeship (Level 3) is planned for 2017

# Great opportunity: our Employer-led trailblazer group

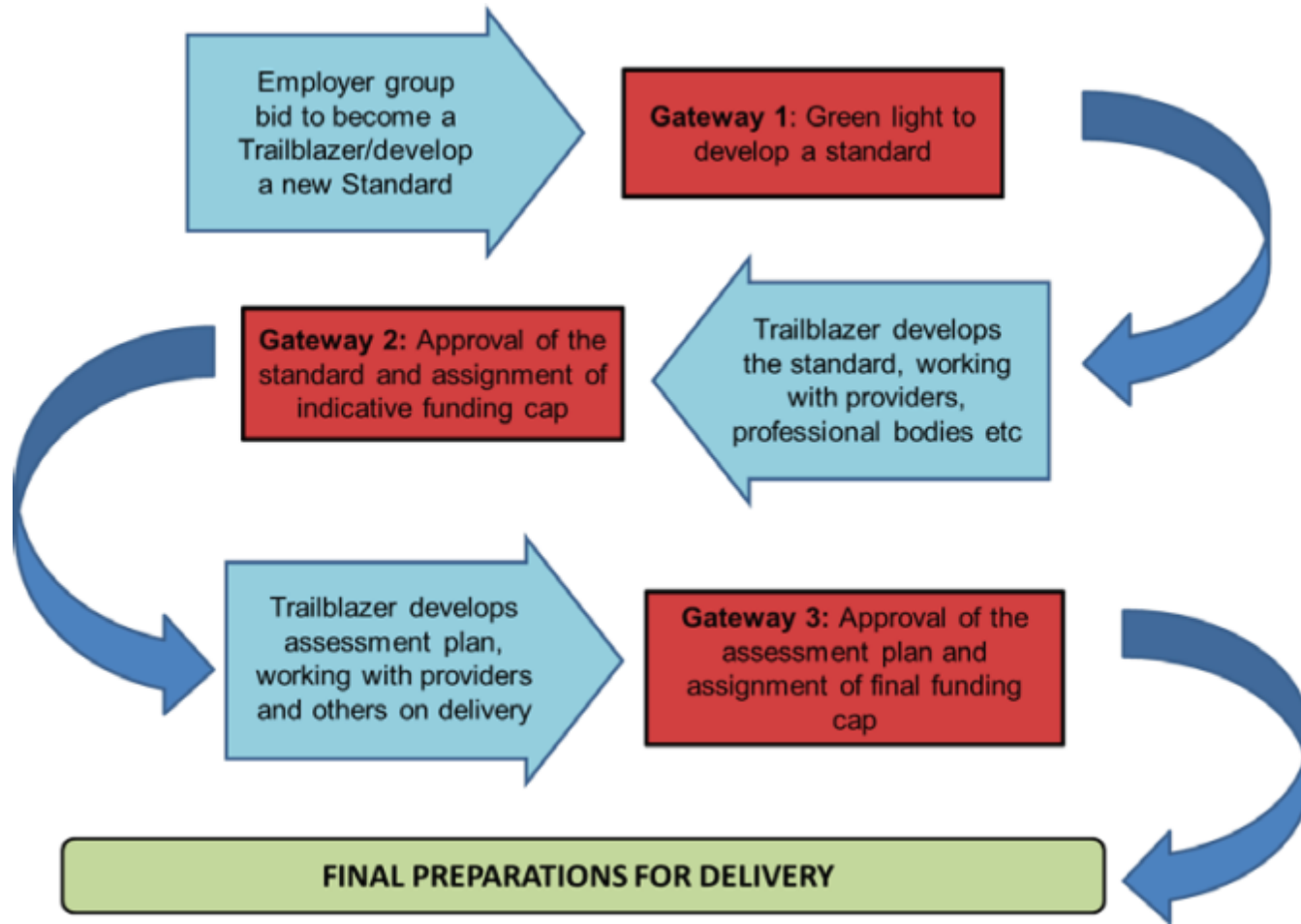
## PROJECT CONTROLS TECHNICIAN (LEVEL 3) TRAILBLAZER EMPLOYER GROUP LED BY COSTAIN

Lead Employer	<b>Costain</b>
Employers	Air Products, Aker Solutions, Alpha Plus, Alstom, AMEC Foster Wheeler, Atkins Global, Balfour Beattie, Bechtel, Bilfinger, Boulting, Cavendish Nuclear, CB&I, CH2MHill, Cordell Group, Crossrail, Decipher Group, Doosan, EDF Energy, Fabricom Engie, Fluor, HS2, Jacobs, KBR, LakerVent, Magnox, MOD, Mustang Engineering, Nichols UK, Petrofac, PJD Ltd, Prima UnO, PruceNewman, Quartzeltec, Scottish Water, Sellafield, Shepley Engineers, Siemens, Singleton Birch, Total, Transport for Greater Manchester, Transport for London, Turner and Townsend, Worley Parsons
Professional and Sector Bodies	ACostE, APM, BCECA, CECES, ECITB, Engineering Construction Institute, GAPPS, IRM, N-SAN. RICS
Academia	University of Manchester, Cumbria University, Leeds University, Loughborough University, Richmond College
Training Organisations	20/20 Business Group, ACSL, Gen2, Monitor Mpower, Project Controls Online, TASC
Consultants	Estimata, First Planner, Pathfinder Planning, Sunbeam
Government	BIS, HMRC

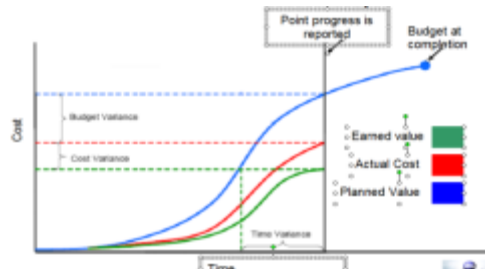
## Our Employer-led trailblazer group



# End-to-end process up to 'Go live'



# 20% off the job training



## ESTIMATE OF DIRECT MATERIALS & CONSTRUCTION MANHOURS

Subject: Steel Work

Location: Hutton Community Centre

Code	Materials	Purchased From	Cost per Item	Quantity	Total Cost	Time
2.5	Steel Girders	Cleveland Bridge	£3,491 (Fully Assembled)	4	£33,965	37.5 days
2.2.4	Crane	Werner Cost book	£53,000	1	£53,000	37.5 days
	Man Hours	Werner Cost book	£5,400	1	£5,400	37.5 days
					£12,365	37.5 days

Crafts	Resource Man Hours			No. of man	Hours per man	Hours per day	Hours per week
	No. of days	No. of weeks	No. of man hours for job				
Earth Works	20	4	640	4	160	8	40
Steel Erection	39	6	1872	6	312	8	40
Brick Laying	30	6	1440	6	240	8	40
Roof	22	5	880	5	176	8	40
Pipe work	23	5	1104	6	184	8	40
Joinery	20	4	720	3	240	8	40
Plumbing	20	4	720	3	240	8	40
Insulation	20	4	640	4	160	8	40
Electrical Insulation	43	8	1376	4	344	8	40
Swimming pool install	65	13	3120	6	520	8	40



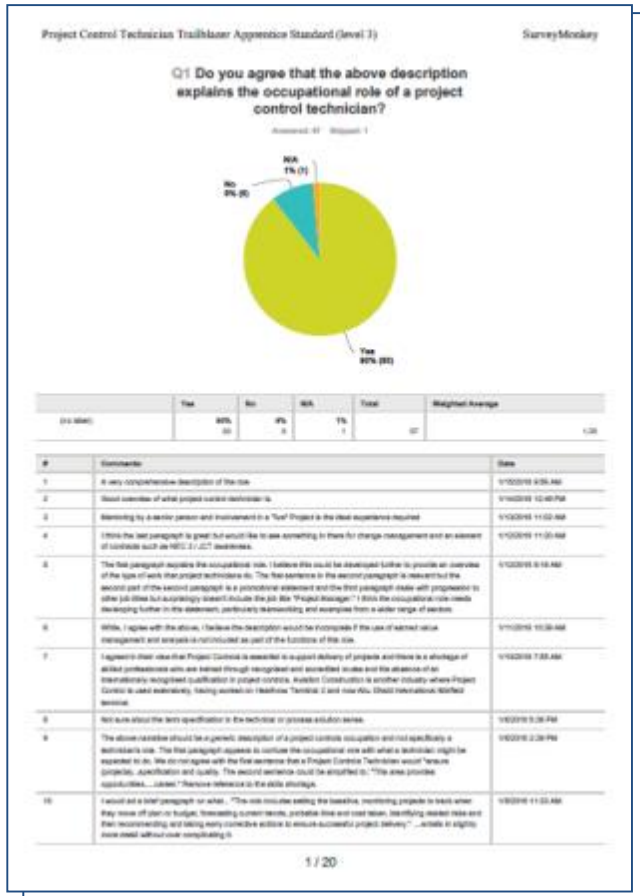
# Developing the level 3 Standard

KNOWLEDGE	SKILLS	BEHAVIOURS
<ul style="list-style-type: none"> <li>■ Project Controls</li> <li>■ Technical information:</li> <li>■ Estimating practice</li> <li>■ Planning and scheduling practice</li> <li>■ Cost engineering practice</li> <li>■ Work breakdown and coding structure</li> <li>■ Tracking data and progress reporting</li> <li>■ Analysis techniques</li> <li>■ Technical, engineering and mathematical principles</li> <li>■ Importance of safety</li> <li>■ Employer <del>organisation</del>, management systems, and procedures</li> <li>■ Commercial matters</li> <li>■ Project Controls related software and IT systems</li> </ul>	<ul style="list-style-type: none"> <li>■ Develop work breakdown and coding structures</li> <li>■ Manage data</li> <li>■ Estimate</li> <li>■ Schedule and plan</li> <li>■ Cost engineer and control</li> <li>■ Monitor progress/ performance and <del>analyse</del> data</li> <li>■ Use computer based technology</li> <li>■ Problem solve</li> <li>■ Effectively communicate</li> <li>■ Input to project closeout</li> <li>■ Observe and apply professional ethics</li> <li>■ Apply safety in the context of the role</li> </ul>	<ul style="list-style-type: none"> <li>■ Strong work ethic, takes personal responsibility for own work, meets deadlines, sets the right example for others and displays honesty and integrity</li> <li>■ Team player that shows sensitivity to others and works collaboratively demonstrating an openness to others' ideas and input</li> <li>■ Positive attitude, constructive thinking and able to adjust to change</li> <li>■ Attention to detail, with an enquiring mind, not afraid to ask questions, seek assistance or challenge</li> <li>■ Committed to advancing own learning and competence, showing a willingness to learn new skills</li> <li>■ Applies and upholds principles of social responsibility, environmental sustainability, equality and diversity</li> </ul>

# Developing the level 3 Standard - wider engagement

An online consultation ran for 4 weeks between December 2015 - January 2016

- All members on the Working Group list received an initial email in December and a reminder in January
- 1600 members of the ACostE were emailed and invited to comment
- The invitation to comment was extended to members of the Project Control Managers' Committee of BCECA (British Chemicals Engineering Contractors' Association)
- The survey was promoted via LinkedIn through Shane Forth (Costain) and ECITB regional networks
- 68 responses were received from 60 employers.
- 25% of respondents employed less than 250 people
- 88% of respondents directly employ project controllers.
- The working group (employers plus representatives of the main Professional Institutes) met on 19<sup>th</sup> January 2016 to review the feedback and comments and updated the draft Standard



# Level 3 Standard approved - June 2016

## Apprenticeship standard for Project Controls Technician

### 1. Occupation(s)

A Project Controls Technician controls, monitors and systematically analyses progress and performance data on engineering, manufacturing, construction and infrastructure projects. They require strong analytical skills and a practical approach to interpret technical information. They use specific, complex software tools to undertake a wide range of project controls tasks, including: identifying the right data for **acquiring** progress setting baseline targets; tracking progress and performance; forecasting trends; identifying, modelling and anticipating deviations from baseline; assessing the impact of design/construction changes; and using insight to recommend early preventative and remedial actions.

Project Controls includes the technical disciplines of estimating, planning, scheduling and cost engineering for which this apprenticeship gives a comprehensive grounding leading to roles such as project controller, estimator, planner, scheduler and cost engineer. Typically job holders work in large project teams on complex projects in sectors such as construction, manufacturing, engineering, energy and infrastructure – where detailed progress /performance tracking, and an understanding of on-site hazards, health and safety requirements and compliance is critical. This hands-on role is crucial to ensuring the successful delivery of complex projects and a shortage of skilled professionals provides opportunities for a secure, fulfilling long-term career.

2. Progression: With additional training the Project Controls Technician could also progress to more specialist roles in areas such as project controls, planning, scheduling, estimating, cost control, risk and quality and ultimately a role as project controls manager or director.

3. Suggested Entry Requirements: Set by individual employers, entry requirements will typically include a minimum of 5 GCSE grades A\* - C (or equivalent qualifications) including mathematics; English (Language).

4. Technical knowledge – the Project Controls Technician requires an understanding of:

- Project controls: the project life-cycle, breakdown structures, the relationship between time and cost, quality and risk, how project controls is critical to successful project delivery
- Technical information: how to review and interpret technical information from different sources e.g. engineering drawings, manufacturing plans or construction plans to develop the scope for control
- Estimating practice: classes of estimate, how to interpret technical requirements and specifications to develop the estimate, techniques for estimate development such as parametric, analogous, bottom-up.
- Planning and scheduling practice: difference between planning and scheduling, key terms and processes used to produce control schedules, how to interpret the technical requirements to produce a workable control schedule including development of logic networks, dependencies, critical paths, resource management, levelling and smoothing and impact of uncertainty and risk
- Cost engineering practice: key terms and processes related to preparing control budgets, cash flow, cost control and cost engineering relationships
- Work breakdown and coding structures: their purpose, how to create, use and interpret them to enable accurate control and the need for flexibility
- Tracking data and progress reporting: collection, validation and monitoring of data against plan, reviewing accuracy of reporting, how to tailor the presentation of data for understanding and buy-in
- Analysis techniques: how to identify trends and variances using techniques such as earned value analysis, forecasting, critical path analysis and risk analysis
- Technical, engineering and mathematical principles: what these are and how to apply them to support effective project controls within the context of the role
- Importance of safety: relevant engineering, construction and infrastructure specific knowledge including related national and industrial health, safety and environmental standards and legislation
- Employer organisation, management systems, and procedures: related governance including quality, change control, data management and security, configuration management, version control, risk analysis and management, and document control
- Commercial matters: how they impact on the role, the basics of contract and supply chain management
- Project controls related software and IT systems: attributes, limitations and systems used, in-house and proprietary applications used for: planning and scheduling, cost and risk analysis, estimating and progress and performance monitoring.

### 5. Technical skills - the Project Controls Technician is able to:

- Develop work breakdown and coding structures to meet the scope laid out in the projects' technical information and specification, ensuring that the controls will monitor project progress and performance accurately
- Manage data: source, retrieve, check, edit, format, record and **analyse** data – using it to create relevant time, cost and resource reports
- Estimate: develop cost estimates for defined scopes of work, create appropriate benchmarks, **analyse** quotes from sub-contractors and suppliers, and input to tenders and the early stages of projects
- Schedule and plan: break down the scope into activities to create a logical linked control schedule to input to the development of outline and integrated plans and baseline schedules; identify critical milestones; gather accurate progress data for controlling the schedule; and monitor progress
- Cost engineer and control: prepare control budgets, carry out cost control activities, gather and interpret cost data, monitor progress on a regular basis, interpret trends and forecasts; keep in line with contractual requirements, maintain baselines; ensure accurate reporting and control
- Monitor progress/performance and **analyse** data: associated with milestones, schedules, progress, manpower, resource and costs; undertake earned value analysis, create progress reports and identify variances from plan and likely consequences if no corrective action is taken
- Use computer based technology: model potential trends and resource use etc. using the right software package for the right task
- Problem solve: recommend early corrective actions to reduce variances, identify issues and risks, present and maintain related action plans and contingencies
- Effectively communicate: with good interpersonal skills and share the right information with the right people in an appropriate format to enable effective project control
- Input to project closeout: generate key benchmarks and outputs including lessons learnt
- Observe and apply professional ethics, and maintain a duty of care
- Apply safety in the context of the role: comply with relevant national and international health, safety and environmental requirements
- Work in accordance with company management systems, policies and procedures: especially those relating to quality, data security, risk, change and document management.

### 6. Behavioural

- Strong work ethic, takes personal responsibility for own work, meets deadlines, sets the right example for others and displays honesty and integrity
- Team player that shows sensitivity to others and works collaboratively demonstrating an openness to others' ideas and input
- Positive attitude, constructive thinking and able to adjust to change
- Attention to detail, with an enquiring mind, not afraid to ask questions, seek assistance or challenge
- Committed to advancing own learning and competence, showing a willingness to learn new skills
- Applies and upholds principles of social responsibility, environmental sustainability, equality and diversity.

7. Duration: The duration of this apprenticeship is typically 36-42 months.

8. Qualifications: Prior to taking the end-point assessment candidates must achieve level 2 English and maths and must attain a Level 3 Diploma in project control practice.

9. Level and Professional registration: This is a level 3 apprenticeship. On completion the apprentice can choose to apply for membership of the Association of Cost Engineers (ACoSE) as a Graduate Member. This standard is also designed to meet the professional standards of the Engineering Council for registration as an Engineering Technician (EngTech), gaining EngTech is subject to candidates having suitable engineering experience and undergoing a professional review process.

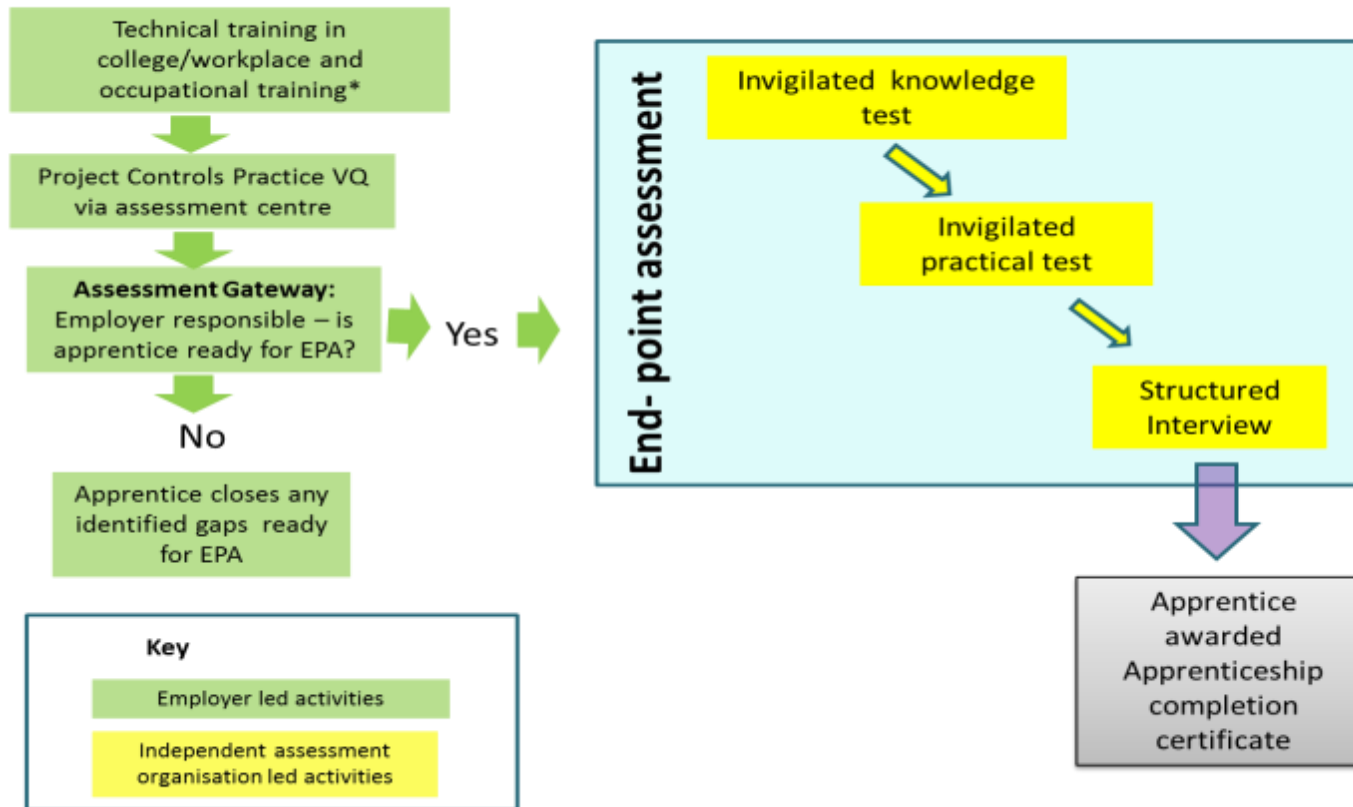
With further training following on from the apprenticeship, individuals may choose to specialise in specific sectors or related roles which could lead to membership of other related professional bodies.

10. Review date: This apprentice standard will be reviewed in 3 years.



# End-point assessment (EPA)

## Project Controls Technician apprenticeship overview



\* including achievement of L2 English and maths

# End-point assessment

## Knowledge test

Technical knowledge

Multiple choice, simple and complex

Online, invigilated, controlled environment, closed book

90 mins max

25% of overall grade

## Practical test

Technical skills

Analysis, interpretation and communication of data

Written, invigilated, controlled environment, closed book

120 mins

50% of overall grade

## Structured interview

Technical KSBs

Application of KSBs and understanding of PCT occupation

Face to face, minimum 2 independent assessors, optional Employer rep

60-80 mins

25% of overall grade

# End-point assessment

## EPA grading

**Knowledge test:** awarded a passmark and grade. 25% weighting

**Practical test:** awarded a passmark and grade. 50% weighting

**Structured interview:** awarded a passmark and grade. 25% weighting

**Final grade calculation** = passmarks x weighting = final mark  
= mark and grading rules applied = final grade

## Final grade awarded

Fail

Less than  
65%

Pass

>65%

Must pass all 3  
elements as a  
minimum

Merit

>75%

Must have a  
merit in the  
practical

Distinction

>85%

Must have a  
distinction in  
the practical

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# Benefits

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*“Jonathan has worked well and excelled at the planning tasks. Recent estimating experience will be valuable to him. I have no doubt he will go from strength to strength.”*



*“Highly intelligent and self assured. Quickly exceeded expectations. Comfortable with responsibility and delivers promptly. Emily has the potential to advance far.”*



*“Many Thanks for your input and assistance over the last four months. Hope you enjoyed the experience. Good luck at Invista - I'm sure you will do very well in the future.”*



*“Josh has been exposed to a number of areas of the business. He is currently producing weekly earned value progress reports for a number of Engineering projects*



*“I have been delighted with Eve’s attitude, performance and output during her time with estimating. She has far exceeded my expectations of a project control apprentice.”*

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# Benefits

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## Driving forwards: higher level apprenticeship

- Building the training pathway
- At the 6th meeting of our employer-led group in October 2016, we agreed prepare a higher level project controls trailblazer
- A core and options approach
- For project control managers supervising multi-disciplined project controls teams
- For specialist practitioners in
  - planning
  - cost estimating
  - cost control
- A proposal will be submitted to DfE for the higher apprenticeship in Q1 2017



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## Driving forwards: linking with Professional bodies

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Represent the professional interests of those with responsibility, at all levels, for the prediction, planning and control of resources and cost for activities that involve engineering, manufacturing, and construction.

Benefits include professional recognition, networking opportunities, access to knowledge resources and much more. [Read more](http://www.acoste.org.uk)  
[www.acoste.org.uk](http://www.acoste.org.uk)



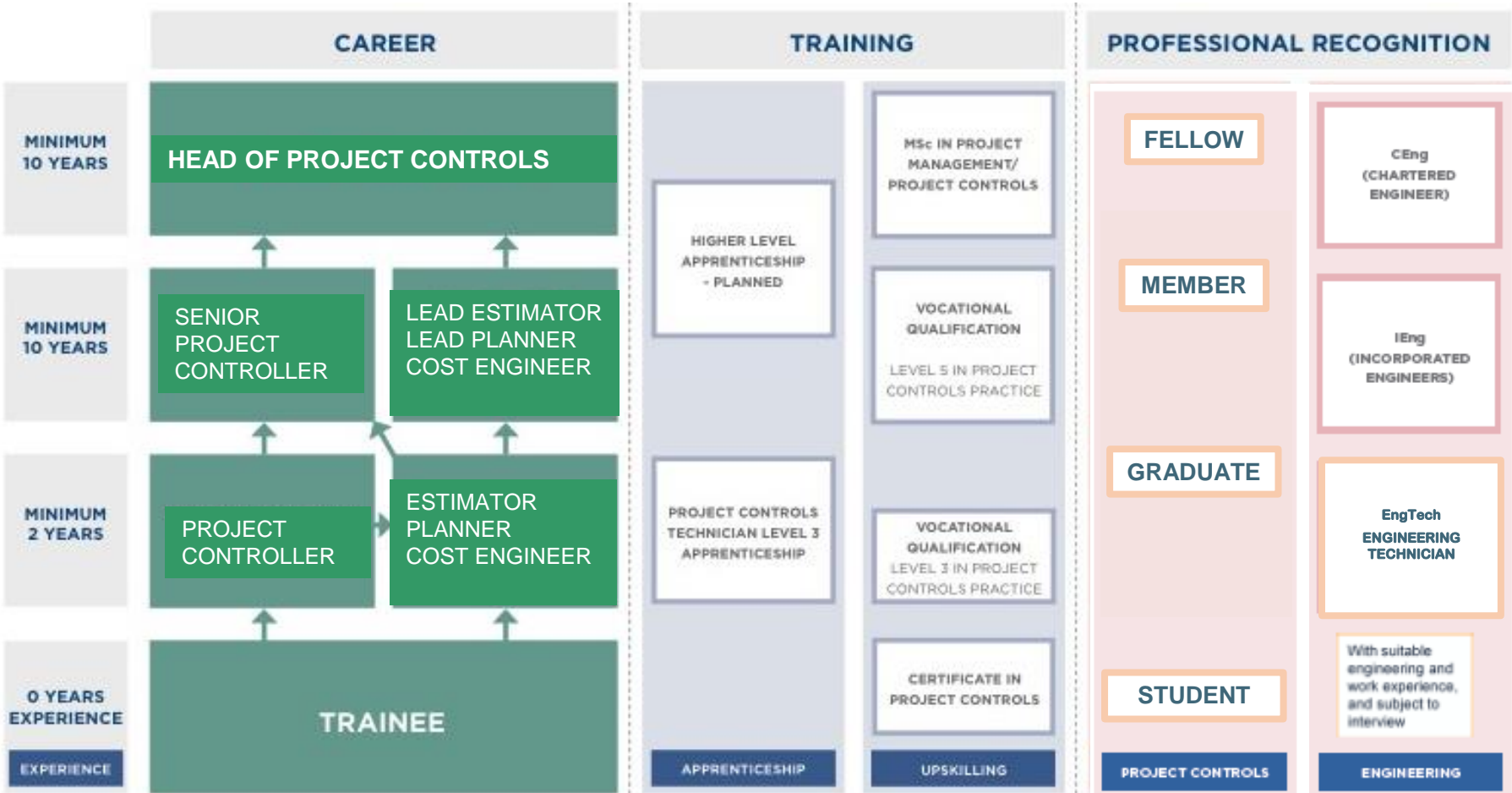
Committed to developing and promoting project and programme management through its [FIVE Dimensions of Professionalism](#):  
[membership](#),  
[qualifications](#),  
[events](#),  
[publications](#),  
[online services](#).



the UK regulatory body for the engineering profession. Holds the national registers of 222,000 Engineering Technicians (EngTech), Incorporated Engineers (IEng), Chartered Engineers (CEng) and Information and Communications Technology Technicians (ICTech).

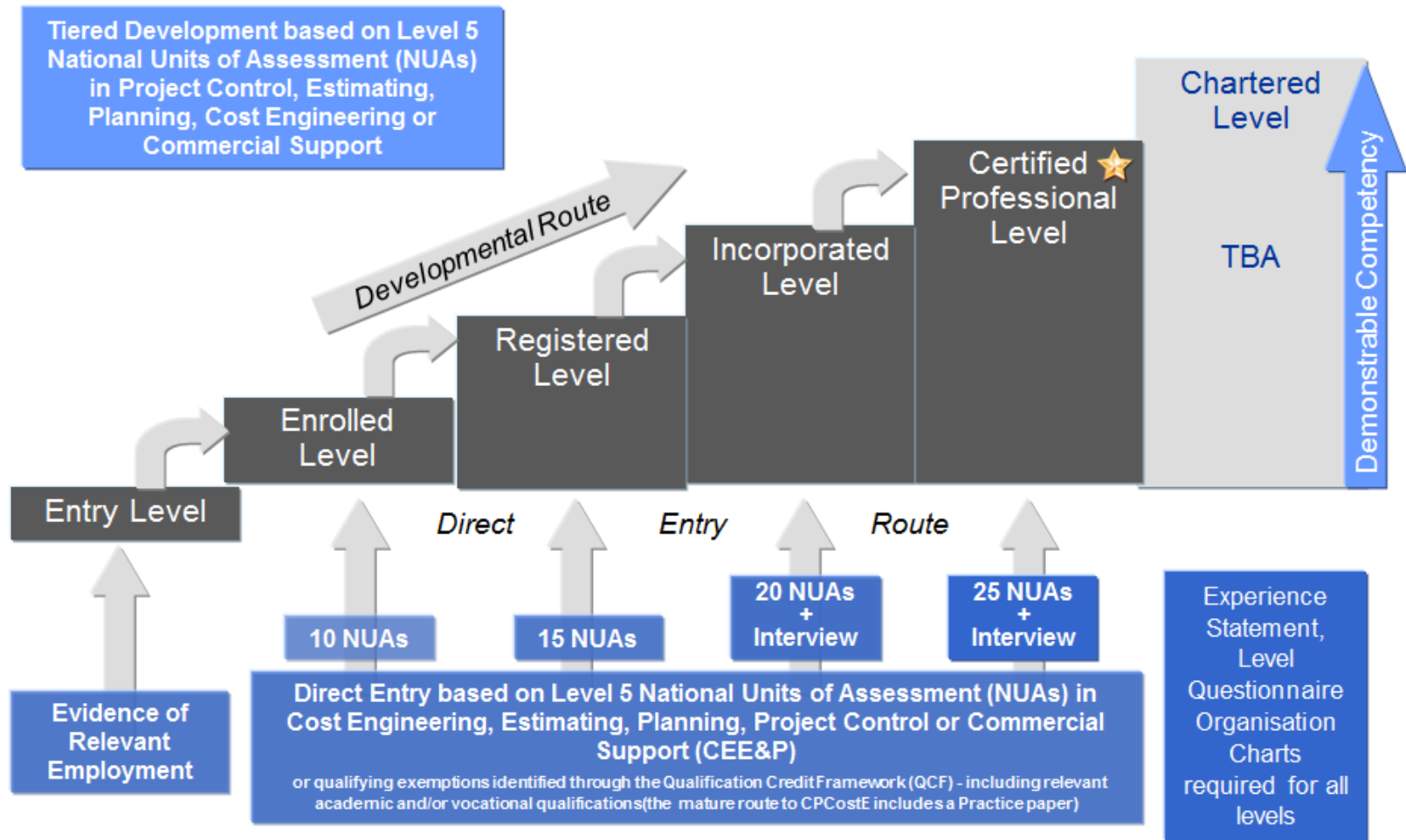


# Driving forwards: building the career, skills and professional pathways





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## Driving forwards: building the career, skills and professional pathways

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- Professional recognition of the skillset offered to UK Plc by Project Control Professionals remains the key objective of the ACostE
- Whilst ACostE have the ability to offer a route to Chartered status through their registration with the Engineering Council, this is reserved for those project controllers with a recognised engineering degree
- ACostE are preparing a submission to the Privy Council that will enable them to become a Chartered Organisation and afford members of the Association working in Estimating, Planning and Scheduling, Cost Engineering and other roles the professional standing that they deserve

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## Driving forwards: maintaining momentum

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- Raising the profile of the profession
- Project controls as a rewarding, long-term career
- Awareness of the skills and professional pathway
- Increase those with nationally recognised qualifications in project controls
- Expanding the reach of the working group
- Encouraging investment in project controls training and apprenticeships
- Development of a project controls certificate tailored for nuclear companies
- Closer links to and with professional bodies

Work with us



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